डेडीकेटेड फ्रेट कोरीडोर

Tender No. DFC_ADI_ENG_RR_PNUN

For

Construction of Running Room at New Palanpur Junction under CGM, DFCCIL, Ahmedabad Unit.

(PARTICIPATION THROUGH E-TENDER ONLY)

Visit:- www.ireps.gov.in/ itslink at www.dfccil.com

(Help Desk of IREPS : 011-23761525)

TECHNICAL BID
(PACKET-A)

TENDER DOCUMENT
June-2023

Employer:

DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LIMITED
CGM-AHMEDABAD UNIT
(A GOVERNMENT OF INDIA ENTERPRISE)
UNDER MINISTRY OF RAILWAYS

INDEX

Instructions to bidders for online bidding

Important instructions to Tenderer(s) before submitting their tenders online.

General: - All bidders must note that this being E-tender, bids received only through online on E-tendering portal **http://www.ireps.gov.in** shall be considered as a valid offer. Any bid submitted in paper form will not be received and opened and shall be summarily rejected. E-tendering site- https://www.ireps.gov.in / its link at www.dfccil.com (Help desk of IREPS: 011 -23761525). The tenderer/bidders must have Class-III Digital Signature Certificate & must be register on IREPS portal. Only registered tenderer/bidders can participate on e-Tendering. All relevant documents must be uploaded at the time of participating in e-Tendering.

The bidder must ensure that the tender document submission before the closing time as the tender submission shall stop accepting the offer at prescribed date and time.

1. **Online Bidding Methodology:**

   Online Bid System

2. **Broad outline of activities from Bidders perspective:-**

a. Procure a Digital Signing Certificate (DSC)

b. Register on Electronic Tendering System (ETS)

c. Create Users and assign roles on ETS

d. View Notice Inviting Tender (NIT) on (ETS)

e. Download Official copy of Tender Documents from ETS.

f. Clarification to Tender Documents on ETS - Query to DFCCIL (Optional) - view response to queries posted by DFCCIL through addenda.

g. Bid Submission on ETS: Prepare & arrange all documents/paper for submission of bid online and tender fees deposit through E-Payment gateway.

h. Attend Public Online Tender Opening Event (TOE) on ETS.

i. Post TOE clarification on ETS (Optional). Respond to DFCCIL's post - TOE queries.

For participating in this tender online, the following instructions are to be read carefully. These instructions are supplemented with more detailed guidelines on the relevant screens of the ETS.

3. **Digital Certificate:**

For integrity of data and its authenticity/ non repudiation of electronic records and to be compliant with IT Act 2000, it is necessary for each user to have a Digital Certificate (DC) also referred to as Digital Signature Certificate (DSC) of class III issued by a Certifying Authority (CA) licensed by Controller of

Certifying Authority (CCA) (refer http://www.cca.gov.in).

4. Registration:

The Tender documents can be downloaded from the website: https://www.ireps.gov.in and to be submitted in the e-format. Cost of the Tender Documents and EMD have to be submitted only through online payment modes available on IREPS portal like net banking, debit card, credit card etc. Manual payments through Demand draft, Banker's cheque, Deposit receipts, FDR etc. are not allowed. Payments against this tender towards tender document cost and earnest money are to be deposited /submitted before the schedule date & time of submission of the tender otherwise the Bid will not be considered. Amendments, if any, to the tender document will be notified in the above website as and when such amendments are notified. It is the responsibility of the bidders who have downloaded the tender documents from the website to keep themselves abreast of such amendments before submitting the tender documents.

Intending bidders are requested to register themselves on IREPS portal through https://www.ireps.gov.in for obtaining User ID and Password by paying Vendor registration fee and processing fee for participating in the above-mentioned tender.

"Vender Manual" containing the detailed guidelines for E-Tendering is available on www.ireps.gov.in

5. DFCCIL has decided to use process of E- Tendering for inviting this tender and thus the physical copy of the tender documents would not be sold/ accepted.

i) Amendments, if any, to the tender document will be notified in the above website as and when such amendments are to be notified. It is the responsibility of the Tenderer who has downloaded the tender documents from the website to keep themselves abreast of such amendments and attach all the addendum/addenda/corrigendum/corrigenda (if any) duly signed along with the submission of the tender documents.

ii) To participate in the E-bid submission, it is mandatory for the Bidders to get themselves registered with the IREPS (www.ireps.gov.in) and to have User ID and Password.

6. Bank Account Details of DFCCIL

Name	CGM DFCCIL, Ahmedabad
Bank account number	312601010330681
IFSC code	UBIN0546836
Bank Name	Union Bank of India
Bank Branch	Moti Bagh, New Delhi
GST No.	24AACCD4768M1ZB

7. DOCUMENTS ESTABLISHING BIDDER'S ELIGIBILITY A N D QUALIFICATION AS PER BID:-

The bidder shall furnish, as part of his bid document establishing the bidder's eligibility. All these documents should be numbered and should be signed by bidder in each page.

7.1 Tender fee & EMD has to be deposited through e-payment only. The tender processing fees as per applicable rate payable through the e-payment gateways to IREPS portal is Non-refundable. Payments against this tender towards tender document cost and earnest money are to be done before the schedule date & time of submission of the tender otherwise the Bid will not be considered.

7.2 Each page of the tender papers is to be digitally signed by the tenderers or such person/s on his/their behalf that is/are legally authorized to sign for him / them.

7.3 Copy of PAN card.

7.4 The authenticated copy of registered partnership deed and registration of the firm from registrar of firm in case of partnership firm.

7.5 In case of proprietorship firm bidder will submit an affidavit, attested by Notary Public that "I am a sole proprietor of the firm _____ in case of _____ proprietorship firm on Non judicial stamp paper.

7.6 Bidder's profile duly filled in, as per tender document.

7.7 Power of Attorney for signing the Application. If applicable, the Power of Attorney for Lead Member of JV;

7.8 Article of association and memorandum in case of private/public limited company.

7.9 Copy of E.P.F. registration.

7.10 Copy of ESI Certificate.

7.11 Copy of GST registration no.

7.12 Certificate for non near relative in DFCCIL.

7.13 Memorandum of Understanding (in case of JV) as per Form-9 (Part-IV, Chapter- II of BID DOCUMENT.)

Note: - (i) Any discrepancy found in the downloaded tender document submitted by the bidder compared to uploaded tender document, the tender document uploaded by the DFCCIL will be treated as valid and any changes (found in the tender document submitted by the bidder) at any stage, will be treated as fraud done to the DFCCIL, and will be liable to cancellation of agreement done (if any) & appropriate action will be taken against the bidder.

(ii) While submitting the Tender Online the Tenderer shall read the terms & conditions and accept the same in order to proceed further to submit their Tender.

8. The following "FOUR KEY INSTRUCTIONS for BIDDERS" must be assiduously adhered to:

1. Obtain individual Digital Signing Certificate (DSC or DC) well in advance of your first tender submission deadline on ETS.
2. Register your organization on ETS well in advance of your first tender submission deadline on ETS.

3. Get your organization's concerned executives trained on ETS using online training module well in advance of your tender submission deadline on ETS.
4. Submit your bids well in advance of tender submission deadline on ETS (DFCCIL should not be responsible for any problem arising out of internet connectivity issues).

9. Modification / Withdrawal of bids:

(i) The Bidder may modify/ withdraw its e- bid after submission prior to the Bid Due Date & time. No Bid shall be modified / withdrawn by the Applicant on or after the Bid Due Date
& time.

(ii) Any alteration/ modification in the Bid or additional information supplied subsequent to the Bid Due Date, unless the same has been expressly sought for by the Authority, shall be disregarded.

(iii) For modification of e-bid, applicant has to detach its old bid from e-tendering portal and upload / resubmit digitally signed modified bid.

(iv) For withdrawal of bid, applicant has to click on withdrawal icon at e-tendering portal and can withdraw its e-bid.

10. **Method for submission of bid documents**

In this TENDER, the Tenderer has to participate in e-Tendering online. Tender Document fee & EMD in respect of e-tendering should accept through net banking or payment gateway only before the schedule date.

Note: The Bidder has to upload the Scanned copy of all required above said documents during Online Bid submission.

Other instructions

a) It is recommended that the Tenderer/vendor should visit the portal (ireps.gov.in), peruse the information provided under the relevant links and login to it and upload documents of bid.

b) DFCCIL reserves right to cancel the tender before submission / opening of tender, postpone the tender submission / opening date and to accept / reject any or all tenders without assigning any reason thereof. DFCCIL's assessment of suitability as per eligibility criteria shall be final and binding.

c) Information as required as per various Forms/Annexures to tender document should be submitted by the tenderers without fail strictly as per formats.

11. OPENING AND EVALUATION OF BIDS:

(i) Opening of Bids will be done through online process.
(ii) For participating in the tender, the authorized signatory holding Power of Attorney shall be the Digital Signatory. In case the authorized signatory holding Power of Attorney and Digital Signatory are not the same, the bid shall be considered non-responsive.

The DFCCIL Authority shall open bid documents received in electronic form at the

scheduled date and time of opening of tender i.e. in the presence of the Bidders who choose to attend.

The DFCCIL Authority will subsequently examine and evaluate the Bids in accordance with the provisions set out in the BID DOCUMENTS.

PART- I
Chapter I

NOTICE INVITING TENDER

PART- I
Chapter I

NOTICE INVITING TENDER E TENDER

Dear Sir,

Name of Work: **Construction of Running Room at New Palanpur Junction under CGM, DFCCIL, Ahmedabad Unit.**
Office of the Chief General Manager, Dedicated Freight Corridor Corporation of India Limited, OCC Building, 'D' Cabin Road, Sabarmati, Ahmedabad-380019, Gujarat, invites tenders in prescribed forms from firms/ Companies/ Joint Ventures (If Applicable) having requisite experience and financial capacity for execution of the following work:

	Table 1			
S. No.	Name of work	Tender cost (Rs)	Earnest money (Rs)	Completion Period
1.	**Construction of Running Room at New Palanpur Junction under CGM, DFCCIL, Ahmedabad Unit.**	**16,74,78,972/-**	**33,49,600/-**	**10 months**

1.1.1 Eligibility shall be assessed on applicants, fulfilling the technical capability and competence as well as for financial and organizational resources as specified in clause no. 1.3.13 (i) A & B of Preamble and General instruction to tenders (Part-I, Chapter III).

2 The tender documents for this work can be downloaded from website **www.ireps.gov.in, www.dfccil.com**, and Central Procurement Portal, **eprocure.gov.in**. and offer of the same shall be uploaded only in the website **www.ireps.gov.in**. The tenderers shall carefully study the conditions given below and submit the offers accordingly, failing which the offers are liable to be not considered:

3 A master copy of the document downloaded from the website mentioned above shall be kept in the office of the tender inviting authority. In case of any discrepancy between the tender document downloaded from the website and the master copy, the latter shall prevail and shall be binding on the tenderer. The offer received shall be deemed to have been submitted on the document as uploaded and appearing in the website mentioned above whose master copy is kept in the office of the tender inviting authority and the agreement shall also be prepared on the basis of master document kept in the office of tender inviting authority.

4 The cost of tender document (tender fee) as mentioned in the notice inviting tender on website www.ireps.gov.in, should be accepted through net banking on payment gateway. The cost of tender document shall not be clubbed with the earnest money deposit. The tenders unaccompanied with the requisite cost of tender documents in

appropriate form shall not be considered or as per instruction given on website www.ireps.gov.in.

5 The tenders shall be filled up after careful study of the documents and the site and any clarification required may be obtained from the tender inviting authority.

6 The tenderers downloading the documents from internet must keep themselves updated through the website from which the tender document is downloaded regarding corrigenda, if any, to the notice inviting tender or the tender document, which shall be uploaded in the same website. The offers received without such corrigenda published through website shall be liable to be rejected.

7 Any wilful changes/deletion/addition in printing carried out in the tender documents shall be viewed very seriously, whether detected at the time of opening/award of tender or after award of work and the same may result in penal action including banning of further business with the defaulting tenderers. In addition, the tenderers are liable to be prosecuted for the same as per law.

8 **I/We certified that I/we am/are not black listed or debarred by Railways or any other Ministry/Department of the Government of India/State Government from participation in tenders/contract on the date of opening of tenders/bids.**

1.1.3 E-Tenders shall be opened online at the time and given date as per NIT.

Section -2
Instructions to Bidders (ITB)

2.0 SUBMISSION OF E-TENDER: -

2.1 Tender Document Obtaining Process

2.1.1 It is mandatory for all Tenderers to have Class-III Digital Signature Certified from any of the Licensed Certifying Agencies ('CA') to participate in E-Tendering of DFCCIL, (Tenderer can see the list of Licensed CAs from the link www.cca.gov.in), in the name of the person who will submit the Online tender and is authorized to do so.

2.1.2 To participate in E-Tender, it is mandatory for Tenderers to get themselves registered with the IREPS (www.ireps.gov.in) and to have User ID and Password.

2.1.3 www.ireps.gov.in is the only website for submission of tender. 'Vender Manual' containing the detailed guidelines for E-Tendering is available on www.ireps.gov.in.

2.1.4 A master copy of the document downloaded from the website mentioned above shall be kept in the office of the tender inviting authority. In case of any discrepancy between the tender document downloaded from the website and the master copy, the latter shall prevail and shall be binding on the tenderer. The offer received shall be deemed to have been submitted on the document as uploaded and appearing in the website mentioned above whose master copy is kept in the office of the tender inviting authority and the agreement shall also be prepared on the basis of master document kept in the office of tender inviting authority.

2.2 The tenderers downloading the documents from internet must keep themselves updated through the website from which the tender document is downloaded regarding corrigenda, if any, to the notice inviting tender or the tender document, which shall be uploaded in the same website. The offers received without such corrigenda published through website shall be liable to be rejected.

2.3 The cost of tender document (tender fee) as mentioned in the notice inviting tender on website **www.ireps.gov.in**, should be accepted through net banking on payment gateway. The cost of tender document shall not be clubbed with the earnest money deposit. The tenders unaccompanied with the requisite cost of tender documents in appropriate form shall not be considered or as per instruction given on website www.ireps.gov.in.

2.4 The tenders shall be filled up after careful study of the documents and the site and any clarification required may be obtained from the tender inviting authority.

2.4.1 The detailed instructions of e-tendering can be read through website www.ireps.gov.in

2.4.2 The Addendum/Corrigendum, if any; shall be hosted on the website www.ireps.gov.in

2.4.3 The tender will be accepted only in e-tendering mode and no other mode of submission shall be accepted.

2.4.4 The supporting documents for all Eligibility Criteria, JV (If applicable) etc. are essentially required to be uploaded on the website www.ireps.gov.in.

2.4.5 Tenderers are required to give Un-Conditional Offers. A Conditional Offer is liable to be rejected. DFCCIL reserves the right to modify, expand, restrict, scrap, reject and re-float tender without assigning any reasons whatsoever.

2.5 The Tenderers shall closely peruse all the clauses, instructions, terms and conditions, scope of work, specification etc. as indicated in the Tender Document before quoting the offer.

2.6 Bid Document shall be accompanied by all the documents required to be submitted as specified in the Tender Document along with all Addendums and Corrigendum.

2.7 All Bids shall be submitted in accordance with the instructions contained in the Tender Document (Bid Document). Non-compliance of any of the instructions contained in the Tender Document is liable in Bid being rejected.

2.8 After award of contract to the Successful Contractor, if it is observed that there is any discrepancy or ambiguity about any terms and conditions mentioned in the Tender Document, the interpretation of same given by DFCCIL shall be considered as final and binding.

2.9 Contractor may visit the site on any working day to assess the Scope of Work before submitting their offer.

2.10 Completed tender documents should be uploaded on or before the date and time of closing of tender specified in the NIT and tender document.

2.11 Any tender received without Earnest money and cost of tender documents in the form as specified in the tender documents shall not be considered and shall be summarily rejected.

2.12 DFCCIL reserves right to cancel the tender before submission /opening of tender, postpone the tender submission/ opening date and to accept/reject any or all tenders without assigning any reason thereof. DFCCIL's assessment of suitability as per eligibility criteria shall be final and binding.

2.13 Tenderers may note that they are liable to be disqualified at any time during tendering process in case any of the information furnished by them is not found to be true. EMD of such tenderers shall be forfeited. The decision of DFCCIL in this regards shall be final and binding.

2.14 Information as required as per various Forms to tender document should be submitted by the tenderers without fail strictly as per formats provided.

2.15 The validity of offer shall be 60 days from the date of opening of the tender.

** ** **

PART - I
Chapter II

GENERAL INFORMATION / DATA SHEET

PART - I
Chapter II
GENERAL INFORMATION/DATA SHEET

Tender No.	**DFC_ADI_ENG_RR_PNUN**
Name of the work	**Construction of Running Room at New Palanpur Junction under CGM, DFCCIL, Ahmedabad Unit.**
Tender Value	**Rs. 16,74,78,972/-**
Completion Period	**10 months**
Earnest Money	**Rs. 33,49,600/-**
Cost of Tender Document	**Rs. 11800/- (10,000 + 18% GST)** Rs. 10,000/- (Rs. Ten Thousand only) + 18 % GST 11,800/- to be paid online through payment gateway provided at **www.ireps.gov.in** payable **in favour of "Dedicated Freight Corridor Corporation of India Limited, Ahmedabad**"
Bidding Start Date	**23.06.2023**
Bidding closing Date and Time	**07.07.2023 up to 16:00 Hrs**
Date and Time of Opening of Tender (Technical Bids - Packet A)	**07.07.2023 up to 16:00 Hrs**
Date and Time of Opening of Financial Bid -Packet B	**Will be notified to bidder qualified in Technical bid and also posted on** www.ireps.gov.in
E-Tendering Web site Address:	www.ireps.gov.in www.ireps.gov.in/ itslink at www.dfccil.com (Help Desk of IREPS : 011-23761525) For any clarification, help and registration for E- Tendering & matter relating to Digital Signature, contact at Help Desk.
Validity of offer	60 days
Security Deposit	5 % of Contract Value
Performance Bank Guarantee	Performance Guarantee (PG) have to be submitted within 21(thirty) days from the date of issue of Letter Of Acceptance (LOA), amounting to 3% of the contract value in the form as give in clause 16.(4) of GCC.
Office Address	Office of the **Chief General Manager, Dedicated Freight Corridor Corporation of India Limited, OCC Building, 'D' Cabin Road, Sabarmati, Ahmedabad-380019, Gujarat**

PART- I
Chapter- III

PREAMBLE & GENERAL INSTRUCTION TO TENDERERS

PREAMBLE &GENERAL INSTRUCTIONS TO TENDERERS

1.3.1 Introduction

(i) General

Dedicated Freight Corridor Corporation of India Ltd. (DFCCIL), a public sector under taking has been set up under the Indian Companies Act, 1956 for implementation of Dedicated Freight Corridor Project. Government of India is the sole shareholder of the DFCCIL.

Ministry of Railways (MOR), Government of India has planned to construct Dedicated Freight Corridor (DFC) covering about 3338 route Kilometres on Eastern and Western Corridors. The coverage of Eastern Corridor is from Ludhiana to Dankuni and Western Corridor is planned from Jawaharlal Nehru Port, Mumbai to Rewari /Tughlakabad /Dadri near Delhi. There will be a linkage between two corridors at Dadri.

(ii) Dedicated Freight Corridor

Eastern DFC Route will be approximately 1839 Km long from Dankuni to Ludhiana via Dankuni – Asansole – Dhanbad – Gaya – Sonnagar - Mughalsarai - Allahabad - Kanpur - Tundla - Aligarh - Khurja - Bulandshahr – Meerut – Saharanpur – Ambala - Ludhiana.

Western DFC Route will be approximately 1520 Km long from Dadri to JNPT via Rewai – Iqbalgarh - Vadodara- JNPT.
Proposed alignment of DFC has been generally kept parallel to existing Indian Railway line except provision of detours at some stations where the existing yards/cities are congested . Level Crossings (LC's) are generally unsafe locations and also a congestion points for road/rail"s users. These LC's are operational bottlenecks for Railways /DFCCIL in terms of loss in punctuality and reduction in line capacity..

(iii) Scope of Work

On behalf of MD DFCCIL, Office of the Chief General Manager, Dedicated Freight Corridor Corporation of India Limited, OCC Building, 'D' Cabin Road, Sabarmati, Ahmedabad-380019, Gujarat, herein after referred to as 'DFCCIL' is inviting e-tenders from Firms/ Companies/Joint Ventures having requisite experience and financial capacity for execution of the following work:

"Construction of Running Room at New Palanpur Junction under CGM, DFCCIL, Ahmedabad Unit."

(a) The proposed work for construction of Running Room as per approved drawing, design, specification and as instructed by representative of DFCCIL i.e. Executive/JPM/Dy.PM/PM of the section.

(b) It is proposed to construct a Running Room at New Palanpur (PNUN) with approximate 100 bed capacity, having approximate 3500 to 4000 Sqm. built up area on available land plot size approximately 120 m X 30 m.

(c) Running Room at New Palanpur (PNUN) shall be constructed for provision of 100 beds for the crew, having Ground + 3 floors, with future provision of expansion for 200 bed capacity.
(d) Ground floor to have Reception, Crew Longue with modern facility, Housekeeping facility, Laundromat etc.
(e) Individual bed with partition & common balcony.
(f) Common wash rooms, WC with 50% Indian style etc.
(g) Separate Rooms with attracted washroom for female crew at ground floor.
(h) Rain water harvesting system, Fire fighting System, Parking Shed.

(i) There will be provision of minimum 6 person capacity lift with spacious stair case.

(j) All room having sufficient capacity of AC, provision of internet, telecom facilities proper CCTV arrangement etc.
(k) Scope of work is as per the requirements given as per Drawing/ Plans/ Design etc. however, DFCCIL reserves right to addition/alteration at their own discretion without assigning any reason and contractor is bound to carry out the work.

(iv) **Cost of the work:** The estimated cost of the work is shown as per NIT **which includes GST Rs. 16,74,78,972/- (Including GST)**

(v) The tenderer shall be governed by General Conditions of Contract (GCC), Preamble and General Instructions to Tenderers (ITT) and Special Conditions of Contract (SCC). Wherever, there is a conflict in any condition between GCC and Special Conditions of Contract mentioned in the tender documents, the condition mentioned in Special Conditions of Contract will prevail. However, decision of DFCCIL in this connection shall be final and binding to contract.

Part I, Chapter-IV and V of the tender document contains General Conditions of Contract and Special Conditions of Contract specific to this work and shall be applicable in the contract.

(vii) **Location**
Works shall be executed in the jurisdiction of Chief General Manager/ DFCCIL/Ahmedabad Unit. However, DFCCIL reserves right to change the site of work anywhere in adjacent / adjoining area of the work defined in Para 1.3.1 (iii) above in the jurisdiction and the contractor shall be bound to execute the work without any extra cost.

1.3.2(a) Tender Bid

The Tender Bid shall be submitted in online mode through website www.ireps.gov.in.
Packet - A

Eligibility/Qualifying element of the Tender Bid along with other documents mentioned in para 1.3.2 (b) 6 (i), here in after called “TECHNICAL BID “

Packet - B

Price elements of the Tender Bid as per para 1.3.2 (b) 6 (ii), herein after called “FINANCIAL BID”.

The TECHNICAL BID (Packet - A) shall be opened on the date of tender opening and the detailed scrutiny of TECHNICAL BID shall be carried out. The “FINANACIAL BID” (Packet - B) shall be opened only of those tenderers who qualify in "Technical Bid". The Financial Bid of un-qualified tenderers shall not be process further. The detailed procedure for tender opening and processing is given in Para 1.3.5.

1.3.2(b) Form of Tender

The Tender documents shall be in two separate documents:-

"Packet – A" containing Technical Bid and “Packet – B" containing financial Bid. Detailed credentials as per the requirement of eligibility criteria and all tender papers except Summary of Prices and Schedule of Prices are to be submitted in "TECHNICAL BID” i.e. Packet-A . Summary of Prices and Schedule of Prices with percentage above/below/at par duly filled on line /shall be uploaded with digital signature”.

ANNEXURE - I

DFCCIL RAILWAY

TENDER FORM (First Sheet)

Tender No. _____

Name of Work _____

To
The Chief General Manager,
DFCCIL, Ahmedabad
Acting through the _____ Railway

I/We _____ have read the various conditions to tender attached hereto and agree to abide by the said conditions. I/We also agree to keep this offer open for acceptance for a period of _____ days from the date fixed for closing of the tender and in default thereof, I/We will be liable for forfeiture of my/our "Bid Security". I/We offer to do the work for _____ DFCCIL, at the rates quoted in the attached bill(s) of quantities and hereby bind myself/ourselves to complete the work in all respects within _____ months from the date of issue of letter of acceptance of the tender.

2. I/We also hereby agree to abide by the Indian Railways Standard General Conditions of Contract, with all correction slips up-to-date and to carry out the work according to the Special Conditions of Contract and Specifications of materials and works as laid down by Railway in the annexed Special Conditions/Specifications, Standard Schedule of Rates (SSOR), DSR Vol-I & Vol-II and it's specification with all correction slips up-to-date for the present contract.

3. A Bid Security of Rs. _____ has already been deposited online/ submitted as Bank Guarantee bond. Full value of the Bid Security shall stand forfeited without prejudice to any other right or remedies in case my/our Tender is accepted and if:

(a) I/We do not submit the Performance Guarantee within the time specified in the Tender document;

(b) I/We do not execute the contract documents within seven days after receipt of notice issued by the DFCCIL that such documents are ready; and

(c) I/We do not commence the work within fifteen days after receipt of orders to that effect.

4. (a) I/We am/are a Startup firm registered by …… Department of Industrial Policy and Promotion (DIPP) and my registration number is ……. valid upto …… (Copy enclosed) and hence exempted from submission of Bid Security.

5. We are a Labour Cooperative Society and our Registration No. is …….. with ……..and hence required to deposit only 50% of Bid Security.

6. Until a formal agreement is prepared and executed, acceptance of this tender shall constitute a binding contract between us subject to modifications, as may be mutually agreed to between us and indicated in the letter of acceptance of my/our offer for this work.

Signature of Witnesses: _____

(1) _____ Signature of Tenderer(s)

(2) _____ Date _____

Address of the Tenderer(s)

TENDER FORM (Second Sheet)

1. **Instructions to Tenderers and Conditions of Tender**: The following documents form part of Tender / Contract:

   a) Tender Forms
   b) Special Conditions/Specifications (enclosed)
   c) Schedule of approximate quantities (enclosed)
   d) Standard General Conditions of Contract-2022 of Indian Railways and Standard Specifications (Works and Materials) of CPWD-2019 as amended/corrected upto latest correction slips are to be followed.
   e) CPWD Delhi Schedule of Rates (Vol-I & Vol-II) of 2021, Delhi Schedule of Rates (E&M)-2022, SOR 2022-23 R&B Electrical works as amended / corrected upto latest correction slips are to be followed.
   f) All general and detailed drawings pertaining to this work which will be issued by the Engineer/DFCCIL or his representatives (from time to time).

2. The Tenderer(s) shall quote his / their rates as a percentage above or below the Schedule of Rates of Tender and must tender for all the items shown in the Schedule of approximate quantities attached. The quantities shown in the attached Schedule are given as a guide and are approximate only and are subject to variation according to the needs of the DFCCIL. The DFCCIL does not guarantee work under each item of the Schedule. The tenderer(s) shall quote rates / rebates only at specified place in online financial Bid. Any revision of rates / rebates submitted (quoted) through a separate letter whether enclosed with the bid (Tender Form) or submitted separately or mentioned elsewhere in the document other than specified place shall be **summarily ignored and will not be considered.**

3. Tenders containing erasures and / or alterations of tender documents are liable to be rejected. Any correction made by tender(s) in his/their entries must be attested by him / them.

4. The works are required to be completed within a period of **10 months** from the date of issue of acceptance letter.

5. Tenders not submitted in the proper Forms are liable to be rejected.

6. **Documents to be enclosed with the BID -**

S. No	Description	Documents
(i)	**For Technical Bid (Packet - A) :-**	
(1)	Offer letter complete.	Form No.1
(2)	Tenderer's credentials in accordance With para 1.3.13 (i), (ii) & (iii) of Preamble and General Instructions to Tenderers.	Form No. 2A,2B &2C
(3)	Certificates for authenticity of documents	Form No. 22
(4)	Earnest money in accordance with Para 1.3.8 and Cost of Tender Document in case of downloaded tenders in accordance with Para1.3.4.3 of Preamble and General Instructions to	
(5)	Written confirmation authorizing the signatory of the tender to commit the tenderer and other documents as per format as applicable, in accordance with para 1.3.6 of Preamble and General Instructions to Tenderers.	
(6)	A copy of the tender documents including amendments digitally signed by the tenderer in token of his having studied the tender papers carefully shall be attached with the tender.	

(ii)	**For Financial Bid (Packet - B) :-**	
(1)	Summary of Prices, Schedule of Prices & Total Prices	Shall be quoted on **www.ireps.gov.in** system

1.3.3 Tender Document

This tender document consists of following five parts along with Instructions to bidders for online bidding:

PART/CHAPTERS	DESCRIPTION
General	Instructions to bidders for Online bidding
PART – I	
Chapter I	Notice Inviting E-Tender
Chapter II	General Information / Data sheet
Chapter III	Preamble and General Instructions to Tenderers

Chapter IV	General Conditions of Contract
Chapter V	Special Conditions of Contract
PART – II	Technical Specifications
PART – III (A)	Additional Technical Specifications
PART – III (B)	Additional Technical Specifications- II
PART – IV	
Chapter I	Milestones and Time Schedule
Chapter II	Tender Forms (including Schedule of Prices)
PART – V	Drawings

1.3.4 Sale and Submission of Tender Document

1.3.4.1 The tender documents for this work can be downloaded from website www.ireps.gov.in, www.dfccil.com, and Central Procurement Portal, eprocure.gov.in. and offer of the same shall be uploaded in the website www.ireps.gov.in. Amendment(s) (if any) will be uploaded on above mentioned websites. For submitting the tender, the Tender documents and amendment(s) can be downloaded from the www.ireps.gov.in by the registered tenderers only.

1.3.4.2 Clause applicable for tender documents downloaded from Internet

Tenderer/s is free to download tender documents at their own cost, for the purpose of perusal as well as for using the same as tender document for submitting their offer. Master copy of the tender document will be available in the *Office of the Chief General Manager, Dedicated Freight Corridor Corporation of India Limited, OCC Building, 'D' Cabin Road, Sabarmati, Ahmedabad-380019, Gujarat*. After award of the work, an agreement will be drawn up. The agreement shall be prepared based on the master copy available in the Office of the Chief General Manager, Dedicated Freight Corridor Corporation of India Limited, OCC Building, 'D' Cabin Road, Sabarmati, Ahmedabad-380019, Gujarat India and not based on the tender documents submitted by the Tenderer. In case of any discrepancy between the tender documents downloaded from the internet and the master copy, later shall prevail and will be binding on the Tenderers. No claim on this account shall be entertained.

1.3.4.3 Cost of Tender documents downloaded from internet

For submission of the tender, the Tender documents and Amendment(s), if any, is/are available on www.ireps.gov.in and the same can be downloaded and used as tender documents for submitting the offer. The cost of the tender document is mentioned in NIT. The cost of the tender document shall be deposited through e-payment mode at www.ireps.gov.in only. In case, the cost of the tender document as detailed above is not deposited, tender will be summarily rejected.

1.3.4.4 Complete tender documents must be submitted online duly completed in all respect upto the scheduled date and time mentioned in the Notice Inviting E-Tender.

1.3.4.5 Tender Document to be downloaded from website www.ireps.gov.in and then, filled (through digital signature) on the same website and not to be submitted in hard copy at all. The offer (after filling the rates) should neither be scanned & uploaded, nor, the hard copy of the same should be submitted.

1.3.4.6 Deleted

1.3.4.7 Each page of the tender papers is to be digitally signed by the tenderers or such person/s on his/their behalf that is/are legally authorized to sign for him / them.

1.3.4.8 Care in Submission of Tenders –

(i) Before submitting a tender, the tenderer will be deemed to have satisfied himself by actual inspection of the site and locality of the works, that all conditions liable to be encountered during the execution of the works are taken into account and that the quoted rates by tenderer in tender forms are adequate and all- inclusive in item of Taxes, Duties & Levies etc. in terms of General/Special Conditions of Contract for the completion of works to the entire satisfaction of the Employer.

(ii) Tenderers will examine the various provisions of the Central Goods and Services Tax Act, 2017(CGST)/Integrated Goods and Services Tax Act, 2017(IGST)/Union Territory Goods and Services Tax Act, 2017(UTGST)/respective state"s State Goods and Services Tax Act (SGST) also, as notified by Central/State Govt & as amended from time to time and applicable taxes before bidding. Tenders will ensure that full benefit of Input Tax (ITC) likely to be availed by them is duly considered while quoting rates.

(iii) The successful tenderer who is liable to be registered under CGST/IGST/UTGST/SGST Act shall submit GSTIN along with other details required under CGST/IGST/UTGST/SGST Act to DFCCIL immediately after the award of contract, without which no payment shall be released to the contractor. The contractor shall be responsible for deposition of applicable GST to the concerned authority.

1.3.4.9 Tenders containing erasures and/or alteration of the tender documents are liable to be rejected.

1.3.4.9.1 All communication between the Employer and the tenderer shall be in writing. For the purposes of seeking clarification, the Employer's address is:
Office of the Chief General Manager, Dedicated Freight Corridor Corporation of India Limited, OCC Building, 'D' Cabin Road, Sabarmati, Ahmedabad-380019, Gujarat. Electronic mail address: cgmdfcadi@gmail.com

1.3.4.10 Tenderers are required to give Un-Conditional offers. A Conditional Offer is liable to be rejected. DFCCIL reserves the right to modify, expand, restrict, cancel, reject and re-float tender without assigning any reasons whatsoever.

1.3.4.11 The bidder shall submit only one bid in the capacity of an individual or sole proprietor, partnership firm or company. Violation of this condition is liable to

disqualify the tender in which bidder has participated and EMD of all such tenderers shall stand forfeited.

1.3.4.12 Withdrawal of Tender: No tender can be withdrawn after scheduled date and time of submission and during tender validity period.

1.3.5 Opening of Tender:

(a) Tender will be opened at the scheduled date and time mentioned in the Notice Inviting E-Tender as per IREPS.

(b) TECHNICAL BID (Packet- A)' of all the tenderers shall be opened first.

(c) After the opening of **TECHNICAL BID" (Packet-A)** of all the tenderers, these bids shall be scrutinized and analysed. If found necessary by the Employer, the tenderers shall be asked to furnish clarifications and the Employer may also hold discussions with the tenderers after giving due notice. The names of the tenderers whose bid are considered complete and meet eligibility criteria shall be short listed.

(d) The **FINANCIAL BID (Packet–B)** shall be opened on a subsequent date and time duly notified well in advance. The Financial bids of only those tenderers shall be opened who are shortlisted after scrutiny of their Technical bid. The Financial bid of the tenderers who do not qualify during scrutiny of Technical bid shall not be opened.

(e) Employer will notified bidders in writing/online who has been rejected on the ground of their technical bids being substantially non- responsive to the requirement of bidding document and their price bids shall remain unopened.

(f) The earnest money of non-qualifying tenderers will be returned back within a reasonable period.

1.3.6 Documents to be Submitted Along with Tender

1.3.6.1 The tenderer shall clearly specify whether the tender is submitted on his own (Proprietary Firm) or on behalf of a Partnership Firm / Company / Joint Venture (JV) / Registered Society / Registered Trust / Hindu Undivided Family (HUF) / Limited Liability Partnership (LLP) etc. The tenderer(s) shall enclose the attested copies of the constitution of their concern, and copy of PAN Card along with their tender. Tender Documents in such cases are to be signed by such persons as may be legally competent to sign them on behalf of the firm, company, association, trust or society, as the case may be.

1.3.6.2 Following documents shall be submitted by the tenderer:

(a) Sole Proprietorship Firm:

(i) All documents in terms of Para 1.3.13 (i) of the Preamble and General Instruction to Tenderers Part I, Chapter III.

(b) HUF:

(i) A copy of notarized affidavit on Stamp Paper declaring that he who is submitting the tender on behalf of HUF is in the position of 'Karta' of Hindu Undivided Family (HUF) and he has the authority, power and consent given by other members to act on behalf of HUF.

(ii) All other documents in terms of Para 1.3.13 (i) of the Preamble and General Instruction to Tenderers Part I, Chapter III.

(c) Partnership Firm:

(i) All documents as mentioned in para 1.3.33 of the Preamble and General Instruction to Tenderers Part I, Chapter III.

(d) Joint Venture (JV):

All documents as mentioned in para 1.3.32 of the Preamble and General Instruction to Tenderers Part I, Chapter III.

(e) Company registered under Companies Act 2013:

(i) The copies of MOA (Memorandum of Association) / AOA (Articles of Association) of the company

(ii) A copy of Certificate of Incorporation

(iii) A copy of Authorization/Power of Attorney issued by the Company (backed by the resolution of Board of Directors) in favour of the individual to sign the tender on behalf of the company and create liability against the company.

(iv) All other documents in terms Para 1.3.13 (i) of the Preamble and General Instruction to Tenderers Part I, Chapter III.

(f) LLP (Limited Liability Partnership):

(i) A copy of LLP Agreement

(ii) A copy of Certificate of Incorporation

(iii) A copy of Power of Attorney/Authorization issued by the LLP in favour of the individual to sign the tender on behalf of the LLP and create liability against the LLP.

(iv) An undertaking by all partners of the LLP that they are not blacklisted or debarred by Railways or any other Ministry / Department of the Govt. of India from participation in tenders / contracts as on the date of submission of bids, either in their individual capacity or in any firm/LLP or JV in which they were / are partners/members. Concealment / wrong information in regard to above shall make the contract liable for determination under Clause 62 of the Standard General Conditions of Contract.

(v) All other documents in terms of Para 1.3.13 (i) of the Preamble and General Instruction to Tenderers Part I, Chapter III.

(g) Registered Society & Registered Trust:

(i) A copy of Certificate of Registration

(ii) A copy of Memorandum of Association of Society/Trust Deed

(iii) A copy of Power of Attorney in favour of the individual to sign the tender documents and create liability against the Society/Trust.

(iv) A copy of Rules & Regulations of the Society

(v) All other documents in terms of Para 1.3.13 (i) of the Preamble and General Instruction to Tenderers Part I, Chapter III.

1.3.6.3 If it is NOT mentioned in the submitted tender that tender is being submitted on behalf of a Sole Proprietorship firm / Partnership firm / Joint Venture / Registered Company etc., then the tender shall be treated as having been submitted by the individual who has signed the tender.

1.3.6.4 After opening of the tender, any document pertaining to the constitution of Sole Proprietorship Firm / Partnership Firm / Registered Company/ Registered Trust / Registered Society / HUF/LLP etc. shall be neither asked nor considered, if submitted. Further, no suo moto cognizance of any document available in public domain (i.e., on internet etc.) or in Railway's record/office files etc. will be taken for consideration of the tender, if no such mention is available in tender offer submitted.

1.3.6.5 A tender from JV shall be considered only where permissible as per the tender conditions.

1.3.6.6 The DFCCIL will not be bound by any change of power of attorney or in the composition of the firm made subsequent to the submission of tender. DFCCIL may, however, recognize such power of attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the Contractor.

The tenderer whether sole proprietor / a company or a partnership firm / joint venture (JV) / registered society / registered trust / HUF / LLP etc if they want to act through agent or individual partner(s), should submit along with the tender, a copy of power of attorney duly stamped and authenticated by a Notary Public or by Magistrate in favour of the specific person whether he/they be partner(s) of the firm or any other person, specifically authorizing him/them to sign the tender, submit the tender and further to deal with the Tender/ Contract up to the stage of signing the agreement except in case where such specific person is authorized for above purposes through a provision made in the partnership deed / Memorandum of Understanding / Article of Association /Board resolution, failing which tender shall be summarily rejected.

A separate power of attorney duly stamped and authenticated by a Notary Public or by Magistrate in favour of the specific person whether he/they be partner(s) of the firm or any other person, shall be submitted after award of work, specifically authorizing him/them to deal with all other contractual activities subsequent to signing of agreement, if required.

Note: A Power of Attorney executed and issued overseas, the document will also have to be legalized by the Indian Embassy and notarized in the jurisdiction where the Power of Attorney is being issued. However, the Power of Attorney provided by Bidders from countries that have signed the Hague Legislation Convention 1961 are not required to be legalized by the Indian Embassy if it carries a conforming Appostille certificate.

1.3.7 Validity of Tender:-

Tenderer shall keep his offer open as mentioned in the Tender Notice.

1.3.8 Bid Security:

(1) (a) The tenderer shall be required to submit the Bid Security with the tender for the due performance with the stipulation to keep the offer open till such date as specified in the tender, under the conditions of tender.

Note:

(i) The Bid Security shall be rounded off to the nearest Rs. 100. This Bid Security shall be applicable for all modes of tendering.

(ii) Any firm recognized by Department of Industrial Policy and Promotion (DIPP) as 'Startups' shall be exempted from payment of Bid Security detailed above.

(iii) Labour Cooperative Societies shall submit only 50% of above Bid Security detailed above.

(b) It shall be understood that the tender documents have been issued to the tenderer and the tenderer is permitted to tender in consideration of stipulation on his part, that after submitting his tender he will not resile from his offer or modify the terms and conditions thereof in a manner not acceptable to the Engineer. Should the tenderer fail to observe or comply with the said stipulation, the aforesaid amount shall be liable to be forfeited to the Railway.

(c) If his tender is accepted, this Bid Security mentioned in sub para (a) above will be retained as part security for the due and faithful fulfillment of the contract in terms of Clause 16 of the General Conditions of Contract, Part-I Chapter IV. The Bid Security of other Tenderers shall, save as herein before provided, be returned to them, but the Railway shall not be responsible for any loss or depreciation that may happen thereto while in their possession, nor be liable to pay interest thereon.

(2) The Bid Security shall be deposited either in cash through e-payment gateway or submitted as Bank Guarantee bond from a scheduled commercial bank of India or as mentioned in tender documents. The Bank Guarantee bond shall be as per Form No. 26 and shall be valid for a period of 90days beyond the bid validity period.

(3) In case, submission of Bid Security in the form of Bank Guarantee, following shall be ensured:

i. A scanned copy of the Bank Guarantee shall be uploaded on e-Procurement Portal (IREPS) while applying to the tender.

ii. The original Bank Guarantee should be delivered in person to the official nominated as indicated in the tender document within 5 working days of deadline of submission of bids.

iii. Non submission of scanned copy of Bank Guarantee with the bid on e-tendering portal (IREPS) and/or non submission of original Bank Guarantee within the specified period shall lead to summary rejection of bid.

iv. The Tender Security shall remain valid for a period of 90 days beyond the validity period for the Tender.

v. The details of the BG, physically submitted should match with the details available in the scanned copy and the data entered during bid submission time, failing which the bid will be rejected.

vi. The Bank Guarantee shall be placed in an envelope, which shall be sealed. The envelope shall clearly bear the identification **"Bid for the ***** Project"** and shall clearly indicate the name and address of the Bidder. In addition, the Bid Due Date should be indicated on the right hand top corner of the envelope.

vii. The envelope shall be addressed to the officer and address as mentioned in the tender document.

viii. If the envelope is not sealed and marked as instructed above, the DFCCIL assumes no responsibility for the misplacement or premature opening of the contents of the Bid submitted and consequent losses, if any, suffered by the Bidder.

1.3.9.1 Right of DFCCIL to Deal with Tenders: The DFCCIL reserves the right of not to invite tenders for any of DFCCIL work or works or to invite open or limited tenders and when tenders are called to accept a tender in whole or in part or reject any tender or all tenders without assigning reasons for any such action. In case if tender is accepted in part by DFCCIL administration, Letter of Acceptance shall be issued as counter offer to the Tenderer, which shall be subject to acceptance by the Tenderer.

1.3.9.2 Clarification of Bids: To assist in the examination, evaluation & comparison and prequalification of the Tender, the DFCCIL may, at its discretion, ask any Bidder for a clarification of its Bid. Any clarification submitted by a Bidder that is not in response to a request by the DFCCIL shall not be entertained or considered. The DFCCIL request for clarification and the response of the bidder in this regard shall be in writing.

However, if a Bidder does not provide clarification of its bid by the date and time communicated in the DFCCIL request for clarification, the bid shall be evaluated as per the documents submitted along with the bid.

1.3.9.3 Execution of Contract Agreement:-

The Tenderer whose tender is accepted shall be required to appear in person at the Office of the Chief General Manager, Dedicated Freight Corridor Corporation of India Limited, OCC Building, 'D' Cabin Road, Sabarmati, Ahmedabad-380019, Gujarat, as the case may be, or if tenderer is a firm or corporation, a duly authorized representative shall appear (there would be no need for appear in person if agreement is signed digitally) and execute the contract agreement within seven days of notice from DFCCIL that the Contract Agreement is ready. Failure to do so shall constitute a breach of the agreement affected by the acceptance of the tender. The Contract Agreement shall be entered into by DFCCIL only after submission of valid Performance Guarantee by the Contractor. In such cases the DFCCIL may determine that such tenderer has abandoned the contract and there upon his tender and acceptance thereof shall be treated as cancelled and the DFCCIL shall be entitled to forfeit the full amount of the Bid Security and other dues payable to the Contractor under this contract. The failed Contractor shall be debarred from participating in the re-tender for that work.

1.3.10 Security Deposit on Acceptance of Tender:

The security deposit / rate of recovery / mode of recovery on acceptance

of tender shall be as per the Para 16(1) to 16(3) Of General Conditions of Contract (GCC).

1.3.11 Tenderer's Address

The tenderer should state in the tender his postal address legibly and clearly. Any communication sent in time, to the tenderer by post at his said address shall be deemed to have reached the tenderer duly and in time. Important documents should be sent by registered post.

1.3.12 Rights of DFCCIL to Deal with Tenders

a. The authority for the acceptance of the tender will rest with the DFCCIL. It shall not be obligatory on the said authority to accept the lowest tender or any other tender and no tenderer(s) shall demand any explanation for the cause of rejection of his/their tender nor the DFCCIL undertake to assign reasons for declining to consider or reject any particular tender or tenders.

b. If the tenderer(s) deliberately gives / give wrong information in his / their tender or creates / create circumstances for the acceptance of his / their tender, the DFCCIL reserves the right to reject such tender at any stage.

c. If any partner(s) of a partnership firm expires after the submission of its tender or after the acceptance of its tender, the DFCCIL shall deem such tender as cancelled/contract as terminated under clause 61 of the Standard General Conditions of Contract, unless the firm retains its character as per partnership agreement. If a sole proprietor expires after the submission of tender or after the acceptance of tender, the DFCCIL shall deem such tender as cancelled / contract as terminated under clause 61 of the Standard General Conditions of Contract.

1.3.13(i) Eligibility Criteria:

(A). Technical Eligibility Criteria:

(a) The tenderer must have successfully completed or substantially completed any one of the following categories of work(s) during last 07 (seven) years, ending last day of month previous to the one in which tender is invited:

(i) Three similar works each costing not less than the amount equal to 30% of advertised value of the tender, or

(ii) Two similar works each costing not less than the amount equal to 40% of advertised value of the tender, or

(iii) One similar work costing not less than the amount equal to 60% of advertised value of the tender.

Similar works means <u>"Construction of any Building Work".</u>

(b) (1) In case of tenders for composite works (e.g. works involving more than one distinct component, such as Civil Engineering works, S&T works, Electrical works, OHE works etc. and in the case of major bridges – substructure, superstructure etc.), tenderer must have successfully completed or substantially completed any one of the following categories of work(s) during last 07 (seven) years, ending last day of month previous to the one in which tender is invited:

(i) Three similar works each costing not less than the amount equal to 30% of advertised value of each component of tender, or
(ii) Two similar works each costing not less than the amount equal to 40% of advertised value of each component of tender, or
(iii) One similar work each costing not less than the amount equal to 60% of advertised value of each component of tender.

Note for (b) (1): Separate completed works of minimum required values shall also be considered for fulfilment of technical eligibility criteria for different components.

(b) (2) In such cases, what constitutes a component in a composite work shall be clearly pre-defined with estimated tender cost of it, as part of the tender documents without any ambiguity.

(b) (3) To evaluate the technical eligibility of tenderer, only components of work as stipulated in tender documents for evaluation of technical eligibility, shall be considered. The scope of work covered in other remaining components shall be either executed by tenderer himself if he has work experience as mentioned in para 1.3.9.1 of the Preamble and General Instruction to Tenderers through subcontractor fulfilling the requirements as per Para 1.3.9.1 or jointly i.e., partly himself and remaining through subcontractor, with prior approval of Chief General Manager/General Manager in writing.

However, if required in tender documents by way of Special Conditions, a formal agreement duly notarised, legally enforceable in the court of law, shall be executed by the main contractor with the subcontractor for the component(s) of work proposed to be executed by the subcontractor(s), and shall be submitted along with the offer for considering subletting of that scope of work towards fulfilment of technical eligibility. Such subcontractor must fulfil technical eligibility criteria as follows:

The subcontractor shall have successfully completed at least one work similar to work proposed for subcontract, costing not less than 35% value of work to be subletted, in last 5 years, ending last day of month previous to the one in which tender is invited through a works contract.

Note: for subletting of work costing up to Rs. 50 lakh, no previous work experience of subcontractor shall be asked for by the DFCCIL/Railway.

In case after award of contract or during execution of work it becomes necessary for contractor to change subcontractor, the same shall be done with subcontractor(s) fulfilling the requirements as per Para 1.3.9.1, with prior approval of GM/Dy.CPM/DFCCIL in writing.

Note for Item (A):

Work experience certificate from private individual shall not be considered. However, in addition to work experience certificates issued by any Govt. Organisation, work experience certificate issued by Public listed company having average annual turnover of Rs 500 crore and above in last 3 financial years excluding the current financial year, listed on National Stock Exchange or Bombay Stock Exchange, incorporated/ registered at least 5 years prior to the date of closing of tender, shall also be considered provided the work experience certificate has been issued by a person authorized by the Public listed company to issue such certificates.

In case tenderer submits work experience certificate issued by public listed company, the tenderer shall also submit along with work experience certificate, the relevant copy of work order, bill of quantities, bill wise details of payment received duly certified by Chartered Accountant, TDS certificates for all payments received and copy of final/last bill paid by company in support of above work experience certificate.

(B) Financial Eligibility Criteria: (ACS-1 dt. 14.07.2022)

The tenderer must have minimum average annual contractual turnover of V/N or V whichever is less; where

V= Advertised value of the tender in crores of Rupees
N= Number of years prescribed for completion of work for which bids have been invited.

The average annual contractual turnover shall be calculated as an average of "total contractual payments" in the previous three financial years, as per the audited balance sheet. However, in case balance sheet of the previous year is yet to be prepared/ audited, the audited balance sheet of the fourth previous year shall be considered for calculating average annual contractual turnover.
The tenderers shall submit requisite information as per Form No. 2B, along with copies of Audited Balance Sheets duly certified by the Chartered Accountant/ Certificate from Chartered Accountant duly supported by Audited Balance Sheet.

(C) Bid Capacity:
The tender/technical bid will be evaluated based on bid capacity formula detailed as Form No. 23.

(D) No Technical and Financial credentials are required for tenders having advertised value up to Rs 50 lakh.

(E) Credentials if submitted in foreign currency shall be converted into Indian currency i.e., Indian Rupee as under:

The conversion rate of US Dollars into Rupees shall be the daily representative exchange rates published by the Reserve Bank of India or entity authorized by RBI to do so for the relevant date or immediately previous date for which rates have been published. Where, relevant date shall be as on the last day of month previous to the one in which tender is invited. In case of any other currency, the same shall first be converted to US Dollars as on

the last day of month previous to the one in which tender is invited, and the amount so derived in US Dollars shall be converted into Rupees at the aforesaid rate. The conversion rate of such currencies shall be the daily representative exchange rates published by the International Monetary Fund for the relevant date or immediately previous date for which rates have been published.

Explanation for Para *1.3.13(i) of the* Preamble and General Instruction to Tenderers Part I, Chapter III *including Para 1.3.13(i) (A) to 1.3.13(i) (E) – Eligibility Criteria:*

1. Substantially Completed Work means an ongoing work in which payment equal to or more than 90% of the present contract value (excluding the payment made for adjustment of Price variation (PVC), if any) has been made to the contractor in that ongoing contract and no proceedings of termination of contract on Contractor's default has been initiated. The credential certificate in this regard should have been issued not prior to 60 days of date of invitation of present tender.

2. In case a work is started prior to 07 (seven) years, ending last day of month previous to the one in which tender is invited, but completed in last 07 (seven) years, ending last day of month previous to the one in which tender is invited, the completed work shall be considered for fulfilment of credentials.

3. If a work is physically completed and completion certificate to this extent is issued by the concerned organization but final bill is pending, such work shall be considered for fulfilment of credentials

4. In case of completed work, the value of final bill (gross amount) including the PVC amount (if paid) shall be considered as the completion cost of work. In case final bill is pending, only the total gross amount already paid including the PVC amount (if paid) shall be considered as the completion cost of work.
   In case of substantially completed work, the total gross amount already paid including the PVC amount (if paid), as mentioned in the certificate, shall be considered as the cost of substantially completed work.

5. If a bidder has successfully completed a work as subcontractor and the work experience certificate has been issued for such work to the subcontractor by a Govt. Organization or public listed company as defined in Note for Item 1.3.13.(i) (A) Para 1.3.13.(i) of the Preamble and General Instruction to Tenderers Part I, Chapter III, the same shall be considered for the purpose of fulfilment of credentials.

6. In case a work is considered similar in nature for fulfilment of technical credentials, the overall cost including the PVC amount (if paid) of that completed work or substantially completed work, shall be considered and no separate evaluation for each component of that work shall be made to decide eligibility.

7. In case of newly formed partnership firm, the credentials of individual partners from previous propriety firm(s) or dissolved previous partnership firm(s) or split previous partnership firm(s), shall be considered only to the extent of their share in previous entity on the date of dissolution / split and their share in newly formed partnership firm. For example, a partner A had 30% share in previous entity and his share in present partnership firm is 20%. In the present tender under consideration, the credentials of partner A will be considered to the extent of 0.3 x 0.2 x Value of the

work done in the previous entity. For this purpose, the tenderer shall submit along with his bid all the relevant documents which include copy of previous partnership deed(s), dissolution deed(s) and proof of surrender of PAN No.(s) in case of dissolution of partnership firm(s) etc.

8. In case of existing partnership firm, if any one or more partners quit the partnership firm, the credentials of remaining partnership firm shall be re-worked out i.e., the quitting partner(s) shall take away his credentials to the extent of his share on the date of quitting the partnership firm(e.g. in a partnership firm of partners A, B & C having share 30%, 30% & 40% respectively and credentials of Rs 10 crore; in case partner C quits the firm, the credentials of this partnership firm shall remain as Rs 6 crore). For this purpose, the tenderer shall submit along with his bid all the relevant documents which include copy of previous partnership deed(s), dissolution deed(s) and proof of surrender of PAN No.(s) in case of dissolution of partnership firm(s) etc.

9. In case of existing partnership firm if any new partner(s) joins the firm without any modification in the name and PAN/TAN no. of the firm, the credentials of partnership firm shall get enhanced to the extent of credentials of newly added partner(s) on the same principles as mentioned in item 6 above. For this purpose, the tenderer shall submit along with his bid all the relevant documents which include copy of previous partnership deeds, dissolution/splitting deeds and proof of surrender of PAN No.(s) in case of dissolution of partnership firm etc.

10. Any partner in a partnership firm cannot use or claim his credentials in any other firm without leaving the partnership firm i.e., In a partnership firm of A&B partners, A or B partner cannot use credentials of partnership firm of A&B partners in any other partnership firm or propriety firm without leaving partnership firm of A&B partners.

11. In case a partner in a partnership firm is replaced due to succession as per succession law, the proportion of credentials of the previous partner will be passed on to the successor.

12. If the percentage share among partners of a partnership firm is changed, but the partners remain the same, the credentials of the firm before such modification in the share will continue to be considered for the firm as it is without any change in their value. Further, in case a partner of partnership firm retires without taking away any credentials from the firm, the credentials of partnership firm shall remain the same as it is without any change in their value.

13. In a partnership firm “AB” of A&B partners, in case A also works as propriety firm “P” or partner in some other partnership firm “AX”, credentials of A in propriety firm “P” or in other partnership firm “AX” earned after the date of becoming a partner of the firm AB shall not be added in partnership firm AB.

14. In case a tenderer is LLP, the credentials of tenderer shall be worked out on above lines similar to a partnership firm.

15. In case company A is merged with company B, then company B would get the credentials of company A also.]

1.3.13 (ii) Tenderer Credentials:

Documents testifying tenderer previous experience and financial status should be produced along with the tender.

Tenderer(s) shall submit following along with his / their tender:

(i) Certificates and testimonials regarding contracting experience for the type of job for which tender is invited with list of works carried out in the past.

(ii) Audited Balance Sheet duly certified by the Chartered Accountant regarding contractual payments received in the past.

(iii) The list of personnel / organization on hand and proposed to be engaged for the tendered work. Similarly list of Plant & Machinery available on hand and proposed to be inducted and hired for the tendered work.

(iv) A copy of certificate stating that they are not liable to be disqualified and all their statements/documents submitted along with bid are true and factual. Standard format of the certificate to be submitted by the bidder is enclosed as Form No. 22. Non submission of a copy of certificate by the bidder shall result in summarily rejection of his/their bid. It shall be mandatorily incumbent upon the tenderer to identify, state and submit the supporting documents duly self attested / digitally signed by which they/he are/is qualifying the Qualifying Criteria mentioned in the Tender Document.

(v) The DFCCIL reserves the right to verify all statements, information and documents submitted by the bidder in his tender offer, and the bidder shall, when so required by the DFCCIL, make available all such information, evidence and documents as may be necessary for such verification. Any such verification or lack of such verification, by the DFCCIL shall not relieve the bidder of its obligations or liabilities hereunder nor will it affect any rights of the DFCCIL there under.

(vi) (a) In case of any information submitted by tenderer is found to be false, forged or incorrect at any time during process for evaluation of tenders, it shall lead to forfeiture of the tender Bid Security besides banning of business for a period of upto five years.

(b) In case of any information submitted by tenderer is found to be false, forged or incorrect after the award of contract, the contract shall be terminated. Bid Security, Performance Guarantee and Security Deposit available with the DFCCIL shall be forfeited. In addition, other dues of the contractor, if any, under this contract shall be forfeited and agency shall be banned for doing business for a period of upto five years.

Non-compliance with any of the conditions set forth therein above is liable to result in the tender being rejected.

1.3.13 (iii) **System of Verification of Tenderer's Credential:**

1. For the works tenders, it has been decided to adopt the certificate based (Form self- attested is required. Signature, Stamp on Each Page). The tenderer shall submit along with the tender document, documents in support of his/their claim to fulfill the eligibility criteria as mentioned in the tender document. Each page of the copy of documents/certificates in support of certificates submitted by the tenderer shall be self– attested/ digitally signed by the tenderer or authorized representative of the tendering firm. Self – attestation shall include signature, stamp and date (on each page).

2. The tenderers shall submit a certificate stating that they are not liable to be disqualified and all their statements/documents submitted along with bid are true and factual. Standard format of the certificate to be submitted by the bidder is enclosed as Form-22. **Non submission of a certificate (Form No. 22) by the bidder shall result in summary rejection of his/their bid.** And it shall be mandatorily incumbent upon the Tenderer to identify state and submit the supporting documents duly self-attested by which they/he is qualifying the Qualifying Criteria mentioned in the Tender Document. It will not be obligatory on the part of Tender Committee to scrutinize beyond the submitted document of tenderer as far as his qualification for the tender is concerned.

3. The DFCCIL reserves the right to verify all statements, information and documents submitted by the bidder in his tender offer, and the bidder shall, when so required by the DFCCIL, make available all such information, evidence and documents as may be necessary for such verification. Any such verification or lack of such verification, by the DFCCIL shall not relieve the bidder of its obligations or liabilities hereunder nor will it affect any right of the DFCCIL

1.3.14 Period of Completion

The entire work is required to be completed in all respects within 10 months (Ten months) from the date of issue of the acceptance letter. Time is the essence of contract. The contractor shall be required to maintain steady and regular progress to the satisfaction of the Engineer to ensure that the work will be completed in all respects within the stipulated time.

1.3.15 If the Tenderer/s deliberately gives any wrong information about credentials / documents in his/their tenders and thereby create(s) circumstances for acceptance of his/their tender, DFCCIL reserves the right to reject such tender at any stage, besides, shall suspend business with such tenderer. The EMD of such tenderers shall also be forfeited.

1.3.16 Quantum of work and materials:

The indicative schedule of quantities of various items of works shall be available at www.ireps.gov.in.

1.3.17 **Employer not bound to accept any tender:**

The employer shall not be bound to accept the lowest or any tender or to assign any reason for non-acceptance or rejection of a tender. The employer reserves the right to accept any tender in respect of the whole or any portion of the work specified in the tender papers or to reduce the work or to accept any tender for less than the tendered quantities without assigning any reason whatsoever.

1.3.18 Schedule of Prices

The Summary of prices and schedule of prices shall be available at www.ireps.gov.in.

1.3.19 Performance Guarantee: Refer relevant clause 16.(4) of GCC.

1.3.20 The tenderer shall furnish information for making payment through ECS/ NEFT / RTGS (Tender Form No. 8 placed at Part IV of the tender documents).

1.3.21 Negotiation:

Should DFCCIL decide to negotiate with a view to bring down the rates, the tenderer called for negotiations should furnish the following form of declaration before commencement of negotiations?
"I..... Do declare that in the event of failure of
contemplated negotiations relating to Tender No..... dated
.....my original tender shall remain open for acceptance on its original terms and conditions,"

1.3.22 Pre-Bid Meeting :- Not Applicable.

1.3.23 Site Inspection:

Tenderers are requested to inspect the site and carry out careful examination to satisfy them as to the nature of work involved and facilities available at the site. They should note carefully all the existing structures and those under construction through other agencies. They should also study the suitability of utilizing the different equipment and the machinery that they intend to use for the execution of the work. The tenderers should also select suitable sites for the purpose of locating their store yard, laboratory, staff quarters etc.

1.3.24 No form C & D shall be issued to the contractor for this work.

1.3.25 Preliminary examination of bids

a) The DFCCIL shall examine the bids to determine whether they are complete, whether any computational errors have been made, whether the documents have been properly signed and whether the bids are generally in order.

b) Arithmetical errors shall be rectified on the following basis if found. If there is a discrepancy between the unit price and the total price, which is obtained by multiplying the unit price and quantity, or between subtotals and the total price, the unit or subtotal price shall prevail, and the total price shall be corrected.

c) The rates should be quoted in figures as well as in words. If there is variation between rates quoted in figures and in words, the rate quoted in „words" shall be taken as correct. If more than one or improper rates are tendered for the same item, the tender is liable to be rejected.

d) Prior to the detailed evaluation, DFCCIL shall determine whether each bid is of acceptable quality, is generally complete and is substantially responsive to the bidding documents. For purposes of this determination, a substantially responsive bid is one that conforms to all the terms, conditions and specifications of the bidding documents without material deviations, objections, conditionality or reservation. A material deviation, objections,

conditionality or reservation is one:

a. That affects in any substantial way the scope, quality or Performance of the contract.
b. That limits in any substantial way, inconsistent with the bidding documents, the DFCCIL"s rights or the successful Bidder's obligations under the contracts; or
c. Whose rectification would unfairly affect the competitive position of other Bidders who are presenting substantially responsive bids.

e) If a bid is not substantially responsive, it shall be rejected by the DFCCIL.

f) In case of tenders containing any conditions or deviations or reservations about contents of tender document. DFCCIL can summarily reject such tender.

1.3.26 Evaluation and comparison of tenders

In case of open tenders, bids, which are determined as substantially responsive, shall be evaluated based on criteria as given in Eligibility Criteria" and as given in Notice Inviting E-Tender. The tenderer must submit all necessary authentic data with necessary supporting certificates of the various items of evaluation criteria failing which his tender is liable to be rejected.

1.3.27 Canvassing

No tenderer is permitted to canvass to DFCCIL on any matter relating to this tender. Any tenderer found doing so may be disqualified and his bid may be rejected.

1.3.28 Award of Contract

1. DFCCIL shall notify the successful tenderer in writing by a Registered Letter/Courier/Speed Post/Email or through bearer that his tender has been accepted.
2. Letter of Acceptance after it is signed by the Contractor in token of his acceptance shall constitute a legal and binding contract between DFCCIL and the contractor till such time the contract agreement is signed.

1.3.29 Understanding and Amendments of Tender Documents:

1. The bidder must own all responsibilities and bear all cost for obtaining all the information including risks, contingencies & other circumstances in execution of the work. It shall also carefully read and understand all its obligations & liabilities given in tender documents.
2. The bidder is advised to visit and examine the site where the work is to be executed and its surroundings or other areas as deemed fit by the bidder and should obtain at his own cost all information that may be necessary for preparing the bid and execution of the contract. The cost of visiting the site and collecting relevant data shall be at the bidder's own expenses. It is a condition of the tender that the tenderer is deemed to have visited the site and satisfied himself with all the conditions prevailing including any difficulties for executing the work.
3. At any time prior to the deadline for submission of bids, DFCCIL may for any

reason whether at its own initiative or in response to any request by any prospective bidder amend the bidding documents by issuing Amendment, which shall be part of the Tender documents.

4. DFCCIL may at its discretion extend the deadline for submission of the bids at any time before the time of submission of the bids.

1.3.30 **Provision for medium & small enterprises (MSE):**

As mandated by Railway Board Letter No. 2010/RS (G)/363/1 dated 05.07.2012 (RBS No. 4/2012), in compliance to public procurement policy, following provisions are included for Medium & Small Enterprises (MSE) in the tender document

1. Tender sets shall be provided free of cost to MSEs registered with the listed agencies for the item tendered.
2. MSEs registered with the listed agencies for the item tendered will be exempted from payment of Earnest Money.
3. (I) MSEs who are interested in availing themselves of these benefits will enclose with their offer the proof of their being MSE registered with any of the agencies mentioned in the notification of Ministry of MSME indicated below:
   (i) District industries Centres
   (ii) Khadi and Village Industries Commission
   (iii) Khadi and Village Industries Board
   (iv) Board
   (v) National Small Industries Corporation
   (vi) Directorate of Handicraft and Handloom
   (vii) Any other body specified by Ministry of MSME.
   (II) The MSEs must also indicate the terminal validity date of their registration.
   Falling (I) & (II) above, such offers will not be liable for consideration of benefits detailed in MSE notification of Government of India dated 23.03.2012.
4. Definition of MSEs owned by SC/ST is as give below:
   (i) In case of proprietary MSE, proprietors (s) shall be SC/ST.
   (ii) In case of partnership MSE, the SC/ST partners shall be holding at least 51% Shares in the unit.
   (iii) In case of Private Limited Companies at least 51% share shall be held by SC/ST Promoters.
5. All bidders registered under Micro, Small and Medium Enterprises (MSMEs) shall have to satisfy the eligibility criteria at par with other bidders. There shall not be any relaxation in eligibility criteria/tender process or other tender requirements and L-1 price.
6. The above facilities shall not be applicable for the items for which they are not registered.
7. The tenderer (s) shall submit copy of current and valid MSMEs registration certificate inclusive of all the pages showing the category of entrepreneur – whether the registered firm is owned by General or SC/ST entrepreneurs, monetary limit of their registration for the items tendered to avail the benefits under the policy. The MSMEs shall also submit a copy of "Entrepreneur"s Memorandum (Part-II)" of the concerned district centre where the unit is established.
8. Registration of Udyog Aadhar Memorandum (UAM): All Micro, Small and

Medium Enterprises (MSMEs) bidders are required to declare UAM Number on CPPP /www. ireps.gov.in failing which such bidders will not be able to enjoy the benefits as per Public Procurement Policy for tenders invited electronically through CPPP /www. ireps.gov.in

1.3.31 Employment/Partnership etc. of Retired Railway Employees**:**

(a) Should a tenderer

i) be a retired Engineer of the gazetted rank or any other gazetted officer working before his retirement, whether in the executive or administrative capacity or whether holding a pensionable post or not, in the Engineering or any other department of any of the railways owned and administered by the MD/DFCCIL for the time being, OR

ii) being partnership firm / joint venture (JV) / registered society / registered trust etc have as one of its partners a retired Engineer of the gazetted rank or any other gazetted officer working before his retirement, OR

iii) being an incorporated company have any such retired Engineer of the gazetted rank or any other gazetted officer working before his retirement as one of its directors ,AND

in case where such Engineer or officer had not retired from government service at least 1 year prior to the date of submission of the tender , THEN

the tenderer will give full information as to the date of retirement of such Engineer or gazetted officer from the said service and as to whether permission for taking such contract, or if the Contractor be a partnership firm or an incorporated company, to become a partner or director as the case may be, has been obtained by the tenderer or the Engineer or officer, as the case may be from the MD/DFCCIL or any officer, duly authorized by him in this behalf, shall be clearly stated in writing at the time of submitting the tender.

(b) In case, upon successful award of contract, should a tenderer depute for execution of the works under or to deal matters related with this contract, any retired Engineer of gazette rank or retired gazetted officer working before his retirement in the Engineering or any other department of any of the railways owned and administered by the MD/DFCCIL for the time being, and now in his employment, then the tenderer will ensure that retired Engineer or retired gazetted officer had retired from government service at least 1 year prior to the date of his employment with tenderer and in case he had retired from service within a year then he possesses the requisite permission from the MD/DFCCIL or any officer, duly authorized by him in this behalf, to get associated with the tenderer.

(c) Should a tenderer or Contractor being an individual, have member(s) of his family or in the case of partnership firm/ company / joint venture (JV) / registered society / registered trust etc. one or more of his partner(s)/shareholder(s) or member(s) of the family of partner(s)/shareholder(s) having share of more than 1% in the tendering entity employed in gazetted capacity in the Engineering or any other department of the railway, then the tenderer at the

time of submission of tender, will inform the authority inviting tenders the details of such persons.

Note:- If information as required above has not been furnished, contract is liable to be dealt in accordance with provision of clause 62 of Standard General Condition of contract.

JOINT VENTURE (JV) IN WORKS TENDERS

(Participation of Joint Venture firms shall be applicable for tenders of value more than Rs. 10 Crore (Rupees Ten Crore) Each As per Railway Board's letter no. 2002/CE-I/CT/37JV. Pt-VIII dated 14.12.2012)

1.3.32 **Participation of Joint Venture (JV) in Works Tender:** This Para shall be applicable for works tenders wherein tender documents provide for the same.

1.3.32.1 Separate identity/name shall be given to the Joint Venture.

1.3.32.2 Number of members in a JV shall not be more than three, if the work involves only one department (say Civil or S&T or Electrical or Mechanical) and shall not be more than five, if the work involves more than one Department. One of the members of the JV shall be its Lead Member who shall have a majority (at least 51%) share of interest in the JV. The other members shall have a share of not less than 20% each in case of JV with upto three members and not less than 10% each in case of JV with more than three members. In case of JV with foreign member(s), the Lead Member has to be an Indian firm/company with a minimum share of 51%.

1.3.32.3 A member of JV shall not be permitted to participate either in individual capacity or as a member of another JV in the same tender.

1.3.32.4 The tender form shall be purchased and submitted only in the name of the JV and not in the name of any constituent member. The tender form can however be submitted by JV or any of its constituent member or any person authorized by JV through Power of Attorney to submit tender.

1.3.32.5 Bid Security shall be submitted by JV or authorized person of JV either as :

(i) Cash through e-payment gateway or as mentioned in tender document, or

(ii) Bank Guarantee bond either in the name of JV, or in the name of all members of JV as per MOU irrespective of their share in the JV if the JV has not been constituted legally till the date of submission of tender.

1.3.32.6 A copy of Memorandum of Understanding (MoU) duly executed by the JV members on a stamp paper, shall be submitted by the JV along with the tender. The complete details of the members of the JV, their share and responsibility in the JV etc. particularly with reference to financial, technical and other obligations shall be furnished in the MoU.

1.3.32.7 Once the tender is submitted, the MoU shall not normally be modified / altered / terminated during the validity of the tender. In case the tenderer fails to observe/comply with this stipulation, the full Bid Security shall be liable to be forfeited.

1.3.32.8 Approval for change of constitution of JV shall be at the sole discretion of the DFCCIL. The constitution of the JV shall not normally be allowed to be modified after submission of the bid by the JV, except when modification becomes inevitable due to succession laws etc., provided further that there is no change in qualification of minimum eligibility criteria by JV after change of composition. However, the Lead Member shall continue to be the Lead Member of the JV. Failure to observe this requirement would render the offer invalid.

1.3.32.9 Similarly, after the contract is awarded, the constitution of JV shall not be normally allowed to be altered during the currency of contract except when modification become inevitable due to succession laws etc. and minimum eligibility criteria should not get vitiated. Failure to observe this stipulation shall be deemed to be breach of contract with all consequential penal action as per contract conditions.

1.3.32.10 On award of contract to a JV, a single Performance Guarantee shall be submitted by the JV as per tender conditions. All the Guarantees like Performance Guarantee, Bank Guarantee for Mobilization Advance, Machinery Advance etc. shall be accepted only in the name of the JV and no splitting of guarantees amongst the members of the JV shall be permitted.

1.3.32.11 On issue of LOA (Letter of Acceptance), the JV entity to whom the work has been awarded, with the same shareholding pattern as was declared in the MOU/JV Agreement submitted along with the tender, shall be got registered before the Registrar of the Companies under 'The Companies Act -2013' (in case JV entity is to be registered as Company) or before the Registrar/Sub-Registrar under the 'The Indian Partnership Act, 1932' (in case JV entity is to be registered as Partnership Firm) or under 'The LLP Act 2008' (in case JV entity is to be registered as LLP). A separate PAN shall be obtained for this entity. The documents pertaining to this entity including its PAN shall be furnished to the DFCCIL before signing the contract agreement for the work. In case the tenderer fails to observe/comply with this stipulation within 60 days of issue of LOA, contract is liable to be terminated. In case contract is terminated DFCCIL shall be entitled to forfeit the full amount of the Bid Security and other dues payable to the Contractor under this contract. The entity so registered, in the registered documents, shall have, inter-alia, following Clauses:

1.3.32.11.1 Joint and Several Liability - Members of the entity to which the contract is awarded, shall be jointly and severally liable to the DFCCIL for execution of the project in accordance with General and Special Conditions of Contract. The members of the entity shall also be liable jointly and severally for the loss, damages caused to the DFCCIL during the course of execution of the contract or due to non-execution of the contract or part thereof.

1.3.32.11.2 Duration of the Registered Entity - It shall be valid during the entire currency of the contract including the period of extension, if any and the maintenance period after the work is completed.

1.3.32.11.3 Governing Laws - The Registered Entity shall in all respect be governed by and interpreted in accordance with Indian Laws.

1.3.32.12 Authorized Member - Joint Venture members in the JV MoU shall authorize Lead member on behalf of the Joint Venture to deal with the tender, sign the agreement or enter into contract in respect of the said tender, to receive payment, to witness joint measurement of work done, to sign measurement books and similar such action in respect of the said tender/contract. All notices/correspondences with respect to the contract would be sent only to this authorized member of the JV.

1.3.32.13 No member of the Joint Venture shall have the right to assign or transfer the interest right or liability in the contract without the written consent of the other members and that of the DFCCIL in respect of the said tender/contract.

1.3.32.14 Documents to be enclosed by the JV along with the tender:

1.3.32.14.1 In case one or more of the members of the JV is/are partnership firm(s), following documents shall be submitted:

(i) A notarized copy of the Partnership Deed or a copy of the Partnership deed registered with the Registrar.

(ii) A copy of consent of all the partners or individual authorized by partnership firm, to enter into the Joint Venture Agreement on a stamp paper,

(iii) A notarized or registered copy of Power of Attorney in favour of the individual to sign the MOU/JV Agreement on behalf of the partnership firm and create liability against the firm.

(iv) An undertaking by all partners of the partnership firm that they are not blacklisted or debarred by DFCCIL or any other Ministry / Department of the Govt. of India from participation in tenders / contracts as on the date of submission of bids, either in their individual capacity or in any firm/LLP in which they were / are partners/members. Any Concealment / wrong information in regard to above shall make the bid ineligible or the contract shall be determined under Clause 62 of the Standard General Conditions of Contract.

1.3.32.14.2 In case one or more members is/are Proprietary Firm or HUF, the following documents shall be enclosed:

(i) A copy of notarized affidavit on Stamp Paper declaring that his Concern is a proprietary Concern and he is sole proprietor of the Concern OR he who is signing the affidavit on behalf of HUF is in the position of 'Karta' of Hindu Undivided Family (HUF) and he has the authority, power and consent given by other members to act on behalf of HUF.

1.3.32.14.3 In case one or more members of the JV is/are companies, the following documents shall be submitted:

(i) A copy of resolutions of the Directors of the Company, permitting the company to enter into a JV agreement,

(ii) The copies of MOA (Memorandum of Association) / AOA (Articles of Association) of the company

(iii) A copy of Certificate of Incorporation

(iv) A copy of Authorization/copy of Power of Attorney issued by the Company (backed by the resolution of Board of Directors) in favour of the individual, to sign the tender, sign MOU/JV Agreement on behalf of the company and create liability against the company.

1.3.32.14.4 In case one or more members of the JV is/are LLP firm/s, the following documents shall be submitted:

(i) A copy of LLP Agreement.

(ii) A copy of Certificate of Incorporation of LLP.

(iii) A copy of resolution passed by partners of LLP firm, permitting the Firm to enter into a JV agreement.

(iv) A copy of Authorization /copy of Power of Attorney issued by the LLP firm (backed by resolution passed by the Partners) in favour of the individual, to sign the tender and/or sign the MOU/ JV agreement on behalf of the LLP and create liability against the LLP.

(v) An undertaking by all partners of the LLP that they are not blacklisted or debarred by DFCCIL/Railways or any other Ministry / Department of the Govt. of India from participation in tenders / contracts as on the date of submission of bids, either in their individual capacity or in any firm/LLP or JV in which they were / are partners/members. Any Concealment / wrong

information in regard to above shall make the contract liable for determination under Clause 62 of the Standard General Conditions of Contract.

1.3.32.14.5 In case one or more members of the JV is/are Society/s or Trust/s, the following documents shall be submitted:

(i) A copy of Certificate of Registration
(ii) A copy of Memorandum of Association of Society/Trust Deed
(iii) A copy of Rules & Regulations of the Society
(iv) A copy of Power of Attorney, in favour of the individual to sign the tender documents and create liability against the Society/Trust.

1.3.32.14.6 All other documents in terms of Para 1.3.13.(i) of the Preamble and General Instruction to Tenderers, Part I, Chapter III above.

1.3.32.15 Credentials & Qualifying Criteria: Technical, financial eligibility and Bid capacity of the JV shall be adjudged based on satisfactory fulfilment of the following criteria:

1.3.32.15.1 Technical Eligibility Criteria ('a' or 'b' mentioned hereunder):

(a) For Works without composite components

The technical eligibility for the work as per para 1.3.13.(i)(A) Preamble & General Instruction to tenderer above, shall be satisfied by either the 'JV in its own name & style' or 'Lead member of the JV'.

Each other (non-lead) member(s) of JV, who is/ are not satisfying the technical eligibility for the work as per para 1.3.13.(i)(A) Preamble & General Instruction to tenderer above, shall have technical capacity of minimum 10% of the cost of work i.e., each non-lead member of JV member must have satisfactorily completed or substantially completed during the last 07 (seven) years, ending last day of month previous to the one in which tender is invited, one similar single work for a minimum of 10% of advertised value of the tender.

(b) For works with composite components

The technical eligibility for major component of work as per para 1.3.13.(i)(A) Preamble & General Instruction to tenderer above, shall be satisfied by either the 'JV in its own name & style' or 'Lead member of the JV' and technical eligibility for other component(s) of work as per para 1.3.13.(i)(A) Preamble & General Instruction to tenderer above, shall be satisfied by either the 'JV in its own name & style' or 'any member of the JV'.

Each other (non-lead) member(s) of JV, who is/ are not satisfying the technical eligibility for any component of the work as per para 1.3.13.(i)(A) Preamble & General Instruction to tenderer above, shall have technical capacity of minimum 10% of the cost of any component of work mentioned in technical eligibility criteria. i.e., each other (non-lead) member of must have satisfactorily completed or substantially completed during the last 07 (seven) years, ending last day of month previous to the one in which tender is invited, one similar single work for a minimum of 10% of cost of any component of work mentioned in technical eligibility criteria.

Note for Para 1.3.32.15.1:

(a) The Major component of the work for this purpose shall be the component of work having highest value. In cases where value of two or more component of work is same, any one work can be classified as Major component of work.

(b) Value of a completed work done by a Member in an earlier JV shall be reckoned only to the extent of the concerned member's share in that JV for the purpose of satisfying his/her compliance to the above mentioned technical eligibility criteria in the tender under consideration.

1.3.32.15.2 **Financial Eligibility Criteria**

The JV shall satisfy the requirement of "Financial Eligibility" mentioned at para 1.3.13(i)(B) above. The "financial capacity" of the lead member of JV shall not be less than 51% of the financial eligibility criteria mentioned at para 1.3.13(i)(B) above.

The arithmetic sum of individual "financial capacity" of all the members shall be taken as JV's "financial capacity" to satisfy this requirement.

Note: Contractual payment received by a Member in an earlier JV shall be reckoned only to the extent of the concerned member's share in that JV for the purpose of satisfying compliance of the above mentioned financial eligibility criteria in the tender under consideration.

1.3.32.15.3 **Bid Capacity**

The JV shall satisfy the requirement of "Bid Capacity" requirement mentioned at para 1.3.13(i)(C) above. The arithmetic sum of individual "Bid capacity" of all the members shall be taken as JV's "Bid capacity" to satisfy this requirement.

1.3.33 Participation of Partnership Firms in works tenders:

1.3.33.1 The Partnership Firms participating in the tender should be legally valid under the provisions of the Indian Partnership Act.

1.3.33.2 The partnership firm should have been in existence or should have been formed prior to submission of tender. Partnership firm should have either been registered with the Registrar or the partnership deed should have been notarized as per the Indian Partnership Act, prior to submission of tender.

1.3.33.3 Separate identity / name should be given to the partnership firm. The partnership firm should have PAN / TAN number in its own name and PAN / TAN number in the name of any of the constituent partners shall not be considered. The valid constituents of the firm shall be called partners.

1.3.33.4 Once the tender has been submitted, the constitution of the firm shall not normally be allowed to be modified / altered / terminated during the validity of the tender as well as the currency of the contract except when modification becomes inevitable due to succession laws etc., in which case prior permission should be taken from DFCCIL/Railway and in any case the minimum eligibility criteria should not get vitiated. The re-constitution of firm in such cases should be followed by a notary certified Supplementary Deed. The approval for change of constitution of the firm, in any case, shall be at the sole discretion of the DFCCIL

/Railways and the tenderer shall have no claims what-so-ever. Any change in the constitution of Partnership firm after submission of tender shall be with the consent of all partners and with the signatures of all partners as that in the Partnership Deed. Failure to observe this requirement shall render the offer invalid and full Bid Security shall be forfeited.

If any Partner/s withdraws from the firm after submission of the tender and before the award of the contract, the offer shall be rejected and Bid Security of the tenderer will be forfeited. If any new partner joins the firm after submission of tender but prior to award of contract, his / her credentials shall not qualify for consideration towards eligibility criteria either individually or in proportion to his share in the previous firm. In case the tenderer fails to inform DFCCIL/Railway beforehand about any such changes / modification in the constitution which is inevitable due to succession laws etc. and the contract is awarded to such firm, then it will be considered a breach of the contract conditions liable for determination of the contract under Clause 62 of the Standard General Conditions of Contract.

1.3.33.5 A partner of the firm shall not be permitted to participate either in his individual capacity or as a partner of any other firm in the same tender.

1.3.33.6 The tender form shall be submitted only in the name of partnership firm. The Bid Security shall be submitted by partnership firm. The Bid Security submitted in the name of any individual partner or in the name of authorized partner (s) shall not be considered.

1.3.33.7 On issue of Letter of Acceptance (LOA) to the partnership firm, all the guarantees like Performance Guarantee, Guarantee for various Advances to the Contractor shall be submitted only in the name of the partnership firm and no splitting of guarantees among the partners shall be acceptable.

1.3.33.8 On issue of Letter of Acceptance (LOA), contract agreement with partnership firm shall be executed in the name of the firm only and not in the name of any individual partner.

1.3.33.9 In case the Letter of Acceptance (LOA) is issued to a partnership firm, the following undertakings shall be furnished by all the partners through a notarized affidavit, before signing of contract agreement.

(a) Joint and several liabilities:

The partners of the firm to which the Letter of Acceptance (LOA) is issued, shall be jointly and severally liable to the DFCCIL/Railway for execution of the contract in accordance with General and Special Conditions of the Contract. The partners shall also be liable jointly and severally for the loss, damages caused to the DFCCIL / Railway during the course of execution of the contract or due to non-execution of the contract or part thereof.

(b) Duration of the partnership deed and partnership firm agreement:

The partnership deed/partnership firm agreement shall normally not be modified/altered/ terminated during the currency of contract and the

maintenance period after the work is completed as contemplated in the conditions of the contract. Any change carried out by partners in the constitution of the firm without permission of DFCCIL/Railway, shall constitute a breach of the contract, liable for determination of the contract under Clause 62 of the Standard General Conditions of Contract.

(c) Governing laws: The partnership firm agreement shall in all respect be governed by and interpreted in accordance with the Indian laws.

(d) No partner of the firm shall have the right to assign or transfer the interest right or liability in the contract without the written consent of the other partner/s and that of the DFCCIL/Railway.

1.3.33.10 The tenderer shall clearly specify that the tender is submitted on behalf of a partnership firm. The following documents shall be submitted by the partnership firm, with the tender:

a. A notarized copy of the Partnership Deed or a copy of the Partnership deed registered with the Registrar.
b. A notarized or registered copy of Power of Attorney in favour of the individual to tender for the work, sign the agreement etc. and create liability against the firm.
c. An undertaking by all partners of the partnership firm that they are not blacklisted or debarred by DFCCIL/Railways or any other Ministry / Department of the Govt. of India from participation in tenders / contracts as on the date of submission of bids, either in their individual capacity or in any firm/LLP in which they were / are partners/members. Any Concealment / wrong information in regard to above shall make the bid ineligible or the contract shall be determined under Clause 62 of the Standard General Conditions of Contract.
d. All other documents in terms of Para 1.3.13 (i) of the Preamble and General Instruction to Tenderers Part I, Chapter III.

1.3.33.11 **Evaluation of eligibility of a partnership firm:**

Technical and financial eligibility of the firm shall be adjudged based on satisfactory fulfilment of the eligibility criteria laid down in Para 1.3.13 (i) of the Preamble and General Instruction to Tenderers Part I, Chapter III.

PART - I

CHAPTER IV

GENERAL CONDITIONS OF CONTRACT

GENERAL CONDITIONS OF CONTRACT

DEFINITIONS AND INTERPRETATION

1. (1) Definition: - In these General conditions of Contract, the following terms shall have the meaning assigned hereunder except where the context otherwise requires:-

(a) "Railway" shall mean the President of the Republic of India or the Administrative Officers of the DFCCIL or of the Successor DFCCIL authorized to deal with any matters which these presents are concerned on his behalf.

(b) "DFCCIL" shall mean Dedicated Freight Corridor Corporation of India Ltd, a Govt. of India Enterprise (under Ministry of Railways) and a company incorporated under the provisions of the Companies Act, 1956 having it's registered office at 5th Floor, Supreme Court Metro Station Complex, New Delhi-110001 represented through its Managing Director or CGM/GM (hereinafter referred to as "DFCCIL") which expression shall, unless repugnant to the context, be deemed to include it's successors and assigns.

(c) "MD/DFCCIL" shall mean the officer - in-charge of the General Superintendence and Control of the DFCCIL (MD) and shall mean and include their successors, of the successor of DFCCIL (hereinafter referred to as "MD/DFCCIL").

(d) "CGM" shall mean the officer - in-charge of the CGM unit of DFCCIL and shall also include GM(Co) of DFCCIL.

(e) "Engineer" shall mean Dy. CPM/DFCCIL or any other superior official of DFCCIL or PMC appointed by DFCCIL.

(f) "Engineer's Representative" shall mean the PM/Dy.PM/APM /JPM/Sr. Executive/Executive in direct charge of the work and shall include appointed by the DFCCIL and shall mean and include the Engineer's Representative of the successor DFCCIL.

(g) "Contractor" shall mean the person / Firm / Company / JV whether incorporated or not who enters into the contract with the DFCCIL and shall include their executors, administrators, and successors and permitted assigns.

(h) "Contract" shall mean and include the Agreement of Work Order, the accepted Schedule of Rates of IR or the Schedule or Rates of CPWD modified by the tender percentage for items of works quantified, or not quantified, the Standard General Conditions of Contract, the Special Conditions of Contracts, if any; the Drawing, the Specifications, the Special Specifications, if any and Tender Forms, if any and all other documents included as part of contract.

(i) "Works" shall mean the works to be executed in accordance with the contract.

(j) "Specifications" shall mean the Specifications for materials and works referred / mentioned in tender documents.

(k) "Schedule of rates of Railway" shall mean the schedule of rates issued under the authority of the Chief Engineer from time to time and shall also include Rates specified in tender document.

Standard Schedule of Rates (SSOR) shall mean the schedule of Rates adopted by the Railway, which includes-

(i) "Unified Standard Schedule of Rates of the Railway (USSOR)" i.e. the Standard Schedule of Rates of the Railway issued under the authority of the Chief Engineer from time to time, updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents;

(ii) "Delhi Schedule Of Rates (DSR)" i.e. the Standard Schedule of Rates published by Director General/ Central Public Works Department, Government of India, New Delhi, as adopted and modified by the Railway under the authority of the Chief Engineer from time to time, updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents.

(l) "Drawing" shall mean the maps, drawings, plans and tracings or prints there of annexed to the contract and shall include any modifications of such drawings and further drawings as may be issued by the Engineer from time to time.

(m) "Constructional Plan" shall mean all appliances or things of whatsoever nature required for the execution, completion or maintenance of the works or temporary works (as hereinafter defined) but does not include materials or other things intended to form or forming part of the permanent work.

(n) "Temporary Works" shall mean all temporary works of every kind required for the execution completion and/or maintenance of the works.

(o) "Site" shall mean the lands and other places on, under, in or through which the works are to be carried out and any other lands or places provided by the Railway/DFCCIL for the purpose of the contract.

(p) "Period of Maintenance" shall mean the defect liability period from the date of completion of the works as certified by the Engineer.

(q) "Bid" or "Tender", "Bidder" or "Tenderer" wherever appearing in this document shall have the same and interchangeable meaning.

(r) Date of inviting tender shall be the date of publishing tender notice on IREPS

website if tender is published on website or the date of publication in newspaper in case tender is not published on website.

(s) "Contractor's authorised engineer" shall mean a graduate engineer having more than 3 years experience in the relevant field of construction work involved in the contract, duly approved by Engineer.

1.(2) Singular and Plural:- Words importing the singular number shall also include the plural and vice versa where the context requires.

1.(3) Headings & marginal headings:-The headings and marginal headings in these general conditions are solely for the purpose of facilitating reference and shall not be deemed to be part thereof or be taken into consideration in the interpretation or construction thereof or the contract.

GENERAL OBLIGATION

2. (1) **Execution Co-relation and intent of contract Documents:-**The contract documents shall be signed in triplicate by the DFCCIL and the Contractor. The contract documents are complementary, and what is called for by any one shall be as binding as if called for by all, the intention of the documents is to include all labour and materials, equipment's and transportation necessary for the proper execution of work. Materials or work not covered by or properly inferable from any heading or class of the specifications shall not be supplied by the DFCCIL to the contractors unless distinctly specified in the contract documents. Materials or works described in words which so applied have a well-known technical or trade meaning shall be held to refer to such recognized standards.

2.(2) If a work is transferred from the jurisdiction of one Railway to another Railway or to a Project Authority/ DFCCIL or vice versa while contract is in subsistence, the contract shall be binding on the Contractor and the Successor Railway/DFCCIL Project in the same manner & take effect all respects as if the Contractor and the Successor Project were parties there to from the inception and the corresponding officer or the Competent Authority in the Successor Railway/DFCCIL Project will exercise the same powers and enjoy the same authority as conferred to the Predecessor Railway/DFCCIL Project under the original contract/agreement entered into.

2.(3) If for administrative or other reasons the contract is transferred to the Successor Railway/Successor Project Authority of DFCCIL the contract shall not withstanding any things contained herein contrary there to, be binding on the Contractor and the Successor Railway /Project Authority/ DFCCIL in the same manner and take effect in all respect as if the Contractor and the Successor Railway/ successor Project Authority of DFCCIL had been parties thereto from the date of this contract. The contract shall be Administered/Managed by GGM/GM/Co/ GM nominated by DFCCIL.

3. (1) **Law governing the contract:-** The contract shall be governed by the law for the time being in force in the Republic of India.

3.(2) Compliance to regulations and bye-laws:-The contractor shall conform to the provision of any statute relating to the works and regulations and by-laws of any location authority and of any water and lighting companies or undertakings, with whose system the work is proposed to be connected and shall before making any variation from the drawings or the specifications that may be necessitated by so confirming give to the Engineer notice specifying the variation proposed to be made and the reasons for making the variation and shall not carry out such variation until he has received instructions from the Engineer in respect thereof. The contractor shall be bound to give all notices required by statute, regulations or bye-laws as aforesaid and to pay all fees and taxes payable to any authority in respect thereof.

3.(3) Environmental and Forest clearances:

The DFCCIL/Railway represents and warrants that the environmental and forest clearances pertaining to the work commensurate with the progress of work/agreed programme, will be obtained by Engineer. In the event of any delay in securing respective clearances leading to delay in execution of work, the Contractor shall be entitled to Extension of Time for the period of such delay in accordance with the provisions of Clause-17A(ii).

4. **Communications to be in writing:-** All notices, communications, reference and complaints made by the Railway/DFCCIL or the Engineer or the Engineer's Representative or the Contractor inter-se concerning the works shall be in writing or e- mail on registered e-mail IDs i.e. the e mail id provided for correspondence in the contract agreement, otherwise email id registered with IREPS and no notice, communication, reference or complaint not in writing or through e-mail, shall be recognized.

5. **Service of Notices on Contractors:-** The contractor shall furnish to the Engineer the name designation and address of his authorized agent and all complaints, notices, communications and references shall be deemed to have been duly given to the contractor if delivered to the contractor or his authorized agent or left at or posted to the address so given and shall be deemed to have been so given in the case of posting on day on which they would have reached such address in the ordinary course of post/email or on the day on which they were so delivered or left. In the case of contract by partners, any change in the constitution of the firm shall be forthwith notified by the contractor to the Engineer.

6. **Occupation and use of land:-** No land belonging to or in the possession of the Railway/DFCCIL shall be occupied by the Contractor without the permission of the Railway/DFCCIL. The Contractor shall not use, or allow to be used; the site for any purposes other than that of executing the works. Whenever non-railway bodies/persons are permitted to use Railway/DFCCIL premises with competent authority's approval, conservancy charges as applicable from time to time may be levied.

7. **Assignment or subletting of contract: -** The contractor shall not assign or sublet the contract or any part thereof or allow any person to become interested therein any manner whatsoever without the special permission in writing of the DFCCIL. Any breach of this condition shall entitle the DFCCIL to rescind the contract under clause 62 of these conditions and also render the contractor liable for payment to the DFCCIL in respect of any loss or damage arising or ensuing from such cancellation. Provided always that execution of the details of the work by petty contractor under the direct and personal supervision of the Contractor or his agent shall not be deemed to be sub-letting under this clause.

   In case Contractor intends to subcontract part of work, he shall submit a proposal in writing seeking permission of GM/Dy.CPM/DFCCIL for the same. While submitting the proposal to Railway/DFCCIL, Contractor shall ensure the following:

   (a)) (i) Total value of work to be assigned to sub-contractor(s) shall not be more than 50% of total contract value.

(ii) The subcontractor shall have successfully completed at least one work similar to work proposed for subcontract costing not less than 35% value of work to be sublette, in last 5 years through a works contract directly given to him by a Govt. Department; or by a Public listed company having average annual turnover of Rs 500 crore and above in last 3 financial years excluding the current financial year, listed on National Stock Exchange or Bombay Stock Exchange, registered at least 5 years back from the date of submission of proposal by Contractor to Railway/DFCCIL and work experience certificate issued by a person authorised by the Public Listed Company to issue such certificates.

The subcontractor shall have successfully completed at least one work similar to work proposed for subcontract in last 5 years, ending date of submission of proposal by Contractor to Railway/DFCCIL, costing not less than 35% value of work to be subletted, through a works contract. For fulfilment of above, Work Experience Certificate issued by a Govt. Department/Organisation shall be considered. Further, Work Experience Certificate issued by a Public listed company shall be considered provided the company is having average annual turnover of Rs 500 crore and above in last 3 financial years excluding the current financial year, listed on National Stock Exchange or Bombay Stock Exchange, registered at least 5 years back from the date of submission of proposal by Contractor to Railway/DFCCIL and work experience certificate issued by a person authorised by the Public Listed Company to issue such certificates.
Note: for subletting of work costing up to Rs 50 lakh no previous work experience shall be asked for by the Railway/DFCCIL.

In case contractor submits subcontractor's work experience certificate issued by public listed company, the contractor shall also submit along with work experience certificate, the relevant copy of work order, bill of quantities, bill wise details of payment received duly certified by Chartered Accountant, TDS certificates for all payments received and copy of final/last bill paid by company in support of above work experience certificate.

(iii) There is no banning of business with the sub-contractor in force over IR.

(b) The Contractor shall provide to the Engineer a copy of the agreement to be entered into by Contractor with subcontractor. No subcontractor shall be permitted without a formal agreement between Contractor and subcontractor. This agreement shall clearly define the scope of work to be carried out by subcontractor and the terms of payment in clear & unambiguous manner.

(c) On receipt of approval from GM/Dy.CPM/DFCCIL, Contractor shall enter into a formal agreement legally enforceable in Court of Law with subcontractor and submit a copy of the same to the Engineer.

(d) The Contractor shall intimate to the Engineer not less than 7 days in

advance, the intended date of commencement of subcontractor's work.

(e) Once having entered into above arrangement, Contractor shall discontinue such arrangement, if he intends to do so at his own or on the instructions of Railway/DFCCIL, with prior intimation to GM/Dy.CPM/DFCCIL.

(f) The Contractor shall indemnify Railway /DFCCIL against any claim of subcontractor.

(g) The Contractor shall release payment to the Sub-contractor(s) promptly and shall endeavour to resolve all issues amicably and speedily with the Sub-contractor(s), so that the execution of work is not affected in any manner whatsoever.

(h) In addition to issuance of work experience certificate to Contractor, the Engineer, when, based on documents, is satisfied that subcontracted work has been carried out by subcontractor, shall issue work experience certificate to the subcontractor also for the portion of work subcontracted and successfully completed by the sub-contractor.

(i) The responsibility of successful completion of work by subcontractor shall lie with Contractor. Subcontracting will in no way relieve the Contractor to execute the work as per terms of the Contract.

(j) Further, in case Engineer is of the view that subcontractor's performance is not satisfactory, he may instruct the Contractor to remove the subcontractor from the work and Contractor has to comply with the above instructions with due promptness. Contractor shall intimate the actual date of discontinuation of subcontract to Engineer. No claim of Contractor whatsoever on this account shall be entertained by the Railway/DFCCIL and this shall be deemed as "excepted matter" (matter not arbitrable).

(k) The permitted subletting of work by the contractor shall not establish any contractual relationship between the sub- contractor and the DFCCIL and shall not relieve the contractor of any responsibility under the contract.

8. Assistance by the DFCCIL for the Stores to be obtained by the Contractor:- Owing to difficulty in obtaining certain materials (including Tools & Plant) in the market, the DFCCIL may have agreed without any liability therefore to endeavour to obtain or assist the contractor in obtaining the required quantities of such materials as may be specified in the tender. In the event of delay or failure in obtaining the required quantities of the aforesaid material the contractor shall not be deemed absolved of his own responsibility and shall keep in touch with day to day positions regarding their availability and accordingly adjust progress of works including employment of labour and the DFCCIL shall not in any way be liable for the supply of materials or for the non-supply thereof for any reasons whatsoever nor for any lossor damage arising in consequence of such delay or no supply.

9. Deleted

10. Use of Ballast Trains: The Railway/DFCCIL may agree to allow the Contractor use of the ballast or material trains under such conditions as shall be specially prescribed, provided that the Contractor shall pay for the use thereof charges calculated at public tariff rates on the marked carrying capacity of each vehicle subject to specified minimum charge per day or part of day and provided further that the Contractor shall indemnify the Railway/DFCCIL

against any claims or damages arising out of the use or misuse thereof and against any liabilities under the Workmen's Compensation Act, 1923 or any statutory amendments thereto.

11. **Carriage of materials:-** No forwarding orders shall be issued by the DFCCIL for the conveyance of contractor's materials, tools and plant by Rail which may be required for use in the works and the contractor shall pay full freight charges at public tariff rates therefore.

12. **Representation on Works: -** The contractor shall, when he is not personally present on the site of the works place and keep a responsible agent at the works during working hours who shall on receiving reasonable notice, present himself to the Engineer and orders given by the Engineer or the engineer's representative to the agent shall be deemed to have the same force as if they had been given to the Contractor. Before absenting himself, the contractor shall furnish the name and address of his agent for the purpose of this clause and failure on the part of the Contractor to comply with this provision at any time will entitle the DFCCIL to rescind the contract under clause 62 of these conditions.

13. **Relics and Treasures:-** All gold, silver, oil and other minerals of any description and all precious stones, coins, treasures relics antiquities and other similar things which shall be found in or upon the site shall be the property of the DFCCIL and the Contractor shall duly preserve the same to the satisfaction of the DFCCIL and shall from time to time deliver the same to such person or persons as the DFCCIL may appoint to receive the same.

14. **Excavated material:-**The contractor shall not sell or otherwise dispose of or remove except for the purpose of this contract, the sand, stones, clay, ballast, earth, rock or other substances or materials which may be obtained from any excavation made for the purpose of the works or any building or produced upon the site at the time of delivery of the possession thereof but all the substances, materials, buildings and produce shall be the property of the DFCCIL provided that the contractor may, with the permission of the Engineer, use the same for the purpose of the works either free of cost or pay the cost of the same at such rates as may be determined by the Engineer.

15. **Indemnity by Contractors:-** The contractor shall indemnify and save harmless the Railway/DFCCIL from and against all actions, suit proceedings losses, costs, damages, charges, claims and demands of every nature and description brought or recovered against the Railways/DFCCIL by reason of any act or omission of the contractor, his agents or employees, in the execution of the works or in his guarding of the same. All sums payable by way of compensation under any of these conditions shall be considered as reasonable compensation to be applied to the actual loss or damage sustained, and whether or not any damage shall have been sustained.

16. **Security Deposit**

16.(1) Security Deposit: The Security Deposit shall be 5% of the contract value. The Bid Security submitted by the Contractor with his tender will be retained/encashed by the Railways/DFCCIL as part of security for the due and faithful fulfilment of the contract by the Contractor. Provided further that, if Contractor submits the Cash or Term Deposit Receipt issued from a Scheduled commercial bank of India or irrevocable Bank Guarantee Bond from a Scheduled commercial bank of India,

either Towards the Full Security Depositor the Part Security Deposit equal to or more than Bid Security, the Railway/DFCCIL shall return the Bid Security, to the Contractor.

Balance of Security Deposit may be deposited by the Contractor in cash or Term Deposit Receipt issued from Scheduled commercial bank of India or irrevocable Bank Guarantee bond issued from Scheduled commercial bank of India, or may be recovered at the rate of 6% of the bill amount till the full Security Deposit is recovered. Provided also that in case of defaulting Contractor, the Railway/DFCCIL may retain any amount due for payment to the Contractor on the pending "on account bills" so that the amounts so retained (including amount guaranteed through Performance Guarantee) may not exceed 10% of the total value of the contract.

The Irrevocable Bank Guarantee submitted towards Security deposit shall be initially valid up to the stipulated date of Maintenance period plus 60 days and shall be extended from time to time, depending upon extension of contract granted in terms of Clause 17A and 17B of the Standard General Conditions of Contract.
Note: Security Deposit deposited in cash by the Contractor or recovered from the running bills of a Contractor or submitted by contractor as Term Deposit Receipt(s) can be refunded/returned to the contractor, in lieu of irrevocable Bank Guarantee bond issued from scheduled commercial bank of India, to be submitted by him, for an amount equal to or more than the already available Security Deposit, provided however that, in a contract of value less than Rs. 50 Crore, such refund/ return of the already available Security Deposit is permitted up to two times and in a contract of value equal to or more than Rs. 50 Crore, such refund / return of the already available Security Deposit is permitted up to three times.

16.(2) (i) Refund of Security Deposit: Security Deposit mentioned in sub clause (1) above shall be returned to the Contractor along with or after, the following:

(a) Final Payment of the Contract as per clause 51.(1) and
(b) Execution of Final Supplementary Agreement or Certification by Engineer that Railway/DFCCIL has No Claim on Contractor and
(c) Maintenance Certificate issued, on expiry of the maintenance period as per clause 50.(1), in case applicable.

16. (2) (ii) Forfeiture of Security Deposit: Whenever the contract is rescinded as a whole under clause 62 (1) of these conditions, the Security Deposit already with railways/DFCCIL under the contract shall be forfeited. However, in case the contract is rescinded in part or parts under clause 62 (1) of these conditions, the Security Deposit shall not be forfeited.

16.(3) No interest shall be payable upon the Bid Security and Security Deposit or amounts payable to the Contractor under the Contract, but Government Securities deposited in terms of Sub-Clause 16.(4)(b) of this clause will be payable with interest accrued thereon.

16.(4) Performance Guarantee

The procedure for obtaining Performance Guarantee is outlined below:

(a) The successful bidder shall have to submit a Performance Guarantee (PG) within 21 (Twenty one) days from the date of issue of Letter of Acceptance (LOA). Extension of time for submission of PG beyond 21 (Twenty one) days and upto 60 days from the date of issue of LOA may be given by the Authority who is competent to sign the contract agreement. However, a penal interest of 12% per annum shall be charged for the delay beyond 21(Twenty one) days, i.e. from 22nd day after the date of issue of LOA. Further, if the 60th day happens to be a declared holiday in the concerned office of the Railway/DFCCIL, submission of PG can be accepted on the next working day.

In all other cases, if the Contractor fails to submit the requisite PG even after 60 days from the date of issue of LOA, the contract is liable to be terminated. In case contract is terminated Railway/DFCCIL shall be entitled to forfeit Bid Security and other dues payable to the contractor against that particular contract, subject to maximum of PG amount. In case a tenderer has not submitted Bid Security on the strength of their registration as a Startup recognized by Department of Industrial Policy and Promotion (DIPP) under Ministry of Commerce and Industry, DIPP shall be informed to this effect.

The failed Contractor shall be debarred from participating in re-tender for that work.

(b) The successful bidder shall submit the Performance Guarantee (PG) in any of the following forms, amounting to 3% of the original contract value:-

(i) A deposit of Cash;
(ii) Irrevocable Bank Guarantee;
(iii) Government Securities including State Loan Bonds at 5% below the market value;
(iv) Pay Orders and Demand Drafts tendered by any Scheduled Commercial Bank of India;
(v) Guarantee Bonds executed or Deposits Receipts tendered by any Scheduled Commercial Bank of India;
(vi) Deposit in the Post Office Saving Bank;
(vii) Deposit in the National Savings Certificates;
(viii) Twelve years National Defence Certificates;
(ix) Ten years Defence Deposits;
(x) National Defence Bonds and
(xi) Unit Trust Certificates at 5% below market value or at the face value whichever is less. Also, FDR in favour of FA&CAO (free from any encumbrance) may be accepted.

(c) The Performance Guarantee shall be submitted by the successful bidder after the Letter of Acceptance (LOA) has been issued, but before signing of the contract agreement. This P.G. shall be initially valid upto the stipulated date of completion plus 60 days beyond that. In case, the time for completion of work gets extended, the Contractor shall get the validity of P.G. extended to cover such extended time for completion of work plus 60 days.

(d) The value of PG to be submitted by the Contractor is based on original contract value and shall not change due to subsequent variation(s) in the original contract value.

(e) The Performance Guarantee (PG) shall be released after physical completion of the work based on 'Completion Certificate' issued by the competent authority stating that the Contractor has completed the work in all respects satisfactorily.

(f) Whenever the contract is rescinded, the Performance Guarantee already submitted for the contract shall be encashed.

(g) The Engineer shall not make a claim under the Performance Guarantee except for amounts to which the President of India/DFCCIL is entitled under the contract (not withstanding and/or without prejudice to any other provisions in the contract agreement) in the event of:

(i) Failure by the Contractor to extend the validity of the Performance Guarantee as described herein above, in which event the Engineer may claim the full amount of the Performance Guarantee.

(ii) Failure by the Contractor to pay President of India/DFCCIL any amount due, either as agreed by the Contractor or determined under any of the Clauses/Conditions of the Agreement, within 30 days of the service of notice to this effect by Engineer.

(iii) The Contract being determined or rescinded under clause 62 of these conditions.

16. **Force Majeure Clause:-** If at any time, during the continuance of this contract, the Performance in whole or in part by either party of any obligation under this contract shall be prevented or delayed by reason of any war, hostility, acts of public enemy, civil commotion, sabotage, serious loss or damage by fire, explosions, epidemics, strikes, lockouts or act of God (hereinafter, referred to events) provided, notice of the happening of any such event is given by either party to the other within 30 days from the date of occurrence thereof, neither party shall by reason of such event, be entitled to terminate this contract nor shall either party have any claim for damages against the other in respect of such non- performance of delay in performance, and works under the contract shall be resumed as soon as practicable after such event has come to an end or ceased to exist, and the decision of the Engineer as to whether the works have been so resumed or not shall be final and conclusive, provided further that if the performance in whole or in part of any obligation under this contract is prevented or delayed by reason of any such event for a period exceeding 120 days, either party may at its option terminate the contract by giving notice to the other party.

17A Extension of Time in Contracts (ACS no. 01 dt. 14.07.2022): Subject to any requirement in the contract as to completion of any portion or portions of the works before

completion of the whole, the Contractor shall fully and finally complete the whole of the works comprised in the contract (with such modifications as may be directed under conditions of this contract) by the date entered in the contract or extended date in terms of the following clauses:

(i) Extension due to Modification: If any modifications have been ordered which in the opinion of the Engineer have materially increased the magnitude of the work, then such extension of the contracted date of completion may be granted as shall appear to the Engineer to be reasonable in the circumstances, provided moreover that the Contractor shall be responsible for requesting such extension of the date as may be considered necessary as soon as the cause thereof shall arise.

(ii) Extension for Delay not due to Railway/DFCCIL or Contractor: If in the opinion of the Engineer, the progress of work has any time been delayed by any act or neglect of Railway's/DFCCIL employees or by other Contractor employed by the Railway/DFCCIL under Sub-Clause (4) of Clause 20 of these Conditions or in executing the work not forming part of the contract but on which Contractor's performance necessarily depends or by reason of proceeding taken or threatened by or dispute with adjoining or to neighbouring owners or public authority arising otherwise through the Contractor's own default etc. or by the delay authorized by the Engineer pending arbitration or in consequences of the Contractor not having received in due time necessary instructions from the Railway/DFCCIL for which he shall have specially applied in writing to the Engineer or his authorized representative then upon happening of any such event causing delay, the Contractor shall immediately give notice thereof in writing to the Engineer within 15 days of such happening, but shall nevertheless make constantly his best endeavours to bring down or make good the delay and shall do all that may be reasonably required of him to the satisfaction of the Engineer to proceed with the works. The Contractor may also indicate the period for which the work is likely to be delayed and shall be bound to ask for necessary extension of time.

(iii) Extension for Delay due to Railways/DFCCIL: In the event of any failure or delay by the Railway/DFCCIL to hand over the Contractor possession of the lands necessary for the execution of the works or to give the necessary notice to commence the works or to provide the necessary drawings or instructions or any other delay caused by the Railway/DFCCIL due to any other cause whatsoever, then such failure or delay shall in no way affect or vitiate the contract or alter the character thereof or entitle the Contractor to damages or compensation therefor, but in any such case, the Railway/DFCCIL may grant such extension or extensions of the completion date as may be considered reasonable.

The Contractor shall indicate the period for which the work is likely to be delayed and shall seek extension of time as may be considered necessary under clause 17A(i) or/and 17A(ii) or/ and 17A(iii) above, as soon as the cause thereof shall arise and, in any case, not less than 15 days before the expiry of the date fixed for completion of the works. The Engineer shall consider the same and shall grant and communicate such extension of time as in his opinion is reasonable having regard to the nature and period of delay and the type and quantum of work affected thereby. No other compensation shall be payable for works so carried forward to the extended period of time; the same rates, terms and conditions of contract being applicable, as if such extended period of time was originally provided in the original contract itself.

The non-submission of request for extension or submission of request within less than 15 days before the expiry of the date fixed for completion of the works, shall make him ineligible for extension under these sub clauses, subject to final decision of Engineer.

17B Extension of Time with Liquidated Damages (LD) for delay due to Contractor:

The time for the execution of the work or part of the works specified in the contract documents shall be deemed to be the essence of the contract and the works must be completed not later than the date(s) as specified in the contract. If the Contractor fails to complete the works within the time as specified in the contract for the reasons other than the reasons specified in Clause 17 and 17A, the Railway/DFCCIL may, if satisfied that the works can be completed by the Contractor within reasonable short time thereafter, allow the Contractor for further extension of time (Proforma at Form no. 14) as the Engineer may decide. On such extension the Railway/DFCCIL will be entitled without prejudice to any other right and remedy available on that behalf, to recover from the Contractor as agreed damages and not by way of penalty for each week or part of the week, a sum calculated at the ***rate of liquidated Damages as decided by Engineer, between 0.005% to 0.30% of contract value of the works for each week or part of the work.***

For the purpose of this Clause, the contract value of the works shall be taken as value of work as per contract agreement including any supplementary work order/contract agreement issued. Provided also, that the total amount of liquidated damages under this condition shall not exceed 5% of the contract value or of the total value of the item or groups of items of work for which a separate distinct completion period is specified in the contract.

Provided further, that if the Railway/DFCCIL is not satisfied that the works can be completed by the Contractor and in the event of failure on the part of the contractor to complete the work within further extension of time allowed as aforesaid, the Railway/DFCCIL shall be entitled without prejudice to any other right or remedy available in that behalf, to appropriate the contractor's Security Deposit and rescind the contract under Clause 62 of these Conditions, whether or not actual damage is caused by such default.

NOTE:

In a contract, where extension(s) of time have been allowed once under clause 17B, further request(s) for extension of time under clause 17A can also be considered under exceptional circumstances. Such extension(s) of time under clause 17A shall be without any Liquidated damages, but the Liquidated damages already recovered during extension(s) of time ranted previously under clause 17B shall not be waived. However, Price variation during such extension(s) shall be dealt as applicable for extension(s) of time under clause 17B.

17C Bonus for Early Completion of Work: In open tenders having advertised value more than Rs.50 crore and original period of completion 12 months or more, when there is no reduction in original scope of work by more than 10%, and no extension granted on either railway/DFCCIL or Contractor's account, Contractor shall be entitled for a bonus of 1% for each 30 days early completion of work. The period of less than 30 days shall be ignored while working out bonus. The maximum bonus

shall be limited to 5% of original contract value. The completion date shall be reckoned as the date of issuance of completion certificate by Engineer.

18.(1) **Illegal Gratification:-** Any bribe, commission, gift or advantage given, promised or offered by or on behalf of the Contractor or his partner or agent or servant or anyone on his behalf, to any officer or employee of the Railway/DFCCIL or to any person on his behalf in relation to obtaining or execution of this or any other contract with the Railway/DFCCIL shall, in addition to any criminal liability which he may incur, subject Contractor to the rescission of the contract and all other contracts with the Railway/DFCCIL and to the payment of any loss or damage resulting from such decision and the Railway/DFCCIL shall be entitled to deduct the amounts so payable from the Contractor's bills/Security Deposit or any other dues of Contractor with the Government of India.

18.(2) The contractor shall not lend or borrow from or have or enter into any monitory dealings and transactions either directly or indirectly with any employee of the DFCCIL and if he shall do so, the DFCCIL shall be entitled forthwith to rescind the contract and all other contracts with the DFCCIL. Any question or dispute as to the commission or any such offence or compensation payable to the DFCCIL under this clause shall be settled by the Chief General Manager/Ahmedabad of the DFCCIL, in such a manner as he shall consider fit and sufficient and his decision shall be final and conclusive. In the event of rescission of the contract under this clause, the contractor will not be paid any compensation whatsoever except payments for the work done up to the date of rescission.

EXECUTION OF WORKS

19.(1) **Contractor's understanding:-** It is understood and agreed that the contractor has, by careful examination, satisfied himself as to the nature and location of the work, the conformation of the ground, the character, quality and quantity of the materials to be encountered, the character of equipment and facilities needed preliminary to and during the progress of the works, the general and local conditions, the labour conditions prevailing therein and all other matters which can in any way affect the works under the contract.

19.(2) **Commencement of works:-**The contractor shall commence the works within 10 days after the receipt by him of an order in writing to this affect from the Engineer and shall proceed with the same with due expedition and without delay.

19.(3) **Accepted Programme of work (ACS no. 01 dt. 14.04.2022):-** The contractor who has been awarded the work shall as soon as possible but not later than 30 days after the date of receipt of the acceptance letter in respect of contracts with initial completion period of two years or less or not later than 90 days for other contracts have to submit the detailed programme of work indicating the time schedule of various items of works in the form of Bar Chart/PERT/ Chief General Manager. He shall also submit the details of organization (in terms of labour and supervisors) plant and machinery, that

he intends to utilize (from time to time) for execution of the work within stipulated date of completion. The programme of work amended as necessary by discussions with the Engineer, shall be treated as the agreed programme of the work for the purpose of this contract and the contractor shall endeavour to fulfil this programme of work. The progress of work will be watched accordingly and the liquidated damages will be with reference to the overall completion date. Nothing stated herein shall preclude the contractor in achieving earlier completion of item or whole of the works than indicated in the programme.

In Contracts for works of New Line/Gauge Conversion/Doubling/Railway Electrification, finalized through Tenders having advertised value more than Rs. 100 crores, the Contractor shall submit a detailed time programme to the Engineer within 30 days after issue of LOA. The program shall include the physical and Financial Progress vis-à-vis program and forecast cash flow adopting Project Management Software such as **Primavera/Sure Track/MS Project etc**. The program must identify the milestones, interface requirements and program reporting elements. The Contractor shall supply, free of cost one set of authorized software to the Engineer and the soft copy of structured program for the project. This shall be updated every month. The Contractor shall also submit a revised programme whenever the previous programme is inconsistent with actual progress. Each programme shall include:

The order in which the Contractor intends to carry out the Works, including the anticipated timing of each stage, Contractor's Documents, procurement, manufacture of Plant, delivery to Site, construction, erection and testing, each of these stages for work by each Subcontractor, if any, the sequence and timing of inspections and tests specified in the Contract, and a supporting report which includes:

A general description of the methods which the Contractor intends to adopt, and of the major stages, in the execution of the Works, and
details showing the Contractor's reasonable estimate for the number of each class of Contractor's Personnel &Equipment, required on the Site for each major stage.

Unless the Engineer, within 21 days after receiving a programme, gives notice to the Contractor stating the extent to which it does not comply with the Contract, the Contractor shall proceed in accordance with the programme, subject to his other obligations under the Contract. The Engineer shall be entitled to rely upon the programme when planning their activities.

If, at any time, the Engineer gives notice to the Contractor that a programme fails (to the extent stated) to comply with the Contract or to be consistent with actual progress and the Contractor's stated intentions, the Contractor shall submit a revised programme to the Engineer within 15 days in accordance with this Sub-Clause.

19. (4) Setting out of works:- The contractor shall be responsible for the correct setting out of all works in relation to original points, lines and levels of reference at his cost. The contractor shall execute the work true to alignment, grade, levels and dimensions as shown in the drawing and as directed by

the Engineer's representative and shall check these at frequent intervals. The contractor shall provide all facilities like labour and instruments and shall co- operate with the Engineer's representative to check all alignment, grades, levels and dimensions. If, at any time, during the progress of the works any error shall appear or arise in any part of the work, the contractor, on being required so to do by the Engineer's representative shall, at his own cost rectify such errors, to the satisfaction of the Engineer's representative. Such checking shall not absolve the contractor of his own responsibility of maintaining accuracy in the work. The contractor shall carefully protect and preserve all bench marks, sight rails, pegs and other things used in setting out the work.

20.(1) Compliance to Engineer's instructions:-The Engineer shall direct the order in which the several parts of the works shall be executed and the contractor shall execute without delay all orders given by the Engineer from time to time but the contractor shall not be relieved thereby from responsibility for the due performance of the works in all respects.

20.(2) Alterations to be authorized:-No alterations in or additions to or omissions or abandonment of any part of the works shall be deemed authorized, except under instructions from the Engineer, and the contractor shall be responsible to obtain such instructions in each and every case in writing from the Engineer.

20.(3) Extra works:- Should works over and above those included in the contract require to be executed at the site, the contractor shall have no right to be entrusted with the execution of such works which may be carried out by another contractor or contractors or by other means at the option of the DFCCIL.

20. (4) Separate contracts in connection with works: - The DFCCIL shall have the right to let other contracts in connection with the works. The contractor shall afford other contractors reasonable opportunity for the storage of their materials and the execution of their works and shall properly connect and coordinate his work with theirs. If any part of the contractors work depends for proper execution or result upon the work of another contractor(s), the contractor shall inspect and promptly report to the Engineer any defects in such works that render it unsuitable for such proper execution and results. The contractor's failure so-to inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the reception of his work, except as to defects which may develop in the other contractor's work after the execution of his work.

21. Instruction of Engineer's Representative: - Any instructions or approval given by the Engineer's representative to contractor in connection with the works shall bind the contractor as though it had been given by the Engineer provided always as follows.

(a) Failure of the Engineer's representative to disapprove any work or materials shall not prejudice, the power of the Engineer thereafter to disapprove such work or material and to order the removal or breaking up thereof.

(b) If the Contractor shall be dissatisfied by reason of any decision of the Engineer's representative, he shall be entitled to refer the matter to the Engineer who shall there upon confirm or vary such decision.

22. **(1) Adherence to specifications and drawings**: - The site and the detailed drawings shall be made available to the contractor commensurate with the accepted programme of work submitted under clause 19(3). The whole of the works shall be executed in perfect conformity with the specifications and drawings of the contract. If contractor performs any works in a manner contrary to the specifications or drawings or any of them and without such reference to the Engineer he shall bear all the costs arising or ensuing therefore and shall be responsible for all loss to the DFCCIL.

22. (2) Drawings and specifications of the works: - The contractor shall keep one copy of drawings and specifications at the site, in good order, and such contract documents as may be necessary available to the Engineer or the Engineer's representative.

22.(3) Ownership of drawings and specifications: - All drawings and specifications and copies thereof furnished by the DFCCIL to the Contractor are deemed to be the property of the DFCCIL. They shall not be used on other works and with the exception of the signed contract set, shall be returned by the contractor to the DFCCIL on completion of the work or termination of the contract.

22.(4) Compliance with Contractor's request for details:- The Engineer shall furnish with reasonable promptness, after receipt by him of the contractor's request for the same, additional instructions by means of drawings or otherwise, necessary for the proper execution of the works or any part thereof. All such drawing and instructions shall be consistent with the contract Documents and reasonably inferable there from.

22.(5) Meaning and intent of specification and drawings:- If any ambiguity arises as to the meaning and intent of any portion of the specifications and drawings or as to execution or quality of any work or material, or as to the measurements of the works the decision of the Engineer thereon shall be final subject to the appeal (within 7 days of such decision being intimated to the contractor) to the GM/Dy.CPM/DFCCIL who shall have the power to correct any errors, omissions, or discrepancies in aforementioned items and whose decision in the matter in dispute or doubt shall be final and conclusive.

23 **Working during night: -** The contractor shall not carry out any work between sun-set and sun-rise without the previous permission of the Engineer/DFCCIL.

24. **Damage to Railway / DFCCIL property or private life and property:-**The contractor shall be responsible for all risk to the work and for trespass and shall make good at his own expense all loss or damage whether to the works themselves or to any other property of the Railway or the lives, persons or property of others from whatsoever cause in connection with the works until they are taken over by the Railway/ DFCCIL and this although all reasonable

and proper precautions may have been taken by the contractor, and in case the Railway / DFCCIL shall be called upon to make good any costs, loss or damages, or to pay an compensation, including that payable under the provisions of the Workmen's Compensation Act or any statutory amendments thereof to any person or persons sustaining damages as aforesaid by reason of any act, or any negligence or omissions on the part of the contractor the amount of any costs or charges including costs and charges in connection with legal proceedings, which the Railway / DFCCIL may incur in reference thereto, shall be charged to the contractor. The Railway / DFCCIL shall have the power and right to pay or to defend or compromise any claim of threatened legal proceedings or in anticipation of legal proceedings being instituted consequent on the action or default of the contractor, to take such steps as may be considered necessary or desirable to ward off or mitigate the effect of such proceedings, charging to contractor, as aforesaid any sum or sums of money which may be paid and any expenses whether for reinstatement or otherwise which may be incurred and the propriety of any such payment, defence or compromise, and the incurring of any such expenses shall not be called in question by the contractor.

25. **Sheds, stores houses and Yards**:-The contractor shall at his own expense provide himself with sheds, stores houses and yards in such situations and in such numbers as in the opinion of the Engineer is requisite for carrying on the works and the contractor shall keep at each such sheds, stores houses and yard a sufficient quantity of materials and plant in stock as not to delay the carrying out of the works with due expedition and the Engineer and the Engineer's representative shall have free access to the said sheds, store houses and yards at any time for the purpose of inspecting the stock of materials or plant so kept in hand, and any materials or plan which the Engineer may object to shall not be brought upon or used in the works, but shall be forthwith removed from the sheds, store houses or yards by the contractor. The contractor shall at his own expenses provide and maintain suitable mortar mills, soaking vats or any other equipment necessary for the execution of the works.

26. Provision of efficient and competent Staff at work sites by the Contractor:-

26.1 The contractor shall place and keep on the works at all times efficient and competent staff to give the necessary directions to his workmen and to see that they execute their work in sound and proper manner and shall employ only such supervisors, workmen and labourers in or about the execution of any of these works as are careful and skilled in the various trades.

26.2 The contractor shall at once remove from the works any agents, permitted sub- contractor, supervisor, workman or labourer who shall be objected to by the Engineer and if and whenever required by the Engineer, he shall submit a correct return showing the names of all staff and workmen employed by him.

26.3 In the event of the Engineer being of the opinion that the contractor is not employing on the works a sufficient number of staff and workmen as is necessary for the proper completion of the works within the time prescribed,

the contractor shall forthwith on receiving intimation to this effect deploy the additional number of staff and labour specified by the Engineer within seven days of being so required and failure on the part of the contractor to comply with such instructions will entitle the Railway/DFCCIL to rescind the contract under clause 62 of these conditions.

26A. Deployment of Qualified Engineers at Work Sites by the Contractor:-

26A.1 The contractor shall also employ Qualified Graduate Engineer or Qualified Diploma Holder Engineer, based on value of contract, as may be prescribed by the Ministry of Railways through separate instructions from time to time.

26A.2 In case the contractor fails to employ the Engineer, as aforesaid in Para 26A.1, he shall be liable to pay penalty at the rates, as may be prescribed by the Ministry of Railways through separate instructions from time to time for the default period for the provisions, as contained in Para 26A.1.

26A.3 Deleted

27.(1) Workmanship and testing:- The whole of the works and / or supply of materials specified and provided in the contract or that may be necessary to be done in order to form and complete any part thereof shall be executed in the best and most substantial workman like manner with materials of the best and most approved quality of their respective kinds, agreeable to the particulars contained in or implied by the specifications and as referred to in and represented by the drawings or in such other additional particulars, instructions and drawings may be found requisite to be given during the carrying on of the works and to the entire satisfaction of the Engineer according to the instructions and directions which the contractors may from time to time receive from the Engineer. The materials may be subjected to tests by means of such machines, instruments and appliances as the Engineer may direct and wholly at the expense of the contractor.

27. (2) Removal of improper work and materials:- The Engineer or the Engineer's Representative shall be entitled to order from time to time:

(a) The removal from the site within the time specified in the order of any materials which in his opinion are not in accordance with the specifications or drawings.

(b) The substitution of proper and suitable materials, and

(c) the removal and proper re-execution, notwithstanding any previous tests thereof or on account payments therefore, of any work which in respect of materials or workmanship; is not in his opinion in accordance with the specifications and in case of default on the part of the contractor in carrying out such order the DFCCIL shall be entitled to rescind the contract under clause 62 of these conditions.

(d) The provision of Construction and Demolition Waste Management Rule 2016 issued by Ministry of Environment Forest and Climate Change dated 29.03.2016 and published in the Gazette of India, Part – II, Section -3, Sub-section (ii) are binding upon the Contractor. Contractor shall implement these provisions at worksites, for which no extra payment will be payable.

28. Facilities for inspection:- The contractor shall afford the Engineer and the

Engineer's Representative every facility for entering in and upon every portion of the work at all hours for the purpose of inspection or otherwise and shall provide all labour, materials, planks, ladders, pumps, appliances and things of every kind required for the purpose and the Engineer and the Engineer's Representative shall at all times have free access to every part of the works and to all places at which materials for the works are stored or being prepared.

29. **Examination of work before covering up:-** The contractor shall give 7 days" notice to the Engineer or the Engineer's representative whenever any work or materials are intended to be covered up in the earth, in bodies or walls or otherwise to be placed beyond the reach of measurements in order that the work may be inspected or that correct dimensions may be taken before being so covered, placed beyond the reach of measurement in default whereof, the same shall at the option of the Engineer or the Engineer's representative be uncovered and measured at the contractor's expense or no allowance shall be made for such work or materials.

30. **Temporary Works: -** All temporary works necessary for the proper execution of the works shall be provided and maintained by the contractor and subject to the consent of the Engineer shall be removed by him at his expenses when they are no longer required and in such manner as the Engineer shall direct. In the event of failure on the part of the contractor to remove the temporary works, the Engineer will cause them to be removed and cost as increased by supervision and other incidental charges shall be recovered from the contractor. If temporary huts are provided by the contractor on the Railway / DFCCIL land for labour engaged by him for the execution of works, the contractor shall arrange for handing over vacant possession of the said land after the work is completed; if the contractor's labour refuse to vacate, and have to be rejected by the Railway / DFCCIL necessary expenses incurred by the Railway / DFCCIL in connection therewith shall be borne by the contractor.

31. **(1) Contractor to supply water for works: -** Unless otherwise provided in the contract, the contractor shall be responsible for the arrangements to obtain supply of water necessary for the works.

31.(2) Deleted

31.(3) Deleted

31.(4)(a)Contractor to arrange supply of Electric power for works:- Unless otherwise provided in the contract, the contractor shall be responsible for arrangements to obtain supply of electric power for the works.

31.(4)(b) Deleted

32. **Property in materials and plant:-** The materials and plant brought by the Contractor upon the site or on the land occupied by the Contractor in connection with the works and intended to be used for the execution thereof shall immediately, they are brought upon the site of the said land, be deemed to be the property of the Railway / DFCCIL. Such of them as during the progress of the works are rejected by the Engineer under Clause 25 of these conditions or are declared by him not to be needed for the execution of the

works or such as on the grant of the certificate of completion remain unused shall immediately on such rejection, declaration or grant cease to be deemed the property of the Railway / DFCCIL and the Contractor may then (but not before) remove them from the site or the said land. This clause shall not in any way diminish the liability of the Contractor nor shall the Railway / DFCCIL be in any way answerable for any loss or damage which may happen to or in respect of any such materials or plant either by the same being lost, stolen, injured or destroyed by fire, tempest or otherwise.

33. (1) **Tools, Plant and Materials Supplied by Railway / DFCCIL: -** The Contractor shall take all reasonable care of all tools, plant and materials or other property whether or a like description or not belonging to the Railway/DFCCIL and committed to his charge for the purpose of the works and shall be responsible for all damage or loss caused by him, his agents, permitted subcontractor, or his workmen or others while they are in his charge. The Contractors shall sign accountable receipts for tools, plants and materials made over to him by the engineer and on completion of the works shall hand over the unused balance of the same to the Engineer in good order and repair, fair wear and tear excepted, and shall be responsible for any failure to account for the same or any damage done thereto.

33.(2) **Hire of DFCCIL / Railway's Plant:-** The DFCCIL may hire to the Contractor such plant as concrete mixers, compressors and portable engines for use during execution of the works on such terms as may be specified in the special conditions or in a separate agreement for Hire of Plant.

34. (1) **Precaution during progress of works: -** During the execution of works, unless otherwise specified, the Contractor shall at his own cost provide the materials for and execute all shoring, timbering and strutting works as is necessary for the stability and safety of all structures, excavations and works and shall ensure that no damage, injury or loss is caused or likely to be caused to any person or property.

34.(2) **Roads and Water courses:-** Existing roads or water courses shall not be blocked, cut through, altered, diverted or obstructed in any way by the Contractor, except with the permission of the Engineer. All compensations claimed for any unauthorized closure, cutting through, alterations, diversion or obstruction to such roads or water courses by the Contractor or his agent or his staff shall be recoverable from the Contractor by deduction from any sums which may become due to him in terms of contract, or otherwise according to law.

34.(3) **Provision of access to premises:-** During progress of work in any street or thoroughfare, the Contractor shall make adequate provision for the passage of traffic, for securing safe access to all premises approached from such street or thoroughfare and for any drainage, water supply or means of lighting which may be interrupted by reasons of the execution of the works and shall react and maintain at his own cost barriers, lights and other safeguards as prescribed by the Engineer, for the regulation of the traffic, and provide watchmen necessary to prevent accidents. The works shall in such cases be executed night and day if so ordered by the Engineer and with such vigour so that the traffic way be impeded for as

short a time as possible.

34.(4) **Safety of Public:-** The Contractor shall be responsible to take all precautions to ensure the safety of the public whether on public or DFCCIL/Railway property and shall post such look out men as may in the opinion of the Engineer be required to comply with regulations pertaining to the work.

35. **Deleted.**

36.(1) **Suspension of works:-** The Contractor shall on the order of the Engineer, suspend the progress of the works or any part thereof for such time or times and in such manner as the Engineer may consider necessary and shall during such suspension properly protect and secure the work so far as is necessary in the opinion of the Engineer. If such suspension is:-

(a) Provided for in the contract, or
(b) Necessary for the proper execution of the works or by the reason of weather conditions or by some default on the part of the Contractor, and/or
(c) Necessary for the safety of the works or any part thereof.
(d) Necessary for the safety of adjoining public or other property or safety of the public or workmen or those who have to be at the site, or
(e) Necessary to avoid disruption of traffic and utilities, as also to permit fast repair and restoration of any damaged utilities, or
(f) Due to instruction of The National Green Tribunal or any other statutory authority due to high level of pollution in the city of worksite.

36.(2) The Contractor shall not be entitled to the extra costs, if any, incurred by him during the period of suspension of the works, but in the event of any suspension ordered by the Engineer for reasons other than aforementioned and when each such period of suspensions exceeds 14 days, the contractor shall be entitled to such extension of time for completion of the work as the Engineers may consider proper having regard to the period or periods of such suspensions and to such compensations as the Engineer may consider reasonable in respect of salaries or wages paid by the Contractor to his employees during the periods of such suspension.

36.(3) **Suspension lasting more than 3 months:-** If the progress of the works or any part thereof is suspended on the order of the Engineer for more than three months at a time, the Contractor may serve a written notice on the Engineer requiring permission within 15 days from the receipt thereof to proceed with the works or that part thereof in regard to which progress is suspended and if such permission is not granted within that time the Contractor by further written notice so served may, but is not bound to, elect to treat the suspension where it affects part only of the works as an omission of such part or where it affects the whole of the works, as an abandonment of the contract by the DFCCIL.

37. **Rates for items of works:-** The rates, entered in the accepted Schedule of Rates of the Contract are intended to provide for works duly and properly completed in accordance with the general and special (if any) conditions of the contract and the specifications and drawings together with such enlargements, extensions, diminutions, reductions, alterations or additions as may be ordered in terms of

Clause 42 of these conditions and without prejudice to the generality thereof and shall be deemed to include and cover superintendence and labour, supply, including full freight, of materials, stores, patterns, profiles, moulds, fittings, centring, scaffolding, shoring props, timber, machinery, barracks, tackle, roads, pegs, posts, tools and all apparatus and plant required on the works, except such tools, plant or materials as may be specified in the contract to be supplied to the Contractor by the DFCCIL, the erection, maintenance and removal of all temporary works and, buildings, all watching, lighting, bailing, pumping and draining, all prevention of or compensation for trespass, all barriers and arrangements for the safety of the public or of employees during the execution of works, all sanitary and medical arrangements for labour camps as may be prescribed by the DFCCIL, the setting of all work and of the construction, repair and upkeep of all centre lines, bench marks and level pegs thereon, site clearance, all fees duties, royalties, rent and compensation to owners for surface damage or taxes and impositions payable to local authorities in respect of land, structures and all material supplied for the work or other duties of expenses for which the Contractor may become liable or may be put to under any provision of law for the purpose of or in connection with the execution of the contract, and all such other incidental charges or contingencies as may havebeen specially provided for in the specifications.

38. Deleted

39.(1) Rates for Extra Item(s) of Works (ACS no. 01 dt. 14.07.2022):

(a) Standard Schedule of Rates (SSOR) Items: Any item of work carried out by the Contractor on the instructions of the Engineer which is not included in the accepted rates/schedule but figures in the Standard Schedule of Rates (SSOR), shall be executed at the rates set forth in the "Standard Schedule of Rates (SSOR)" modified by the tender percentage as accepted in the contract for that chapter of Standard Schedule of Rates (SSOR).

For item(s) not covered in this sub clause, the rate shall be decided as agreed upon between the Engineer and the Contractor before the execution of such items of work as per sub clause (b).

(b) Other Items: For any item of work to be carried out by the Contractor but not included in the accepted rates/schedule and also not covered under sub clause (a) above, the Contractor shall be bound to notify the Engineer at least seven days before the necessity arises for the execution of such items of works that the accepted rates/schedule does not include rate or rates for such extra work involved. The rates payable for such items shall be decided at the meeting to be held between the Engineer and Contractor, in as short a period as possible after the need for the special item has come to the notice. In case the Contractor fails to attend the meeting after being notified to do so or in the event of no settlement being arrived at, the Railway shall be entitled to execute the extra works by other means and the Contractor shall have no claim for loss or damage that may result from such procedure.

The assessment of rates for extra item(s) shall be arrived at based on the prevailing market rates of labour, machinery & materials and by taking guidance from the following documents in order of priority:

i. Analysis of Rates for "Unified Standard Schedule of Rates of Indian Railways (USSOR)"
ii. Analysis of Rates for "Delhi Schedule of Rates issued by CPWD (DSR)"
iii. Market Analysis

39.(2) Provided that if the Contractor commences work or incurs any expenditure in regard thereto before the rates as determined and agreed upon as lastly hereunto fore- mentioned, then and in such a case the Contractor shall only be entitled to be paid in respect of the work carried out or expenditure incurred by him prior to the date of determination of rates as aforesaid according to the rates as shall be fixed by the Engineer. However if the Contractor is not satisfied with the decision of the Engineer in this respect he may appeal to the Chief Engineer/Chief General Manager. within 30 days of getting the decision of the Engineer, supported by analysis of the rates claimed. The Chief Engineer's/ Chief General Manager's decision after hearing both the parties in the matter would be final and binding on the Contractor and the DFCCIL.

40. (1) **Handing over of works: -** The Contractor shall be bound to hand over the works executed under the contract to the DFCCIL complete in all respects to the satisfaction of the Engineer. The Engineer shall determine the date on which the work is considered to have been completed, in support of which his certificate shall be regarded as sufficient evidence for all purposes. The Engineer shall determine from time to time, the date on which any particular section of the work shall have been completed, and the contractor shall be bound to observe any such determination of the Engineer.

40.(2) **Clearance of site on completion**:- On completion of works, the Contractor shall clear away and remove from the site all constructional plant, surplus materials, rubbish and temporary works of every kind and leave the whole of the site and works clean and in a workman like condition to the satisfaction of the Engineer. No final payment in settlement of the accounts for the works shall be paid, held to be due or shall be made to the, Contractor till, in addition to any other condition necessary for final payment, site clearance shall have been affected by him, and such clearance may be made by the Engineer at the expense of the Contractor in the event of his failure to comply with this provision within 7 days after receiving notice to that effect. Should it become necessary for the Engineer to have the site cleared at the expenses of the Contractor, the DFCCIL shall not be held liable for any loss or damage to such of the Contractor's property as may be on the site and due to such removal there from which removal may be effected by means of public sales of such materials and property or in such a way as deemed fit and convenient to the Engineer.

40A Offloading of Part(s) of Work: At the final stage of completion/ commissioning of work, in case the contractor fails to complete the final part(s) of the work and the value of such part(s) of the work is limited to 5% of the original contract value, the Engineer may allow/decide for offloading of such part(s) of works, either after the

Contractor's request in writing to do so or after serving a 14 (Fourteen) days suo-moto notice (as per Form no. 27A), if the Engineer is of the opinion that :-

(i) Such Offloading of works (up to 5% of original contract value) would enable successful completion of contract/work,

(ii) Termination/ Part termination of the contract at this stage is not be in the interest of the Railway/work;, and

(iii) The anticipated additional cost for execution of such works through other mode would not be substantial and can be recovered from the pending dues of the contractor;

The Contractor shall be informed, in due course, by the Engineer of the mode and cost of execution of such offloaded work through other agency(ies) (as per Form No. 27B). The extra expenditure so incurred in execution of the offloaded work, shall be recovered from subsequent Bill(s) or any other dues of the Contractor, but not exceeding the value of Performance Guarantee available in the contract. There shall be no other repercussion of such offloading on execution of the balance contract. The Contractor shall have no claim on account of above mentioned offloading of works.

VARIATIONS IN EXTENT OF CONTRACT

41. Modification to contract to be in writing: - In the event of any of the provisions of the contract requiring to be modified after the contract documents have been signed, the modifications shall be made in writing and signed by the DFCCIL and the Contractor and no work shall proceed under such modifications until this has been done . Any verbal or written arrangement abandoning, modifying, extending, reducing or supplementing the contract or any of the terms thereof shall be deemed conditional and shall not be binding on the DFCCIL unless and until the same is incorporated in a formal instrument and signed by the DFCCIL and the Contractor, and till then the DFCCIL shall have the right to repudiate such arrangements.

42.(1) Powers of modification to contract:- DFCCIL shall be entitled by order in writing to enlarge or extend, diminish or reduce the works or make any alterations in their design, character position, site, quantities, dimensions or in the method of their execution or in the combination and use of materials for the execution thereof or to order any additional work to be done or any works not to be done and the contractor will not be entitled, to any compensation for any increase/reduction in the quantities of work but will be paid only for the actual amount of work done and for approved materials supplied against a specific order.

42.(2) (i) Unless otherwise specified in the contract, the accepted variation in quantity of each individual item of the contract would be up to 25% of the quantity originally contracted, except in case of foundation work. (in which no variation limit shall apply). However, the rates for the increased quantities shall be as per sub- para (iii) below.

(ii) The contractor shall be bound to carry out the work at the agreed rates

and shall not be entitled to any claim or any compensation whatsoever up to the limit of 25% variation in quantity of individual item of works.

(iii) In case an increase in quantity of an individual item by more than 25% of the agreement quantity is considered unavoidable, then same shall be executed at following rates.

(a) Quantities operated in excess of 125% but upto 140% of the agreement quantity of the concerned item, shall be paid at 98% of the rate awarded for that item in that particular tender;

(b) Quantities operated in excess of 140% but upto 150% of the agreement quantity of the concerned item shall be paid at 96% of the rate awarded for that item in that particular tender;

(c) Variation in quantities of individual items beyond 150% will be avoided and would be permitted only in exceptional unavoidable circumstances and shall be paid at 96% of the rate awarded for that item in that particular tender.

(d) Variation to quantities of Minor Value Item:

The limit for varying quantities for minor value items shall be 100% (as against 25% prescribed for other items). A minor value item for this purpose is defined as an item whose original agreement value is less than 1 % of the total original agreement value.

d.(i) Quantities operated upto and including 100% of the agreement quantity of the concerned minor value item, shall be paid at the rate awarded for that item in that particular tender;

d.(ii) Quantities operated in excess of 100% but upto 200% of the agreement quantity of the concerned minor value item, shall be paid at 98% of the rate awarded for that item in that particular tender;

d.(iii) Variation in quantities of individual minor value item beyond 200% will be avoided and would be permitted only in exceptional unavoidable circumstances and shall be paid at 96% of the rate awarded for that item in that particular tender.

(iv) In case of earthwork, the variation limit of 25% shall apply to the gross quantity of earthwork items and variation in the quantities of individual classifications of soil shall not be subject to this limit.

In case of foundation work, no variation limit shall apply and the work shall be carried out by the Contractor on agreed rates irrespective of any variation.

(v) As far as Standard Schedule of Rates (SSOR) items are concerned, the variation limit of 25% would apply to the value of SSOR schedule as a whole and not on individual SSOR items. However, in case of Non Standard Schedule of Rates (SSOR) items, the limit of 25% would apply on the individual items irrespective of the manner of quoting the rate (single percentage rate or individual item rate).

42.(3) Valuation of variations:- The enlargements, extensions, diminution, reduction, alterations or additions referred to in sub-clause (2) of this clause shall in no degree affect the validity of the contract but shall be performed by the Contractor as provided therein and be subject to the same conditions, stipulations and obligations as if they had been originally and expressively

included and provided for in the specifications and drawings and the amounts to be paid therefore shall be calculated in accordance with the accepted schedule of rates. Any extra items / quantities of work falling outside the purview of the provisions of sub-clause (2) above shall be paid for at the rates determined under clause-39 of these conditions.

CLAIMS

43. (1) Monthly Statement of Claims: - The Contractor shall prepare and furnish to the Engineer once in every month an account giving full and detailed particulars of all claims for any additional expenses to which the Contractor may consider himself entitled to and of all extra or additional works ordered by the Engineer which he has executed during the preceding month quarter and no claim for payment for and such work will be considered which has not been included in such particulars.

43.(2) Signing of "No Claim" Certificate:- The Contractor shall not be entitled to make any claim whatsoever against the DFCCIL under or by virtue of or arising out of this contract, nor shall the DFCCIL entertain or consider any such claim, if made by the Contractor, after he shall have signed a "No Claim" Certificate in favour of the DFCCIL in such form as shall be required by the DFCCIL after the works are finally measured up. The contractor shall be debarred from disputing the correctness of the items covered by "No Claim" Certificate or demanding a clearance to arbitration in respect thereof.

MEASUREMENTS, CERTIFICATES AND PAYMENTS

44. Quantities in schedule annexed to Contract: - The quantities set out in the accepted schedule of rates with items of works quantified are the estimated quantities of the works and they shall not be taken as the actual and correct quantities of the work to be executed by the Contractor in fulfilment of his obligations under the contract.

45.(i) Measurement of works by Railways /DFCCIL :- The Contractor shall be paid for the works at the rates in the accepted schedule of rates and for extra works at rates determined under Clause 39 of these conditions on the measurements taken by the Engineer or the Engineer's representative in accordance with the rules prescribed for the purpose by the DFCCIL. The quantities for items the unit of which in the accepted schedule of rates is 100 or 1000 shall be calculated to the nearest whole number, any; fraction below half being dropped and half and above being taken as one; for items the unit of which in the accepted schedule of rates is single, the quantities shall be calculated to two places of decimals. Such measurements will be taken of the work in progress from time to time and at such intervals as in the opinion of the Engineer shall be proper having regard to the progress of works. The date and time on which "on account" or final measurements are to be made shall be communicated to the Contractor who shall be present at the site and shall sign the results of the measurements (which shall also be signed by the Engineer or the Engineer's representative) recorded in the official measurements book as an acknowledgement of his acceptance of the

accuracy of the measures. Failing the Contractor's attendance the work may be measured up in his absence and such measurements shall, notwithstanding such absence, be binding upon the Contractor whether or not he shall have signed the measurement books provided always that any objection made by him to measurement shall be duly investigated and considered in the manner set out below:

(a) It shall be open to the Contractor to take specific objection to any recorded measurements or Classification on any ground within seven days of the date of such measurements. Any re-measurement taken by the engineer or the Engineer's representative in the presence of the Contractor or in his absence after due notice has been given to him in consequence of objection made by the Contractor shall be final and binding on the Contractor and no claim whatsoever shall thereafter be entertained regarding the accuracy and classification of the measurements.

(b) If an objection raised by the Contractor is found by the Engineer to be incorrect the Contractor shall be liable to pay the actual expenses incurred in measurements.

45.(ii) Measurement of works by Contractor's Authorised Representative (If so allowed or instructed):-

(a) The Contractor shall be paid for the works at the rates in the accepted schedule of rates and for extra works at rates determined under Clause 39 of these conditions on the measurements taken by the Contractor's Authorised Engineer in accordance with the rules prescribed for the purpose by the DFCCIL. The quantities for items the unit of which in the accepted schedule of rates is 100 or 1000 shall be calculated to the nearest whole number, any; fraction below half being dropped and half and above being taken as one; for items the unit of which in the accepted schedule of rates is single, the quantities shall be calculated to two places of decimals. Such measurements will be taken of the work in progress from time to time. The date and time on which "on account" or "final" measurements are to be made shall be communicated to the Engineer.

The date and time of test checks shall be communicated to the contractor who shall be present at the site and shall witness the test checks, failing the contractor's attendance the test check may be conducted in his absence, and such test checks shall not withstanding such absence be binding upon contractor provided always that any objection made by contractor to test check shall be duly investigated and considered in the manner set out below:

(i) It shall be open to the Contractor to take specific objection to test checks of any recorded measurement within 7 days of date of such test checks. Any re-test check done by the concerned Railway's authority in the presence of the Contractor or in his absence after due notice given to him in consequent of objection made by the Contractor shall be final and binding on the Contractor and no claim whatsoever shall thereafter be entertained regarding the accuracy and classification of the

measurements.

(ii) If an objection raised by the Contractor is found by the Engineer to be incorrect the Contractor shall be liable to pay the actual expenses incurred in measurements.

(b) Incorrect **Measurement, actions to be taken:** If in case during test check or otherwise, it is detected by Engineer that agency has claimed any exaggerated measurement or has claimed any false measurement for the works which have not been executed; amounting to variation of 5% or more of claimed gross bill amount, action shall be taken as following:

(i) On first occasion of noticing exaggerated/false measurement, Engineer shall impose a penalty of 10% of the claimed gross bill value.

(ii) On any next occasion of noticing any exaggerated / false measurement, DFCCIL shall impose penalty of 15% of claimed gross bill value. In addition the facility of recording of measurements by contractor as well as release of provisional payment shall be withdrawn. Once withdrawn, measurement shall be done by DFCCIL as per Clause 45(i) above.

46. (1) "On-Account" Payments:- The Contractor shall be entitled to be paid from time to time by way of "One-Account" payment only for such works as in the opinion of the Engineer he has executed in terms of the contract. All payments due on the Engineer's/Engineer's Representative's certificates of measurements or Engineer's certified "Contractor's authorized Engineer's measurements" shall be subject to any deductions which may be made under these presents and shall further be subject to, unless otherwise required by Clause 16 of these Conditions, a retention of 6% (Six) by way of Security Deposits, until the amount of Security Deposit by way of such retentions shall amount to 5% of the total value of the contract provided always that the Engineer may by any certificate make any correction or modification in any previous certificate which shall have been issued by him and that the Engineer may withhold any certificate, if the works or any part thereof are not being carried out to his satisfaction.

46.(2) Rounding off amounts: - The total amount due on each certificate shall be rounded off to the nearest rupee i.e. sum less than 50 paise shall be omitted and sums of 50 paise and more up to Re. 1/- will be reckoned as Re. 1/-

46.(3) On Account Payments not prejudicial to final settlement: - "On-Account" payments made to the "Contractor shall be without prejudice to the final making up of the accounts (except where measurements are specifically noted in the easurement Book as "Final Measurements" and as such have been signed by the Contractor) and shall in no respect be considered or used as evidence of any facts stated in or to be inferred from such accounts nor of any particular quantity of work having been executed nor of the manner of its execution being satisfactory.

46.(4) If payment(s) of Advances are applicable in the contract, as mentioned in the Tender

Documents, Railway/DFCCIL shall make payment(s) of Interest bearing advances, on the request of contractor. The payment and recovery of such Advances shall be made as under:

(a): Mobilisation Advance –
This shall be limited to 10% of the Contract value and shall be paid in 2 stages :
Stage 1– 5% of Contract Value on signing of the contract agreement.

Stage 2 – 5% on mobilization of site-establishment, setting up offices, bringing in equipment and actual commencement of work.

The stage 1 of advance shall be payable immediately after signing of contract agreement.

The stage 2 of advance shall be payable at the time of mobilisation, only after submission of an utilization certificate by the contractor that the Stage 1 advance has been properly utilized in the contract.

These Advances shall be payable against irrevocable guarantee (Bank Guarantee, FDRs) from a scheduled commercial bank of India of at least 110% of the value of the sanctioned advance amount (covering principal plus interest).

(b): Advance Against Machinery and Equipment –

This advance shall be limited to a maximum of 10% of the contract value against new Machinery & Equipment, involving substantial outlay, brought to site and essentially required for the work. This advance shall not exceed 75% of the purchase price of such Equipment and shall be payable when Equipment is hypothecated to the President of India by a suitable bond or alternatively covered by an irrevocable Bank Guarantee from a scheduled commercial bank of India for full cost of the Plant & Equipment in a form acceptable to Railways. The Plant & Equipment shall be insured for the full value and for the entire period, they are required for the work. This Plant & Equipment shall not be removed from the site of work without prior written permission of the Engineer. No advance should be given against old Plant & Machinery.

The advances under sub clause (a) and (b) above, are subject to the following conditions –

(i) The full amount of Advances shall be recovered from contractor dues. The recovery shall commence when the value of contract executed reaches 15% of original contract value and shall be completed when the value of work executed reaches 85% of the original contract value. The instalments on each "on account bill" will be on pro-rata basis.
Interest shall be recovered on the advance outstanding for the period commencing from the date of payment of advance till date of particular on-account bill (through which recovery of principal is effected) and adjusted fully against on-account bill along with pro-rata principal recovery. In the event of any short-fall, the same shall be carried forward to the next on-account bill and shall attract interest.

(ii) The advances shall be used by the Contractor for the purpose of the Contract, and for the purpose for which they are paid. Under no circumstances, shall the advances be diverted for other purposes. Any such diversion shall be construed as a breach of the

Contract and the Contractor shall be asked to return the advance at once and pay interest at 15% per annum till the advance is recovered back from him. The Contractor shall return the advance and pay the interest in one go without demur. The Contractor, if required by the Engineer shall provide the details of utilisation of Mobilisation advance.

(iii) If the Contractor is found to have contravened the provision, it will constitute a breach of contract and Railway shall be entitled to terminate the contract and forfeit his Performance Guarantee as well as Security Deposit.

(iv) In cases, where the Contract is rescinded as per clause 62 of the contract or short closed under any other condition(s) of the contract, without making full recovery of advances and accrued interest thereon, by the Railway, such balance of advances and accrued interest thereon shall immediately become due and payable by the Contractor to the Railway. The same shall be recovered from any due of Contractor with the Government of India.

46.(5) Manner of Payment: Unless otherwise specified payments to the Contractor will be transferred electronically to his bank account.

46 Price Variation Clause (PVC): (ACS no. 01 dt. 14.07.2022)

46A.1 Applicability: Price Variation Clause (PVC) shall be applicable only in tender having advertised value above Rs. 2 Crores. Provided further that, in a contract where PVC is applicable, following shall be outside the purview of price adjustments (i.e. shall be excluded from the gross value of the work for the purpose of price variation) :

a) Materials supplied by Railway/DFCCIL to the Contractors, either free or at fixed rate;

b) Any extra item(s) included in subsequent variation falling outside the purview of the Bill(s) of Quantities of tender, under clause 39. (I)(b) of these Standard General Conditions, unless applicability of PVC and 'Base Month' has been specially agreed, while fixing the rates of such extra item(s).

46A.2 Base Month: The Base Month for 'Price Variation Clause' shall be taken as the one month prior to closing of tender, unless otherwise stated elsewhere. The quarter for applicability of PVC shall commence from the month following the Base month. The Price Variation shall be based on the average Price Index of the quarter under consideration.

46A.3 Validity:
Rates accepted by DFCCIL Railway Administration shall hold good till completion of work and no additional
individual claim shall be admissible except:

(a) Payment/recovery for increase/decrease in GST on works contract or imposition/removal of any tax/cess on Works Contract as per Clause 37,

(b) Payment/recovery for overall market situation as per Price Variation Clause given hereunder.

46A.4 Components of various items in a contract on which variation in prices be admissible, shall be steel, cement, ferrous material, non-ferrous material, insulators, zinc and other

materials, labour, plant & machinery, fuel, explosives, detonators etc. Adjustment for variation in prices of these items shall be determined in the manner prescribed.

46A.5 No price variation shall be admissible for fixed components.

46A.6 The percentages of various components in various type of works shall be as specified for all item (s)/ Bill(s) of Quantities in tender document and the same shall be fixed as per table & classifications given below:

(I) For Civil Engineering Works

SN	Classification / Components		1A, 2 & 3A	4A	5A	6A	7	8A	9A	1B, 3B, 4B, 5B, 6B, 8B & 9B	1C, 3C, 4C, 5C, 6C, 8C, & 9C	3D, 4D, 5D, 6D, 8D,& 9D	3E, 4E, 5E, 6E, 8E,& 9E
1	Fixed	*	15	15	15	15	15	15	15	15	15	15	15
2	Labour	L_C	20	25	30	20	50	20	20	0	0	10	25
3	Steel	S_C	0	0	0	0	0	0	0	85	0	50	0
4	Cement	C_C	0	0	15	0	0	0	0	0	85	0	0
5	Plant Machinery & Spares	PM_C	30	15	5	20	15	20	30	0	0	10	30
6	Fuel & Lubricant	F_C	25	15	5	15	15	20	15	0	0	10	20
7	Other Materials	M_C	10	15	30	30	5	25	20	0	0	5	10
8	Detonators & Explosive	E_C	0	15	0	0	0	0	0	0	0	0	0
Total			100	100	100	100	100	100	100	100	100	100	100

*It shall not be considered for any price variation.

The classification mentioned in the table above represents following type of item(s) in the work(s) –

1 Earthwork in Formation

1A All Item(s) excluding 1B or/and 1C
1B Item(s) for supply of Steel
1C Item(s) for supply of Cement

2 Ballast Supply Works

3 Tunnelling Works (Without Explosives)

3A All Item(s) excluding 3B or/and 3C or/and 3D or/and 3E
3B Item(s) for supply of Steel
3C Item(s) for supply of Cement or/and Grout

3D Item(s) for Fabrication & Erection of Structures including supply of Steel
3E Item(s) for Fabrication & Erection of Structures excluding supply of Steel.

4 Tunnelling Works (With explosives)

4A All Item(s) excluding 4B or/and 4C or/and 4D or/and 4E
4B Item(s) for supply of Steel
4C Item(s) for supply of Cement or/and Grout
4D Item(s) for Fabrication & Erection of Structures including supply of Steel
4E Item(s) for Fabrication & Erection of Structures excluding supply of Steel.

5 Building Works

5A All Item(s) excluding 5B or/and 5C or/and 5D or/and 5E
5B Item(s) for supply of Steel
5C Item(s) for supply of Cement
5D Item(s) for Fabrication & Erection of Structures including supply of Steel
5E Item(s) for Fabrication & Erection of Structures excluding supply of Steel.

6 Bridges & Protection work

6A All Item(s) excluding 6B or/and 6C or/and 6D or/and 6E
6B Item(s) for supply of Steel
6C Item(s) for supply of Cement
6D Item(s) for Fabrication, Assembly, Erection& Launching of Girders including supply of Steel
6E Item(s) for Fabrication, Assembly, Erection &Launching of Girders excluding supply of Steel

7 Permanent Way linking

8 Platform, Passenger Amenities

8A All Item(s) excluding 8B or/and 8C or/and 8D or/and 8E
8B Item(s) for supply of Steel item/fittings
8C Item(s) for supply of Cement Item
8D Item(s) for Fabrication & Erection of Structures including supply of Steel
8E Item(s) for Fabrication & Erection of Structures excluding supply of Steel

9 Any Other Works not covered in Classification 1 to 8

9A All Item(s) excluding 9B or/and 9C or/and 9D or/and 9E
9B Item(s) for supply of Steel
9C Item(s) for supply of Cement or/and Grout
9D Item(s) for Fabrication & Erection of Structures including supply of Steel
9E Item(s) for Fabrication & Erection of Structures excluding supply of Steel

46A.7 Formulae: The Amount of variation in prices in various components (labour, material etc.) shall be worked out by the following formulae:

(i) $$L = \frac{(W \text{ or } W_{SF} \text{ or } W_F \text{ or } W_{SFL} \text{ or } W_{FL}) \times (L_Q - L_B) \times L_C}{L_B \times 100}$$

(ii) $$M = \frac{(W \text{ or } W_{SF} \text{ or } W_F \text{ or } W_{SFL} \text{ or } W_{FL}) \times (M_Q - M_B) \times M_C}{}$$

$$M_B \times 100$$

(iii) $$F = \frac{(W \text{ or } W_{SF} \text{ or } W_F \text{ or } W_{SFL} \text{ or } W_{FL}) \times (F_Q - F_B) \times F_C}{F_B \times 100}$$

(iv) $$E = \frac{(W) \times (E_Q - E_B) \times E_C}{E_B \times 100}$$

(v) $$PM = \frac{(W \text{ or } W_{SF} \text{ or } W_F \text{ or } W_{SFL} \text{ or } W_{FL}) \times (PM_Q - PM_B) \times PM_C}{PM_B \times 100}$$

(vi) $$S = \frac{(W \text{ or } W_S \text{ or } W_{SF}) \times (S_Q - S_B) \times S_C}{S_B \times 100}$$

(vii) $$C = \frac{(W \text{ or } W_C) \times (C_Q - C_B) \times C_C}{C_B \times 100}$$

(II) <u>For DFCCIL Electrification Works:</u>

(viii) $T = [0.4136 \times (C_Q - C_B) / C_B] \times 85$
(ix) $R = [0.94 \times (R_T - R_O) / R_O + 0.06 \times (Z_T - Z_O) / Z_O] \times 85$
(x) $N = [(P_T - P_O) / P_O] \times 85$
(xi) $I = [(I_T - I_O) / I_O] \times 85$
(xii) $G = [(M_Q - M_B) / M_B] \times 85$
(xiii) $Er = [(L_Q - L_B) / L_B] \times 85$

Where,

L	Amount of price variation in Labour
M	Amount of price variation in Materials
F	Amount of price variation in Fuel
E	Amount of price variation in Explosives
PM	Amount of price variation in Plant, Machinery and Spares
S	Amount of price variation in Steel Supply Item
C	Amount of price variation in Cement Supply Item
T	Percentage variation payable on the gross value of bill of Concreting (Bill(s) of Quantities for concrete items)
R	Percentage variation payable on the gross value of bill of Ferrous Items (Bill(s) of Quantities for ferrous items)
N	Percentage variation payable on the gross value of bill of Non-Ferrous Items (Bill(s) of Quantities for non-ferrous items)

I Percentage variation payable on the gross value of bill of Insulator (Bill(s) of Quantities for Insulator items)

G Percentage variation payable on the gross value of bill of General Works (Bill(s) of Quantities for General items)

Er Percentage variation payable on the gross value of erection (Bill(s) of Quantities for Erection Item)

L_C % of Labour Component in the item(s)

M_C % of Material Component in the item(s)

F_C % of Fuel Component in the item(s)

E_C % of Explosive Component in the item(s)

PM_C % of Plant, Machinery and Spares Component in the item(s)

S_C % of Steel Supply item Component in the item(s)

C_C % of Cement Supply item Component in the item(s)

W Gross value of work done by Contractor as per on-account bill(s) excluding the Gross value of work under W_S or/and W_C or/and W_{SF} or/and W_F or/and W_{SFL} or/and W_{FL} and cost of materials supplied by Railway either free or at fixed rate,

W_S Gross value of work done by Contractor for item(s) of supply of steel.

W_C Gross value of work done by Contractor for item(s) of supply of cement and /or supply of grout material.

W_{SF} Gross value of work done by Contractor for item(s) of Fabrication & Erection of Structures including supply of Steel.

W_F Gross value of work done by Contractor for Fabrication & Erection of Structures excluding supply of Steel.

W_{SFL} Gross value of work done by Contractor for item(s) of Fabrication, Assembly, Erection / Launching of Girders including supply of Steel.

W_{FL} Gross value of work done by Contractor for item(s) of Fabrication, Assembly, Erection / Launching of Girders excluding supply of Steel.

L_B Consumer Price Index for Industrial Workers - All India: Published in R.B.I. Bulletin for the base period

L_Q Consumer Price Index for Industrial Workers - All India: Published in R.B.I. Bulletin for the average price index of the 3 months of the quarter under consideration

M_B Wholesale Price Index: All commodities – as published in the R.B.I. Bulletin for the base period

M_Q Wholesale Price Index: All commodities – as published in the R.B.I. Bulletin for the average price index of the 3 months of the quarter under consideration

F_B The average of official prices of Diesel available on the official website of 'Petroleum Planning and Analysis cell' under Ministry of Petroleum and Natural Gas for Delhi, Kolkata, Mumbai &Chennai, for the base period

F_Q The average of official prices of Diesel available on the official website of 'Petroleum Planning and Analysis cell' under Ministry of Petroleum and Natural Gas for Delhi, Kolkata, Mumbai &Chennai, for the 3 months of the quarter under consideration

E_B Index number of Monthly Whole Sale Price Index for the category 'Explosive' of (g). Manufacture of other chemical products under (J) MANUFACTURE OF CHEMICALS AND CHEMICAL PRODUCTS, published by Office of Economic Adviser, Govt. of India, Ministry of Commerce & Industry, Department of Industrial Policy & Promotion (DIPP), for the base period.

E_Q Index number of Monthly Whole Sale Price Index for the category 'Explosive' of (g). Manufacture of other chemical products under (J) MANUFACTURE OF CHEMICALS AND CHEMICAL PRODUCTS, published by Office of Economic Adviser, Govt. of India, Govt. of India, Ministry of Commerce & Industry, Department of Industrial Policy & Promotion (DIPP), for the average price index of 3 months of the quarter under consideration.

PM_B Index Number of Wholesale Prices in India by Groups and Sub Groups (Averages) for 'Manufacture of machinery for mining, quarrying and construction'– published in RBI (Reserve Bank of India) Bulletin, for the base period.

PM_Q Index Number of Wholesale Prices in India by Groups and Sub Groups (Averages) for 'Manufacture of machinery for mining, quarrying and construction'– published in RBI (Reserve Bank of India) Bulletin, for the average price index of 3 months of the quarter under consideration.

S_B The average rate provided by the Joint Plant Committee for the relevant category of steel item as mentioned in Clause 46A.9; for the base period.

S_Q The average rate provided by the Joint Plant Committee for the relevant category of steel item as mentioned in Clause 46A.9; for the 3 months of the quarter under consideration.

C_B Index No. of Wholesale Price Index of sub-group Cement, Lime & Plaster as published in RBI Bulletin for the base period

C_Q No. of Wholesale Price Index of sub-group Cement, Lime & Plaster as published in RBI Bulletin for the average price index of the 3 months of the quarter under consideration

R_T IEEMA price index for Steel Blooms (size 150mmx150mm) for the month which is two months prior to date of inspection of material.

R_O IEEMA price index for Steel Blooms (size 150mmx150mm)for the month which is one month prior to date of opening of tender.

P_T IEEMA price index for Copper wire rods for the month which is two months prior to date of inspection of material.

P_O IEEMA price index for Copper wire rods for the month which is one month prior to date of opening of tender.

Z_T IEEMA price index for Zinc for the month which is two months prior to date of inspection of material

Z_O IEEMA price index for Zinc for the month which is one month prior to date of opening of tender

I_T RBI wholesale price index for the sub-group “Insulators” for the month which is two months prior to date of inspection of material

I_O RBI wholesale price index for the sub-group “Insulators” for the month which is one month prior to date of opening of tender

(III) <u>SIGNALING & TELECOMMUNICATION WORKS:</u>

(a) The following expressions and meanings are assigned to the value of the work done for signalling and telecommunication works:

SIGWK = Value of signalling works for a stage payment of the item signalling works;

INVSIG = Value of inventory for signalling works for a stage payment of the item inventory for signalling works;

INTGTESTSIG = Value of integrated testing and commission for signalling works of the Railway Project;

COMWK= Value of telecommunication works for a stage payment of the item telecommunication works;

INVCOM = Value of inventory for telecommunication works for a stage payment of the item inventory for telecommunication works; and

INTGTESTCOM = Value of integrated testing and commission for telecommunication works of the Railway Project.

(b) Price adjustment for changes in cost of signalling works and telecommunication works shall be paid in accordance with the following formula:

(i) VSIGWK = 0.85 SIGWK x [PELEX x (ELEXi – ELEXo)/ ELEXo + POFC x (OFCi – OFCo)/OFCo + PLB x (LBi – LBo)/LBo + POTH x (OTHi - OTHo)/OTHo + S30C x ($P30C_i$ – $P30C_o$)/ $P30C_o$ + S24C x ($P24C_i$ – $P24C_o$)/ $P24C_o$ + S19C x ($P19C_i$ – $P19C_o$)/ $P19C_o$ + S12C x ($P12C_i$ – $P12C_o$)/ $P120C_o$ + S9C x ($P9C_i$ – $P9C_o$)/ $P9C_o$ + S6C x ($P6C_i$ – $P6C_o$)/ $P6C_o$ + S4C x ($P4C_i$ – $P4C_o$)/ $P4C_o$ + S2C x ($P2C_i$ – $P2C_o$)/ $P2C_o$ + S12C2.5 x ($P12C2.5_i$ – $P12C2.5_o$)/ $P12C2.5_o$ + S2C2.5 x ($P2C2.5_i$ – $P2C2.5_o$)/ $P2C2.5_o$ + S2C25 x ($P2C25_i$ – $P2C25_o$)/ $P2C25_o$ + QC x (PQC_i – PQC_o)/PQC_o;

(ii) VINVSIG = 0.85 SIGWK x [PELEX x (ELEXi – ELEXo)/ ELEXo + POTH x (OTHi - OTHo)/OTHo];

(iii) VINTGTESTSIG = 0.85 INTGTESTSIG x [PLB x (LBi – LBo)/LBo + POTH x (OTHi- OTHo)/OTHo];

(iv) VCOMWK = 0.85 COMWK x [PELEX x (ELEXi – ELEXo)/ ELEXo + POFC x (OFCi – OFCo)/OFCo + PLB x (LBi – LBo)/LBo + POTH x (OTHi - OTHo)/OTHo + S30C x ($P30C_i$ – $P30C_o$)/ $P30C_o$ + S24C x ($P24C_i$ – $P24C_o$)/ $P24C_o$ + S19C x ($P19C_i$ – $P19C_o$)/ $P19C_o$ + S12C x ($P12C_i$ – $P12C_o$)/ $P120C_o$ + S9C x ($P9C_i$ – $P9C_o$)/ $P9C_o$ + S6C x ($P6C_i$ – $P6C_o$)/ $P6C_o$ + S4C x ($P4C_i$ – $P4C_o$)/ $P4C_o$ + S2C x ($P2C_i$ – $P2C_o$)/ $P2C_o$+ S12C2.5 x ($P12C2.5_i$ – $P12C2.5_o$)/ $P12C2.5_o$ + S2C2.5 x ($P2C2.5_i$ – $P2C2.5_o$)/ $P2C2.5_o$ + S2C25 x ($P2C25_i$ – $P2C25_o$)/ $P2C25_o$ + QC x (PQC_i – PQC_o)/ PQC_o+ PCEQP x (CEQPi – CEQPo)/CEQPo];

(v) VINVCOM = 0.85 SIGWK x [PELEX x (ELEXi – ELEXo)/ ELEXo + PCEQP x (CEQPi – CEQPo)/CEQPo + POTH x (OTHi - OTHo)/OTHo]; and

(vi) VINTGTESTCOM = 0.85 INTGTESTCOM x [PLB x (LBi – LBo)/LBo + POTH x (OTHi - OTHo)/OTHo].

Where

VSIGWK = Increase or decrease in the cost of signalling works during the period under consideration due to changes in the rates for relevant components as specified in subparagraph (h);

VINVSIG = Increase or decrease in the cost of inventory for signalling during the period under consideration due to changes in the rates for relevant components as specified in subparagraph (h);

VINTGTESTSIG = Increase or decrease in the cost of integrated testing and commissioning of signalling works of the Railway Project during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (h);

VCOMWK = Increase or decrease in the cost of communication works during the period under consideration due to changes in the rates for relevant components as specified in subparagraph (h);

VINVCOM = Increase or decrease in the cost of inventory for telecommunications works during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (h);

VINTGTESTCOM = Increase or decrease in the cost of integrated testing and commissioning of telecommunication works of the Railway Project during the period under consideration due to changes in the rates for relevant components as specified in subparagraph (h);

PCEQP, PELEX, PIC, PLB, POFC, and POTH are the percentages of communication equipment, electronics, PVC insulated cables, labour, optical fibre cables, and other materials respectively;

CEQPo = The wholesale price index as published by the Ministry of Commerce and Industry, Government of India (hereinafter called "WPI") for communication equipment for the month of the Base Month;

CEQPi = The WPI for communication equipment for the average price index of the 3 months of the quarter under consideration;

ELEXo = The WPI for electronics for the month of the Base Month;

ELEXi = The WPI for electronics for the average price index of the 3 months of the quarter under consideration;

$P30C_i$ = Price payable per Km as adjusted in accordance with price variation Clause for size 30C x 1.5 sq mm signalling cable

$P30C_o$ = Price per Km of cable as per purchase order/ Contract agreement.

S30C = Percentage of size 30C x 1.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

$P24C_i$ = Price payable per Km as adjusted in accordance with price variation Clause for size 24C x 1.5 sq mm signalling cable

$P24C_o$ = Price per Km of cable as per purchase order/ Contract agreement.

S24C = Percentage of size 24C x 1.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

$P19C_i$ = Price payable per Km as adjusted in accordance with price variation Clause for size 19C x 1.5 sq mm signalling cable

$P19C_o$ = Price per Km of cable as per purchase order/ Contract agreement.

S19C = Percentage of size 19C x 1.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

$P12C_i$ = Price payable per Km as adjusted in accordance with price variation Clause for size 12C x 1.5 sq mm signalling cable

$P12C_o$ = Price per Km of cable as per purchase order/ Contract agreement.

S12C = Percentage of size 12C x 1.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

$P9C_i$ = Price payable per Km as adjusted in accordance with price variation Clause for size 9C x 1.5 sq mm signalling cable

$P9C_o$ = Price per Km of cable as per purchase order/ Contract agreement.

S9C = Percentage of size 9C x 1.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

$P6C_i$ = Price payable per Km as adjusted in accordance with price variation Clause for size 6C x 1.5 sq mm signalling cable

$P6C_o$ = Price per Km of cable as per purchase order/ Contract agreement.

S6C = Percentage of size 6C x 1.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

$P4C_i$ = Price payable per Km as adjusted in accordance with price variation Clause for size 4C x 1.5 sq mm signalling cable

$P4C_o$ = Price per Km of cable as per purchase order/ Contract agreement.

S4C = Percentage of size 4C x 1.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

$P2C_i$ = Price payable per Km as adjusted in accordance with price variation Clause for size 2C x 1.5 sq mm signalling cable

$P2C_o$ = Price per Km of cable as per purchase order/ Contract agreement.

S2C = Percentage of size 2C x 1.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

$P12C2.5_i$ = Price payable per Km as adjusted in accordance with price variation Clause for size 12C x 2.5 sq mm signalling cable

$P12C2.5_o$ = Price per Km of cable as per purchase order/ Contract agreement.

S12C2.5 = Percentage of size 12C x 2.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

$P2C2.5_i$ = Price payable per Km as adjusted in accordance with price variation Clause for size 2C x 2.5 sq mm signalling cable

$P2C2.5_o$ = Price per Km of cable as per purchase order/ Contract agreement.

S2C2.5 = Percentage of size 2C x 2.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

$P2C25_i$ = Price payable per Km as adjusted in accordance with price variation Clause for size 2C x 25 sq mm signalling cable

$P2C25_o$ = Price per Km of cable as per purchase order/ Contract agreement.

S2C25 = Percentage of size 2C x 25 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

PQC_i = Price payable per Km as adjusted in accordance with price variation Clause for size 0.9mm dia, 6 Quad cable.

PQC_o= Price per Km of cable as per purchase order/ Contract agreement.

QC = Percentage of size 0.9mm dia, 6 Quad cable shall govern the price.

LBo = The consumer price index for industrial workers – All India, published by Labour Bureau, Ministry of Labour, Government of India, (hereinafter called “CPI”) for the month of the Base Month;

LBi = The CPI for industrial workers – All India for the average price index of the 3 months of the quarter under consideration;

OFCo = The WPI for fibre cables for the month of the Base Month;

OFCi = The WPI for fibre cables for the average price index of the 3 months of the quarter under consideration;

OTHo = The WPI for all commodities for the month of the Base Month; and

OTHi = The WPI for all commodities for the average price index of the 3 months of the quarter under consideration.

(c) The following percentages shall govern the price adjustment of the Contract Price for signalling and telecommunication works:

	Signalling	Telecommunication

Work / *Component*	Signalling Works	Signalling inventory	Integrated testing and Commissioning	Telecommunication Works	Telecomm inventory	Integrated testing and Commissioning
Electronics (PELEX)	***%	***%	-	***%	***%	-
Communication Equipment (PCEQP)	-	-	-	***%	***%	-
Optical Fibre Cable (POFC)	***%	-	-	***%	-	-
30C x 1.5 sq mm signalling cable(S30C)	***%	-	-	***%	-	-
24C x 1.5 sq mm signalling cable (S24C)	***%	-	-	***%	-	-
19Cx 1.5 sq mm signalling cable (S19C)	***%	-	-	***%	-	-
12C x 1.5 sq mm signalling cable (S12C)	***%	-	-	***%	-	-
9C x 1.5 sq mm signalling cable (S9C)	***%	-	-	***%	-	-
6C x 1.5 sq mm signalling cable (S6C)	***%	-	-	***%	-	-
4C x 1.5 sq mm signalling cable (S4C)	***%	-	-	***%	-	-
2C x 1.5 sq mm signalling cable (S2C)	***%	-	-	***%	-	-
12C x 2.5 sq mm signalling cable (S12C2.5)	***%	-	-	***%	-	-
2C x 2.5 sq mm signalling cable (S2C2.5)	***%	-	-	***%	-	-
2C x 25 sq mm signalling cable (S2C25)	***%	-	-	***%	-	-
0.9 mm dia, 6Quad cable (QC)	***%	-	-	***%	-	-
Labour (PLB)	***%	-	***%	***%	***%	***%
Other materials	***%	***%	***%	***%	***%	***%
Total	100%	100%	100%	100%	100%	100%

(Note- the percentages may be finalized by tendering authority depending on BOQ)

FORMULAE FOR SIGNALING & TELECOM CABLE

The price payable for signalling cables is variable as per Price Variation Formula given below:

For Signalling Copper Cables:

P_i= Po+CuF (Cu-Cuo) + CCFcu(CC-CCo) + FeF (Fe-Feo)

For Telecom Copper Cables For Jelly Filled, 0.9 mm dia, 6 quad cable

P_i= Po+CuF (Cu-Cuo) + AlFcu(Al-Alo) + CCFcu (CC-Cco) + FeF (Fe-Feo)

For Aluminium Power Cables:

P_i= Po+AlF (Al-Alo) + CCFAl(CC-CCo) + FeF (Fe-Feo)

Where,

P_i = Price payable per KM as adjusted in accordance with Price variation clause.

Po = Price per KM of cable as per Purchase order.

CuF = Variation factor for Copper

Cuo = Price of copper Rod in Rs. Per MT

CCFCu = Variation factor for PVC Compound for Copper Signalling & Telecom cable

CCo = Price of PVC Compound in Rs. Per MT

AlF = Variation factor for Aluminium

Alo = Price of EC grade LME Aluminium rods (Properzi rods) in Rs. Per MT.

CCFAl = Variation factor for PVC Compound for Aluminium power cable

FeF = Variation factor for Steel

Feo = Price of Steel for Armour (Flat strip 4 mm. x 0.8mm/ Round 1.4mm dia) in Rs. Per MT

(Prices per MT for Cuo, CCo, Feo, Alo as applicable on the 1st working day of the month, one month prior to the deadline for submission of bids. The above prices and indices are as published by IEEMA vide circular reference no. IEEMA (PVC) /CABLE --/--/-- one month prior to the deadline for submission of bids.)

Cu= Price of Copper Rod in Rs. Per MT.

Cc= Price of PVC Compound in Rs. Per MT.

Fe= Price of Steel for Armouring (Flat strip 4mm x 0.8 mm/ Round 1.4mm dia) in Rs. Per MT.

Al = Price of EC grade LME Aluminium rods (Properzi rods) in Rs. Per MT.

(Prices per MT for Cu, CC, Fe, Al as prevailing on 1stworking day of the calendar month covering the date One month prior to the date of inspection call letter will be applicable for the calculation of updated price. The above prices and indices are as published by IEEMA vide circular reference no. IEEMA (PVC) /CABLE --/--/-- one month prior to the date of inspection.)

The value of variation factors for copper, steel and PVC Compound are different for different sizes of signalling cables. Accordingly, the PVC formula for some of the types of signalling cable is as given under:-

Underground Railway Signalling Cable unscreened and armoured copper conductor

(i) Size 30 C x 1.5 sq.mm.
$P30C_i$=P30Co+0.391(Cu-Cuo) +0.557(CC-CCo) +0.425(Fe-Feo)
For armouring, price of steel flat strip of size 4mmx0.8mm is to be taken into consideration.

(ii) Size 24C x 1.5 sq.mm
$P24C_i$= P24Co+0.313(Cu-Cuo) + 0.481 (CC-CCo) +0.398(Fe-Feo)
For armouring, value of steel flat strip of size 4mmx0.8mm is to be taken into consideration.

(iii) Size 19C x 1.5 sq.mm
$P19C_i$= P19Co+0.248(Cu-Cuo) + 0.395(CC-CCo) +0.343(Fe-Feo)
For armouring, value of steel flat strip of size 4mmx0.8mm is to be taken into consideration.

(iv) Size 12C x 1.5 sq.mm
$P12C_i$=P12Co+0.157(Cu-Cuo) + 0.277(CC-CCu) +0.289(Fe-Feo)
For armouring, value of steel wire size 1.4mm dia is to be taken into consideration.

(v) Size 9C x 1.5 sq.mm
$P9C_i$= P9Co+0.117(Cu-Cuo) +0.241(CC-CCu) +0.383(Fe-Feo)
For armouring, value of steel wire size 1.4mm dia is to be taken into consideration.

(vi) Size 6Cx 1.5 sq.mm
$P6C_i$= P6Co+0.078(Cu-Cuo) +0.199(CC-CCu) +0.329(Fe-Feo)
For armouring, value of steel wire size 1.4mm dia is to be taken into consideration.

(vii) Size 4Cx1.5 sq.mm
$P4C_i$=P4Co+0.052(Cu-Cuo) +0.152(CC-CCo) +0.277(Fe-Feo)
For armouring, value of steel wire size 1.4mm dia is to be taken into consideration.

(viii) Size 2C x 4 sq.mm(multistrand)
$P2C_i$= P2Co+0.073(Cu-Cuo) +0.156(CC-CCo) +0.3(Fe-Feo)
For armouring, value of steel wire size 1.4mm dia is to be taken into consideration.

(ix) Size 12C x 2.5 sq.mm
$P12C2.5_i$= P12C2.5o+0.282 (Cu-Cuo) +0.371 (CC-CCo) +0.342 (Fe-Feo)
For armouring, value of steel flat strip of size 4mmx0.8mm is to be taken into consideration.

(x) Size 2C x 2.5 sq.mm
$P2C2.5_i$= P2C2.5o+0.047 (Cu-Cuo) +0.139 (CC-CCo) +0.277 (Fe-Feo)
For armouring, value of steel wire size 1.4mm dia is to be taken into consideration.

(xi) Size 2C x 25 sq.mm PVC insulated, armoured, Aluminium power cable

$P2C25_i$= P2C25o+0.146 (Al-Alo) +0.303 (CC-CCo) +0.306 (Fe-Feo)

For armouring, value of steel flat strip of size 4mmx0.8mm is to be taken into consideration.

(xii) For Jelly filled, 0.9mm dia, 6 quad cable

PQC_i = PQCo + 0.135 (Al-Alo) + 0.139 (Cu-Cuo) + 0.515 (CC-Cco) + 0.693 (Fe-Feo).

For PVC Compound Grade CW-22, is to be taken into consideration.

46A.8 The demands for escalation of cost shall be allowed on the basis of provisional indices as mentioned above in Clause 46A.7. Any adjustment needed to be done based on the finally published indices shall be made as and when they become available.

46A.9: (1) Relevant categories of steel for the purpose of operating Price Variation formula as mentioned in this Clause shall be as under:

SN	***Classification***	**Rates to be used for calculating S_Q or S_B**
1.	Reinforcement bars and other rounds	Average of per tonne rates of 10mm dia TMT & 25mm dia TMT; confirming IS1786; Fe 500
2.	All types and sizes of angles, channels and joists	Average of per tonne rates of 'Angle 75x75x6mm, Mild Steel Plate 10mm thickness and Channel 150x75mm; confirming IS2062, E250 Gr "A"
3.	All types and sizes of plates	Average of per tonne rates of 'MS Plates 10mm thickness and 25mm thickness; confirming IS2062, E250 Gr "A"
4.	Any other section of steel not covered in the above categories	Average of price for the 3 categories covered under SL 1, 2 & 3 in this table.

(2). Relevant city for referring "JPC (Joint Plant Committee)"rates of steel items (SQ /SB) in different Zonal Railways shall be as under :

SL	**City**	**Railway**
1.	Delhi	Northern , North Central, North Eastern, North Western
2.	Kolkata	Eastern, East Central, East Coast, Northeast Frontier, South Eastern, Southeast Central
3.	Mumbai	Central, Western, West Central
4.	Chennai	Southern, South Central & South Western

46A.10 Price Variation during Extended Period of Contract

The price adjustment as worked out above, i.e. either increase or decrease shall be applicable upto the stipulated date of completion of work including the extended period of completion where such extension has been granted under Clause 17A of the Standard General Conditions of Contract. However, where extension of time has been granted due to Contractor's failure under Clause 17B of the Standard General Conditions of Contract, price adjustment shall be done as follows:

a. In case the indices increase above the indices applicable to the last month of original completion period or the extended period under Clause 17A, the price adjustment for the period of extension granted under Clause 17B shall be limited to the amount payable as per the Indices applicable to the last month of the original completion period or the extended period under Clause 17A of the Standard General Conditions of Contract; as the case may be.

b. In case the indices fall below the indices applicable to the last month of original/ extended period of completion under Clause 17A, as the case may be; then the lower indices shall be adopted for the price adjustment for the period of extension under Clause 17B of the Standard General Conditions of Contract.

47.0 **Maintenance of works** The Contractor shall at all times during the progress and continuance of the works and also for the period of maintenance specified in the Tender Form after the date of issue of the certificate of completion by the Engineer or any other earlier date subsequent to the completion of the works that may be fixed by the Engineer be responsible for and effectively maintain and uphold in good substantial, sound and perfect condition all and every part of the works and shall make good from time to time and at all times as often as the Engineer shall require, any damage or defect that may during the above period arise in or be discovered or be in any way connected with the works, provided that such damage or defect is not directly caused by errors in the contract documents, act of providence or insurrection or civil riot, and the contractor shall be liable for and shall pay and make good to the DFCCIL or other persons legally entitled thereto whenever required by the Engineer so to do, all losses, damages, costs and expenses they or any of them may incur or be put or be liable to by reasons or in consequence of the operations of the Contractor or of his failure in any respect.

48. (1) Certificate of completion of works: - As soon as in the opinion of the Engineer, the works has been completed and has satisfactorily passed any final test or tests that may be prescribed, the Engineer shall issue a certificate of completion duly indicating the date of completion in respect, of the work and the period of maintenance of the work shall commence from the date of completion mentioned in such certificate. The certificate, inter alia, should mention that the work has been completed in all respects and that all the contractual obligations have been fulfilled by contractor and that there is no due from the contractor to Railways/DFCCIL against the contract concerned.

The Engineer may also issue such a certificate indicating date of completion with respect to any part of the work (before the completion of the whole of work), which has been both completed to the satisfaction of the

Engineer and occupied or used by the DFCCIL. When any such certificate is given in respect of part of a work, such part shall be considered as completed and the period of maintenance of such part shall commence from the date of completion mentioned in the completion certificate issued for that part of the work.

48.(2) Contractor not absolved by completion Certificate:- The Certificate of completion in respect of the works referred to in sub-clause (1) of this clause shall not absolve the Contractor from his liability to make good any defects imperfections, shrinkages or faults which may appear during the period of maintenance specified in the tender arising in the opinion of the Engineer from materials or workmanship not in accordance with the drawings or specifications or instruction of the Engineer, which defects, imperfections, shrinkages or faults shall upon the direction in writing of the Engineer be amended and made good by the Contractor at his own cost: and in case of default on the part of Contractor the Engineer may employ labour and materials or appoint another Contractor to amend and make good such defects, imperfections, shrinkages and faults and all expenses consequent thereon and incidental thereto shall be borne by the Contractor and shall be recoverable from any moneys due to him under the contract.

48.(3) **Final Supplementary Agreement**: After the work is completed or otherwise concluded by the parties with mutual consent, and taken over by the Railway as per terms and conditions of the contract agreement, and there is unequivocal no claim on either side under the Contract other than as mentioned in item 4 of Form No. 24, the parties shall execute the Final Supplementary Agreement as per Form No. 24

49.0 Approval only by maintenance Certificate:- No certificate other than maintenance certificate referred to in Clause 50 of the conditions shall be deemed to constitute approval of any work or other matter in respect of which it is issued or shall be taken as an admission of the due performance of the contract or any part thereof or of the accuracy of any claim or demand made by the Contractor or of additional varied work having been ordered by the Engineer nor shall any other certificate conclude or prejudice any of the powers of the Engineer.

50.(1) Maintenance Certificate:- The Contract shall not be considered as completed until a Maintenance Certificate shall have been signed by the Engineer stating that the works have been completed and maintained to his satisfaction. The Maintenance Certificate shall be given by the Engineer upon the expiration of the period of maintenance or as soon thereafter as any works ordered during such period pursuant to sub clause (2) Clause 48 of these conditions shall have been completed to the satisfaction of the Engineer and full effect shall be given to this Clause notwithstanding the taking possession of or using the works or any part thereof by the DFCCIL.

50.(2) Cessation of Railway's / DFCCIL Liability: - The DFCCIL shall not be liable to the Contractor for any matter arising out of or in connection with the contract of the execution of the works unless the contractor shall have made a claim in writing in respect thereof before the issue of the Maintenance Certificate under this clause.

50.(3) Unfulfilled Obligations:- Notwithstanding the issue of the Maintenance

certificate the Contractor and (subject to sub-clause 2 of this clause) the DFCCIL shall remain liable for the fulfilment of any obligation incurred under the provision of the contract prior to the issue of the maintenance Certificate which remains unperformed at the time such certificate is issued and for the purposes of determining the nature and extent of any such obligations the contract shall be deemed to remain in force between the parties thereto.

51.(1) Final Payment:- On the Engineer's certificate of completion in respect of the works, adjustment shall be made and the balance of account based on the Engineer or the Engineer's representative's certified measurements or Engineer's certified "contractor's authorized engineer's measurements" of the total quantity of work executed by the Contractor upto the date of completion and on the rates accepted in Bill(s) of Quantities and for extra works on rates determined under Clause 39 of these Conditions shall be paid to the Contractor subject always to any deduction which may be made under these presents and further subject to the Contractor having signed delivered to the Engineer enclosing either a full account in detail of all claims he may have on the Railway in respect of the works or having delivered No Claim Certificate and the Engineer having after the receipt of such account given a certificate in writing that such claims are not covered under excepted matter i.e. Clauses 7(j), 8, 18, 22(5), 39.1, 39.2, 40A, 43(2), 45(i)(a), 55, 55-A(5), 57, 57A, 61(1), 61(2) and 62(1), 63(iv) and 63.2.11 of the Standard General Conditions of Contract or in any Clause (stated as excepted matter) of the Special Conditions of the Contract, that the whole of the works to be done under the provisions of the Contracts have been completed, that they have been inspected by him since their completion and found to be in good and substantial order, that all properties, works and things, removed, disturbed or injured in consequence of the works have been properly replaced and made good and all expenses and demands incurred by or made upon the Railway for or in the respect of damage or loss by from or in consequence of the works, have been satisfied agreeably and in conformity with the contract.

51.(2) Post Payment Audit:- It is an agreed term of contract that the DFCCIL reserves to itself the right to carry out a post-payment audit and or technical examination of the works and the final bill including all supporting vouchers, abstracts etc. and to make a claim on the contractor for the refund any excess amount paid to him if as a result of such examination any over-payment to him is discovered to have made in respect of any works done or alleged to have been done by him under the contract.

51A. Production of vouchers etc. by the Contractor:-

(i) For a contract of more than one crore of rupees, the contractor shall, whenever required, produce or cause to be produced for examination by the Engineer any quotation, invoice, cost or other account, book of accounts, voucher, receipt, letter, memorandum, paper of writing or any copy of or extract from any such document and also furnish information and returns verified in such manner as may be required in any way relating to the execution of this contract or relevant for verifying or ascertaining cost of execution of this contract (the decision of the engineer on the question of relevancy of any documents, information or return being final and binding

in the parties).The contractor shall similarly produce vouchers; etc., if required to prove to the Engineer, that materials supplied by him, are in accordance with the specifications laid down in the contract

(ii) If any portion of the work in a contract of value more than one crore of rupees be carried out by a sub-contractor or any subsidiary or allied firm or company (as per Clause 7 of the General Conditions of Contract), the Engineer shall have power to secure the books of such sub-contract or any subsidiary or allied firm or company, through the contractor, and such books shall be open to his inspection.

(iii) The obligations imposed by sub clause (i) & (ii) above is without prejudice to the obligations of the contractor under any statute rules or orders binding on the contractor.

52.0 Withholding and lien in respect of sums claimed:- Whenever any claim or claims for payment of a sum of money arises out of or under the contract against the contractor, the DFCCIL shall be entitled to withhold and also have a lien to retain such sum or sums in whole or in part from the security, if any, deposited by the contractor and for the purpose aforesaid, the DFCCIL shall be entitled to withhold the said cash security deposit or the security if any, furnished as the case may be and also have a lien over the same pending finalization or adjudication of any such claim. In the event of the security being insufficient to cover the claimed amount or amounts or if no security has been taken from the contractor, the DFCCIL shall be entitled to withhold and have a lien to the extent of the such claimed amount or amounts referred to supra, from any sum or sums found payable or which at any time thereafter may become payable to the contractor under the same contract or any other contract with this or any other DFCCIL or any Department of the Central Government pending finalization or adjudication of any such claim.

It is an agreed term of the contract that the sum of money or moneys so withheld or retained under the lien referred to above, by the DFCCIL will be kept withheld or

retained as such by the DFCCIL till the claim arising out of or under the contract is determined by the arbitrator (if the contract governed by the arbitration clause) or by the competent court as the case may be and that the contractor will have no claim for interest or damages whatsoever on any account in respect of such withholding or retention under the lien referred to supra and duly notified as such to the contractor. For the purpose of this clause, where the contractor is a partnership firm or a limited company, the DFCCIL shall be entitled to withhold and also have a lien to retain towards such claimed amount or amounts in whole or in part from any sum found payable to any partner/limited company, as the case may be whether in his individual capacity or otherwise.

52A. Lien in respect of claims in Other Contracts:-

(i) Any sum of money due and payable to the contractor (including the security

deposit returnable to him) under the contract may be withheld or retained by way of lien by the DFCCIL, against any claim of this or any other DFCCIL or any other Department of the Central Government in respect of a payment of a sum of money arising out of or under any other contract made by the contractor with this or any other Department of the Central Government.

(ii) However, recovery of claims of DFCCIL in regard to terminated contracts may be made from the Final Bills, Security Deposits and Performance Guarantees of other contract or contracts, executed by the contractor. The Performance Guarantees submitted by the Contractor against other contracts, if required, may be withheld and encashed. In addition, 10% of each subsequent "on-account bill" may be withheld, if required, for recovery of DFCCIL/Railways" dues against the terminated contract.

(iii) It is an agreed term of the contract that the sum of money so withheld or retained under this clause by the DFCCIL will be kept withheld or retained as such by the DFCCIL till the claim arising out of or under any other contract is either mutually settled or determined by arbitration, if the other contract is governed by arbitration clause or by the competent court as the case may be and contractor shall have no claim for interest or damages whatsoever on this account or on any other ground in respect of any sum of money withheld or retained under this clause and duly notified as such to the contractor.

53.0 Signature on Receipts for Amounts:- Every receipt for money which may become payable or for any security which may become transferable to the Contractors under these presents, shall, if signed in the partnership name by anyone of the partners of a Contractor's firm be a good and sufficient discharge to the DFCCIL in respect of the moneys or security purported to be acknowledged thereby and in the event of death of any of the Contractor, partners during the pendency of the contract it is hereby expressly agreed that every receipt by anyone of the surviving Contractor partners shall if so signed as aforesaid be good a sufficient discharge as aforesaid provided that nothing in this clause contained shall be deemed to prejudice or effect any claim which the DFCCIL may hereafter have against the legal representative of any contractor partner so dying for or in respect to any breach of any of the conditions of the contract, provided also that nothing in this clause contained shall be deemed to prejudice or effect the respective rights or obligations of the Contractor partners and of the legal representatives of any deceased Contractor partners interse.

LABOUR

54.0 Wages to Labour: -The Contractor shall be responsible to ensure compliance with the provision of the Minimum Wages Act, 1948 (hereinafter referred to as the "said Act") and the Rules made there under in respect of any employees directly or through petty contractors or subcontractors employed by him for the purpose of carrying out this contract.

If, in compliance with the terms of the contract, the Contractor

supplied any labour to be used wholly or partly under the direct orders and control of the DFCCIL whether in connection with any work being executed by the Contractor or otherwise for the purpose of the DFCCIL such labour shall, for the purpose of this clause, still be deemed to be persons employed by the Contractor.

If any moneys shall, as a result of any claim or application made under the said Act be directed to be paid by the DFCCIL, such money shall be deemed to be moneys paid by it as aforesaid within seven days after the same shall have been demanded, the Railway/DFCCIL shall be entitled to recover the same form any moneys due or accruing to the Contractor under this or any other Contract with the DFCCIL.

54A. Apprentices Act: - The contractor shall be responsible to ensure compliance with the provisions of the Apprentices Act, 1961 and the Rules and Orders issued there under from time to time in respect of apprentices directly or through petty contractors or sub- contractors employed by him for the purpose of carrying out the Contract.

If the contractor directly or through petty contractors or sub-contractors fails to do so, his failure will be a breach of the contract and the DFCCIL may, in its discretion, rescind the contract. The contractor shall also be liable for any pecuniary liability arising on account of any violation of the provisions of the Act.

55.1 Provisions of payments of Wages Act: - The Contractor shall comply with the provisions of the Payment of Wages Act, 1936 and the rules made there under in respect of all employees employed by him either directly or through petty contractors or sub-contractors employed by him in the works. If In compliance with the terms of the contract, the Contractor directly or through petty contractors of sub-contractors shall supply any labour to be used wholly or partly under the direct orders and control of the Engineer whether in connection with the works to be executed hereunder or otherwise for the purpose of the Engineer such labour shall never the less be deemed to comprise persons employed by the contractor and any moneys which may be ordered to be paid by the Engineer shall be deemed to be moneys payable by the Engineer on behalf of the Contractor and the Engineer may on failure of the contractor to repay such money to the Railways/DFCCIL deduct the same from moneys due to contractor in the terms of contract. The DFCCIL shall be entitled to deduct from any moneys due to the contractor (whether under this contract or any other contract) all moneys paid or payable by the DFCCIL by the way of compensation of aforesaid or for costs of expenses in connection with any claim thereto and the decision of the Engineer upon any question arising out of the effect or force of this clause shall be final and binding upon the Contractor.

55A. Provisions of Contract labour (Regulation and Abolition) Act, 1970:

55A.(1) The contractor shall comply with the provision of the contract labour (Regulation and Abolition) Act, 1970 and the Contract labour (Regulation and

Abolition) Central Rules 1971 as modified from time to time, wherever applicable and shall also indemnify the DFCCIL from and against any claims under the aforesaid Act and the Rules.

55A.(2) The Contractor shall obtain a valid licence under the aforesaid Act as modified from time to time before the commencement of the work and continue to have a valid licence until the completion of the work. Any failure to fulfil the requirement shall attract the penal provision of the Act.

55A. (3) The Contractor shall pay to the labour employed by him directly or through sub- contractors the wages as per provision of the aforesaid Act and the Rules wherever applicable. The Contractor shall notwithstanding the provisions of the contract to the contrary, cause to be paid the wages to labour indirectly engaged on the works including any engaged by subcontractors in connection with the said work, as if the labour had been immediately employed by him.

55A.(4) In respect of all labour directly or indirectly employed in the work for performance of the contractor's part of, the contract, the Contractor shall comply with or cause to be complied with the provisions of the aforesaid Act and Rules wherever applicable.

55A.(5) In every case in which, by virtue of the provisions of the aforesaid Act or the Rules, the DFCCIL is obliged to pay any amount of wages to a workman employed by the Contractor or his sub-contractor in execution of the work or to incur any expenditure on account of the Contingent, liability of the DFCCIL due to the contractor's failure to fulfil his statutory obligations under the aforesaid Act or the rules the DFCCIL will recover from the Contractor, the amount of wages so paid or the amount of expenditure so incurred, and without prejudice to the rights of the DFCCIL under the section 20, sub-section (2) and section 2, sub-section (4) of the aforesaid Act, the DFCCIL shall be at liberty to recover such amount or part thereof by deducting it from the security deposit and/ or from any sum due by the DFCCIL to the contractor whether under the contract or otherwise. The DFCCIL shall not be bound to contest any claim made against it under sub-section (1) of section 20 and sub-section (4) of section 21 of the aforesaid Act except on the written request of the contractor and upon his giving to the DFCCIL full security for all costs for which the DFCCIL might become liable in contesting such claim. The decision of the DFCCIL regarding the amount actually recoverable from the contractor as stated above shall be final and binding on the Contractor.

55B. Provisions of Employees Provident Fund and Miscellaneous Provisions Act, 1952:

The Contractor shall comply with the provisions of Para 30 & 36-B of the Employees Provident Fund Scheme, 1952; Para 3 & 4 of Employees" Pension Scheme, 1995; and Para 7 & 8 of Employees Deposit Linked Insurance Scheme, 1976; as modified from time to time through enactment of "Employees Provident Fund & Miscellaneous Provisions Act, 1952", wherever applicable and shall also indemnify the DFCCIL from and against any claims under the aforesaid Act and the Rules.

55-C(i) Contractor is to abide by the provisions of various labour laws in terms of above clause 54, 55, 55-A and 55-B of Indian Railways Standard General Conditions of Contract. In order to ensure the same, an application has been developed and hosted on website „www.shramikkalyan.indianrailways.gov.in". Contractor shall register his firm/company etc. and upload requisite details of labour and their payment

in this portal. These details shall be available in public domain. The registration / updation in Portal shall be done as under:

(a) Contractor shall apply for onetime registration of his company/firm etc. in the Shramikkalyan portal with requisite details subsequent to issue of Letter of Acceptance. Engineer shall approve the contractor's registration in the portal within 7 days of receipt of such request.

(b) Contractor once approved by any Engineer, can create password with login ID (PAN No.) for subsequent use of portal for all Letter of Acceptances (LoAs) issued in his favour.

(c) The contractor once registered on the portal, shall provide details of his Letter of Acceptances (LoAs) / Contract Agreements on shramikkalyan portal within 15 days of issue of any LoA for approval of concerned Engineer. Engineer shall update (if required) and approve the details of LoA filled by contractor within 7 days of receipt of such request.

(d) After approval of LoA by Engineer, contractor shall fill the salient details of contract labours engaged in the contract and ensure updating of each wage payment to them on shramikkalyan portal on monthly basis.

(e) It shall be mandatory upon the contractor to ensure correct and prompt uploading of all salient details of engaged contractual labour & payments made thereof after each wage period.

(ii) While processing payment of any „On Account Bill" or "Final Bill" or release of "Advances" or "Performance Guarantee / Security deposit", contractor shall submit a certificate to the Engineer or Engineer"s representatives that "I have uploaded the correct details of contract labours engaged in connection with this contract and payments made to them during the wage period in Railway"s Shramikkalyan portal at "www.shramikkalyan.indianrailways.gov.in" till____Month, __Year."

55-D. Provisions of "The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996" and "The Building and Other Construction Workers" Welfare Cess Act, 1996": The tenderers, for carrying out any construction work, shall get themselves registered with the Registering Officer under Section-7 of the Building and Other Construction Workers Act, 1996 and Rules made thereto by the concerned State Govt., and submit Certificate of Registration issued by Registering Officer of the concerned State Govt. (Labour Dept.). The Cess shall be deducted from contractor's bills as per provisions of the Act.

56.0 Reporting of Accidents of Labour : - The Contractor shall be responsible for the safety of all employees directly or through petty contractors or sub-contractor employed by him on the works and shall report serious accidents to any of them however and wherever occurring on the works to the Engineer or the Engineers Representative and shall made every arrangements to render all possible assistance.

57.0 Provision of Workmen's Compensation Act:- In every case in which by virtue of the provisions of section 12 sub-section (1) of the Workmen's Compensation Act 1923, DFCCIL is obliged to pay compensation to a workman directly or through petty contractor or subcontractor employed by the Contractor in executing the work, DFCCIL will recover from the Contractor the

amount of the compensation so paid, and, without prejudice to the rights of DFCCIL under Section 12 Sub-section (2) of the said Act, DFCCIL shall be at liberty to recover such amount or any part thereof by deducting it from the security deposit or from any sum due by DFCCIL to the Contractor whether under these conditions or otherwise, DFCCIL shall not be bound to contest any claim made against it under Section 12 Sub-section (1) of the said Act except on the written request of the Contractor and upon his giving to DFCCIL full security for all costs for which DFCCIL might become liable in consequence of contesting such claim.

57A. Provision of Mines Act:- The contractor shall observe and perform all the provisions of the Mines Act, 1952 or any statutory modifications or re-enactment thereof for the time being in force and any rules and regulations made there under in respect of all the persons directly or through the petty contractors or sub-contractors employed by him under this contract and shall indemnify the DFCCIL from and against any claims under the Mines Act, or the rules and regulations framed there under, by or on behalf of any persons employed by him or otherwise.

58.0 DFCCIL not to provide quarters for Contractors: - No quarters shall normally be provided by the DFCCIL for the accommodation of the contractor or any of his staff employed on the work.

59.(1) Labour Camps:- The contractor shall at his own expense make adequate arrangements for the housing, supply of drinking water and provision of latrines and urinals for his staff and workmen, directly or through the petty contractors or sub- contractors and for temporary crèche (Bal-mandir) where 50 or more women are employed at a time. Suitable sites on DFCCIL land, if available, may be allotted to the contractor for the erection of labour camps, either free of charge or on such terms and conditions that may be prescribed by the DFCCIL. All camp sites shall be maintained in clean and sanitary conditions by the contractor at his own cost.

59. (2) Compliance to rules for employment of labour: - The contractor(s) shall conform to all laws, by-laws rules and regulations for the time being in force pertaining to the employment of local or imported labour and shall take all necessary precautions to ensure and preserve the health and safety of all staff employed directly or through petty contractors or sub-contractors on the works.

59. (3) Preservation of peace: - The contractor shall take requisite precautions and use his best endeavours to prevent any riotous or unlawful behaviour by or amongst his workmen and other employed directly or through the petty contractors or sub- contractors on the works and for the preservation of peace and protection of the inhabitants and security of property in the neighbourhood of the works. In the event of the DFCCIL requiring the maintenance of a special Police Force at or in the vicinity of the site during the tenure of works, the expenses thereof shall be borne by the contractor and if paid by the DFCCIL shall be recoverable from the contractor.

59.(4) Sanitary arrangements:- The contractor shall obey all sanitary rules and carry out all sanitary measures that may from time to time be prescribed by the Railway Medical Authority and permit inspection of all sanitary

arrangements at all times by the Engineer, the Engineer's Representative of the Medical staff of the DFCCIL. Should the contractor fail to make the adequate sanitary arrangements, these will be provided by the DFCCIL and the cost therefore recovered from the contractor.

59.(5) Outbreak of infectious disease:- The contractor shall remove from his camp such labour and their families as refuse protective inoculation and vaccination when called upon to do so by the Engineer or the Engineer's representative on the advice of the DFCCIL. Should cholera, plague or other infectious disease break out, the contractor shall burn the huts, beddings, clothes and other belongings of or used by the infected parties and promptly erect new huts on health sites as required by the engineer, failing which within the time specified in the Engineer's requisition, the work may be done by the DFCCIL and the cost therefore recovered from the contractor.

59. (6) Deleted

59.(7) Medical facilities at site: - The Contractor shall provide medical facilities at the site as may be prescribed by the Engineer on the advice of the DFCCIL in relation to the strength of the Contractor's resident staff and workmen.

59.(8) Use of intoxicants: - The sale of ardent spirits or other intoxicating beverages upon the work or in any of the buildings, encampments or tenements owned, occupied by or within the control of the contractor or any of his employees shall be forbidden and the Contractor shall exercise his influence and authority to the utmost extent to secure strict compliance with this condition.

59.(9) Restrictions on The Employment of Retired Engineers of Railway/DFCCIL Services Within one Year of Their Retirement : The Contractor shall not, if he is a retired Government Engineer of Gazetted rank, himself engage in or employ or associate a retired Government Engineer of Gazetted rank, who has not completed one year from the date of retirement, in connection with this contract in any manner whatsoever without obtaining prior permission of the President and if the Contractor is found to have contravened this provision it will constitute a breach of contract and administration will be entitled to terminate the contract and forfeit Performance Guarantee (PG)and Security Deposits (SD) of that contract.

60.(1) Non-employment of labours below the age of 15:- The Contractor shall not employ children below the age of 15 as labourers directly or through petty contractors or subcontractors for the execution of work.

60.(2) Medical Certificate of fitness for labour: - It is agreed that the contractor shall not employ a person above 15 and below 19 years of age for the purpose of execution of work under the contract unless a medical certificate of fitness in the prescribed form (Performa at Form No.15) granted to him by a certifying surgeon certifying that he is fit to work as an adult is obtained and kept in the custody of the contractor or a person nominated by him in this behalf and the person carries with him, while at work; a token giving a reference to such certificate. It is further agreed that the responsibility for having the adolescent examined medically at the time of appointment or periodically till he attains the age of 19 years shall devolve entirely on the

contractor and all the expenses to be incurred on this account shall be borne by him and no fee shall be charged from the adolescent or his parent for such medical examination.

60. (3) Period of validity of medical fitness certificate:- A certificate of fitness granted or renewed for the above said purposes shall be valid only for a period of one year at a time. The certifying surgeon shall revoke a certificate granted or renewed if in his opinion the holder of it is, no longer fit for work in the capacity stated therein. Where a certifying surgeon refuses to grant or renew a certificate or revoke a certificate, he shall, if so required by the person concerned, state his reasons in writing for doing so.

60.(4) Medical re-examination of labourer:- Where any official appointed in this behalf by the Ministry of labour is of the opinion that any person employed in connection with the execution of any work under this contract in the age group 15 to 19 years is without a certificate of fitness or is having a certificate of fitness but no longer fit to work in the capacity stated in the certificate, he may serve on the Contractor, or on the person nominated by him in the regard, a notice requiring that such persons shall be examined by a certifying surgeon and such person shall not if the concerned official so directs, be employed or permitted to do any work under this contract unless he has been medically examined and certified that he has been granted a certificate of fitness or a fresh certificate of fitness, as the case may be.

EXPLANATIONS:-

(1) Only qualified medical practitioners can be appointed as "Certifying Surgeons" and the term "Qualified Medical Practitioners" means a person holding a qualification granted by an authority specified in the Schedule to the Indian Medical Degrees Act, 1916 (VII to 1916) or in the Schedule to the Indian Medical Council Act, 1933 (XXVII) of 1933.

(2) The Certifying surgeon may be a medical officer in the service of State or Municipal Corporation.

DETERMINATION OF CONTRACT

61.(1) Right of DFCCIL of determine the contract:- The DFCCIL shall be entitled to determine and terminate the contract at any time should, in the DFCCIL/Railway's opinion, the cessation of work becomes necessary owing to paucity of funds or from any other cause whatever, in which case the value of approved materials at site and of work done to date by the Contractor will be paid for in full at the rate specified in the contract. Notice in writing from the DFCCIL of such determination and the reasons therefore shall be conclusive evidence thereof.

61. (2) Payment on determination of contract o n : - Should the contract be determined under sub clause (1) of this clause and the Contractor claims payment for expenditure incurred by him in the expectation of completing the whole of the work, the Railways/DFCCIL shall admit and consider such claims as are deemed reasonable and are supported by vouchers to the satisfaction of the Engineer. The DFCCIL/Railway's decision on the necessity and propriety of such expenditure shall be final and conclusive.

61.(3) The contractor shall have no claim to any payment of compensation or otherwise, howsoever on account of any profit or advantage which he might have derived from the execution of the work in full but which he did not derive in consequence of determination of contract.

62. (1) Determination of contract owing to default of contractor: - If the Contractor should**:-**

(i) Becomes bankrupt or insolvent, or

(ii) Make an arrangement for assignment in favour of his creditors, or agree to carry out the contract under a Committee of Inspection of his creditors, or

(iii) Being a Company or Corporation, go into liquidation (other than a voluntary liquidation for the purposes of amalgamation or reconstruction), or

(iv) Have an execution levied on his goods or property on the works, or

(v) Assign the contract or any part thereof otherwise than as provided in Clause 7 of these conditions, or

(vi) Abandon the contract, or

(vii) Persistently disregard the instructions of the Engineer, or contravene any provision of the contract, or

(viii) Fail to adhere to the agreed programme of work by a margin of 10% of the stipulated period, or

(ix) Fail to Execute the contract documents in terms of Clause 1.3.9 of PREAMBLE
& GENERAL INSTRUCTIONS TO TENDERERS.

(x) Fails to submit the documents pertaining to identity of JV and PAN .

(xi) Fail to remove materials from the site or to pull down and replace work after receiving from the Engineer notice to the effect that the said materials or works have been condemned or rejected under clause 25 and 27 of these conditions, or

(xii) Fail to take steps to employ competent or additional staff and labour as required under clause 26 of the conditions

(xiii) Fail to afford the Engineer or Engineer's representative proper facilities for inspecting the work or any part thereof as required under clause 28 of the conditions, or

(xiv) Promise, offer or give any bribe, commission, gift or advantage either himself or through his partner, agent or servant to any officer or employee of the DFCCIL or to any person on his or on their behalf in relation to the execution of this or any other contract with this DFCCIL.

(xv) Fail to adhere to the provisions of clause 1.3.32 of PREAMBLE & GENERAL INSTRUCTIONS TO TENDERERS or provision of above Clause 59(9).

(xvi) Submits copy of fake documents/certificates in support of credentials, submitted by the tenderer

Then and in any of the said clause, the Engineer on behalf of the DFCCIL may serve the Contractor with a notice (Proforma at Form No.16) in writing to that effect and if the contractor does not within seven days after the delivery to him such notice proceed to make good

his default in so far as the same is capable of being made good and carry on the work or comply with such directions as aforesaid of the entire satisfaction of the Engineer, the DFCCIL shall be entitled after giving 48 hour's notice (Proforma at Form No. 17) in writing under the hand of the Engineer to rescind the contract as a whole or in part or parts (as may be specified in such notice) and after expiry of 48 hour's notice, a final termination notice (Proforma at Form No. 18) should be issued.

Note: Engineer at his discretion may resort to the part termination of contract with notices, only in cases where progress of work is more than or equal to 80% of the original scope of work.

62. (2) **Right of DFCCIL after, rescission of contract owing to default of contractor:** In the event of any or several of the courses, referred to in sub- clause (1) of the clause, being adopted.

(a) the contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered into any commitments or made any advances on account of or with a view to the execution of the works or the performance of the contract and contractor shall not be entitled to recover or be paid any sum for any work thereto for actually performed under the contract unless and until the Engineer shall have certified the performance of such work and the value payable in respect thereof and the contractor shall only be entitled to be paid the value so certified.

(b) In the contract which has been rescinded as a whole, the Security Deposit already with railways under the contract shall be encashed/ forfeited and the Performance Guarantee already submitted for the contract shall be encashed. The balance work shall be got done independently without risk & cost of the failed Contractor. The failed Contractor shall be debarred from participating in the tender for executing the balance work. If the failed Contractor is a JV or a Partnership firm, then every member/partner of such a firm shall be debarred from participating in the tender for the balance work in his/her individual capacity or as a partner of any other JV /partnership firm.
Further the authorized representative of failed Contractor cannot be accepted as authorized representative in new contract.

(c) In the contract rescinded in part or parts,

(i) The full Performance Guarantee for the contract shall be recovered. No additional Performance Guarantee shall be required for balance of work being executed through the part terminated contract. The contract value of part terminated contract stands reduced to the balance value of work under the contract.

(ii) The Security Deposit of part terminated contract shall be dealt as per clause 16(2) of GCC.

(iii) The defaulting Contractor shall not be issued any completion certificate for the contract.

(iv) The balance work shall be got done independently without risk & cost of the failed Contractor. The failed Contractor shall be debarred from

participating in the tender for executing the balance work. If the failed Contractor is a JV or a Partnership firm, then every member/partner of such a firm shall be debarred from participating in the tender for the balance work in his/her individual capacity or as a partner of any other JV /partnership firm.

(v) Further the authorized representative of failed Contractor will not be accepted as authorized representative in new contract.

(d) The Engineer or the Engineer's Representative shall be entitled to take possession of any materials, tools, implements, machinery and buildings on the works or on the property on which these are being or ought to have been executed, and to retain and employ the same in the further execution of the works or any part thereof until the completion of the works without the Contractor being entitled to any compensation for the use and employment thereof or for wear and tear or destruction thereof.

(e) The Engineer shall as soon as may be practicable after removal of the Contractor fix and determine ex-parte or by or after reference to the parties or after such investigation or enquiries as he may consider fit to make or institute and shall certify what amount (if any) had at the time of rescission of the contract been reasonably earned by or would reasonably accrue to the Contractor in respect of the work then actually done by him under the contract and what was the value of any unused, or partially used materials, any constructional plant and any temporary works upon the site. The legitimate amount due to the Contractor after making necessary deductions and certified by the Engineer should be released expeditiously.

SETTLEMENT OF DISPUTES – INDIAN RAILWAY ARBITRATION AND CONCILIATION RULES

63.0 Conciliation of Disputes:-

(i) This clause is applicable in the tender having advertised value less than or equal to Rs 50 Crore.

(ii) All disputes and differences of any kind whatsoever arising out of or in connection with the contract, whether during the progress of the work or after its completion and whether before or after the determination of the contract, shall be referred by the Contractor to the " General Manager /Chief General Manager" through “Notice of Dispute” provided that no such notice shall be served later than 30 days after the date of issue of Completion Certificate by the Engineer. Director/MD DFCCIL shall, within 30 days after receipt of the Contractor’s “Notice of Dispute”, notify the name of conciliator(s) to the Contractor.

(iii) The Conciliator(s) shall assist the parties to reach an amicable settlement in an independent and impartial manner within the terms of contract.

(iv) If the parties reach agreement on a settlement of the dispute, they shall draw up and sign a written settlement agreement duly signed by Engineer In-charge, Contractor and conciliator(s). When the parties sign the settlement agreement, it shall be final and binding on the parties.

(v) The parties shall not initiate, during the conciliation proceedings, any arbitral or judicial proceedings in respect of a dispute that is the subject matter of the conciliation proceedings.

(vi) The conciliation proceedings shall be terminated as per Section 76 of ‘The Arbitration and Conciliation Act, 1996.

63.1 **Matters finally determined by the DFCCIL** – All disputes and differences of any kind whatsoever arising out of or in connection with the contract, whether during the progress of the work or after its completion and whether before or after the determination of the contract, shall be referred by the contractor to the Managing Director/Director/Chief General Manage/DFCCIL shall within 120 days after receipt of the contractor's representation make and notify decisions on all matters referred to by the contractor in writing provided that matter for which provision has been made in clauses 7(j), 8, 18, 22(5),39.1, 39.2, 40A,43(2), 45(i)(a), 55, 55-A(5), 57, 57A,61(1), 61(2),62(1), 63(iv) and 63.2.11 of General Conditions of contract or in any special clause of the conditions of the contract shall be deemed as "excepted matters" (matters not arbitrable) and decisions of the DFCCIL authority, thereon shall be final and binding on the contractor; provided further that "excepted matters" shall stand specifically excluded from the purview of the Dispute Adjudication Board (DAB) and arbitration.

63.2 **Dispute Adjudication Board (DAB):** This clause is applicable in the tender having advertised value more than Rs 50 Crore.

63.2.1 Any dispute/s if not settled with the Engineer, shall be referred to DAB.

The DAB shall consist of a panel of three Retired Railway Officers, retired not below senior administrative grade (SAG). The DAB shall be formed within 90 days of signing of Contract Agreement. For this purpose, a panel of DAB members shall be maintained in the MD DFCCIL office. The complete panel, which shall not be less than five members, shall be sent by Director/MD DFCCIL to the Contractor to nominate one member of the DAB from the panel as Contractor's nominee within two weeks of receipt of the panel. On receipt of Contractor's nominee, the Director/MD DFCCIL shall nominate one member from the same panel as DFCCIL nominee for the DAB. Both above nominees shall jointly select presiding member of the DAB from the same panel.

63.2.2 The appointment of DAB shall be effectuated by way of a tri-partite agreement among the Railway, Contractor and the respective DAB members. The terms of the remuneration of each member shall be as fixed by Ministry of Railways from time to time. Each party shall be responsible for paying one-half of this remuneration.

63.2.3 If one or more of the members appointed refuses to act as DAB member, or is unable or unwilling to perform his functions as DAB member for any reason whatsoever or dies or in the opinion of the Director/MD DFCCIL fails to act without undue delay, the parties shall terminate the mandate of such DAB member and thereupon new DAB member shall be appointed in the same manner, as the outgoing DAB member had been appointed.

63.2.4 The appointment of any member may be terminated by mutual agreement of both Parties, but not by the Railway or the Contractor acting alone. Unless otherwise agreed by both the Parties, the appointment of the DAB (including each member) shall expire upon expiry of this Contract Agreement.

63.2.5 Before start of DAB proceedings, each DAB member shall give the following certificate to the Railway and the Contractor:

"I have no any past or present relationship in relation to the subject matter in dispute, whether financial, business, professional or other kind. Further, I have no any past or present relationship with or interest in any of the parties whether financial, business, professional or other kind, which is likely to give rise to justifiable doubts as to my independence or impartiality."

63.2.6 DAB proceedings shall be conducted as decided by the DAB. The DAB shall give its decision within 90 days of a Dispute referred to it by any of the Parties, duly recording the reasons before arriving at the decision. The DAB shall decide the issue within terms and conditions of the contract. This time limit shall be extendable subject to the Parties mutual agreement.

63.2.7 The DAB decision shall not be binding on both the Parties. In case any party is not satisfied by the decision of DAB, then the aggrieved party may approach Arbitral Tribunal for arbitration proceedings.

63.2.8 No dispute shall be referred to Arbitral Tribunal unless the same has been referred to DAB for adjudication. However, in case DAB is not formed due to any reason, the disputes can be directly referred to Arbitral Tribunal to adjudicate the dispute.

63.2.9 In the specific cases of any misconduct by any of the members of the DAB, the parties shall have the right to specifically bring it to the notice of the DAB such conduct, through a statement filed with necessary documents in proof of such misconduct and the DAB, after taking NOTICE of such conduct initiate the replacement of the member concerned, in the same manner the member to be replaced was appointed.

63.2.10 Once the decision is given by DAB, DAB cannot review the decision at its own or on the request of one party, unless both parties agree for review of decision by DAB.

63.2.11 In case DAB decision is not challenged by either party within 180 days of receipt of decision of DAB, the decision shall be considered as final and parties would be barred for referring the same to Arbitral Tribunal for adjudication.

63.2.12 The obligation of the Railway and the Contactor shall not be altered by reasons of issue being or under reference to DAB.

63.2.13 The DAB shall conduct the proceedings at any convenient venue which shall be decided by DAB in consultations with parties.

63.2.14 It is a term of this contract that the Parties shall not approach any Court of Law for settlement of such disputes or differences unless an attempt has first been made by the parties to settle such disputes or differences through DAB and Arbitral Tribunal.

64. (1) Demand for Arbitration:-

64. (1)(i) In the event of any dispute or difference between the parties hereto as to the construction or operation of this contract, or the respective rights and liabilities of the parties on any matter in question, dispute or difference on any account or as to the withholding by the DFCCIL of any certificate to which the contractor may claim to be entitled to, or if the DFCCIL fails to make a decision within 120 days, then and in any such case, but except in any of the "excepted matters" referred to in clause 63.1 of these conditions, the contractor, after 120 days but within 180 days of his presenting his final claim on disputed matters shall demand in writing that the dispute or difference be referred to arbitration.

64.(1)(ii)(a) The demand for arbitration shall specify the matters which are in

question, or subject of the dispute or difference as also the amount of claim item wise. Only such dispute or difference, in respect of which the demand has been made, together with counter claims or set off, given by the DFCCIL, shall be referred to arbitration and other matters shall not be included in the reference.

64.(1)(ii)(b): The parties may waive off the applicability of Sub-Section 12(5) of Arbitration and Conciliation (Amendment) Act 2015, if they agree for such waiver in writing, after dispute having arisen between them, in the format given under (Form No. 25) of these conditions.

64. (1) (iii) (a) The arbitration proceedings shall be assumed to have commenced from the day, a written and valid demand for arbitration is received by the DFCCIL.

(b) The claimant shall submit his claim stating the facts supporting the claims along with all the relevant documents and the relief or remedy sought against each claim within a period of 30 days from the date of appointment of the Arbitral Tribunal.

(c) The DFCCIL shall submit its defence statement and counter claim(s), if any, within a period of 60 days of receipt of copy of claims from Tribunal thereafter, unless otherwise extension has been granted by Tribunal.

(d) **Place of Arbitration**: The place of arbitration would be within the geographical limits of the DFCCIL unit where the cause of action arose or the Headquarter of the DFCCIL or any other place with the written consent of both the parties.

64.(1)(iv) No new claim shall be added during proceedings by either party. However, a party may amend or supplement the original claim or defence thereof during the course of arbitration proceedings subject to acceptance by Tribunal having due regard to the delay in making it.

64.(1)(v) If the contractor(s) does/do not prefer his/their specific and final claims in writing, within a period of 90 days of receiving the intimation from the Railways/DFCCIL that the final bill is ready for payment, he/they will be deemed to have waived his/their claim(s) and the Railways/DFCCIL shall be discharged and released of all liabilities under the contract in respect of these claims.

64.(2) Obligation During Pendency of Arbitration:– Work under the contract shall, unless otherwise directed by the Engineer, continue during the arbitration proceedings, and no payment due or payable by the DFCCIL shall be withheld on account of such proceedings, provided, however, it shall be open for Arbitral Tribunal to consider and decide whether or not such work should continue during arbitration proceedings.

64. (3) Appointment of arbitrator

64.(3)(a)(i) In cases where the total value of all claims in question added together does not exceed 1,00,00,000/- (Rupees One Crore), the Arbitral tribunal shall consist of a sole arbitrator nominated by the MD/DFCCIL The sole arbitrator shall be appointed within 60 days from the day when a written and valid demand for arbitrator is received by MD/DFCCIL .

64. (3) (a) (ii) In cases not covered by the clause 64(3) (a) (i), the Arbitral Tribunal shall consist of a Panel of three officials, as the arbitrators. For this purpose, the DFCCIL will send a panel of more than 3 names of DFCCIL officers which may also include the name(s) of Officer(s) empanelled to work as Arbitrator to the contractor within 60 days from the day when a written and valid demand for arbitration is received by the MD/DFCCIL.
Contractor will be asked to suggest to MD/DFCCIL at least 2 names out of the panel for appointment as contractor's nominee within 30 days from the date of dispatch of the request by Railway /DFCCIL. The MD/DFCCIL shall appoint at least one out of them as the contractor's nominee and will, also simultaneously appoint the balance number of arbitrators either from the panel or from outside the panel, duly indicating the "presiding arbitrator" from amongst the 3 arbitrators so appointed. MD/DFCCIL shall complete this exercise of appointing the Arbitral Tribunal within 30 days from the receipt of the names of contractor's nominees. While nominating the arbitrators it will be necessary to ensure that one of them is from the Accounts department. An officer of selection grade of accounts department shall be considered of equal status to the officers in SA grade of other department of DFCCIL for the purpose of appointment of arbitrator.

64. (3)(a)(iii) If one or more of the arbitrators appointed as above refuses to act as arbitrator, withdraws from his office as arbitrator, or vacates his/their office/offices or is/are unable or unwilling to perform his functions as arbitrator for any reason whatsoever or dies or in the opinion of the MD/DFCCIL fails to act without undue delay, the MD/DFCCIL shall appoint new arbitrator/arbitrators to act in his/their place in the same manner in which the earlier arbitrator/arbitrators had been appointed. Such re-constituted Tribunal may, at its discretion, proceed with the reference from the stage at which it was left by the previous arbitrator(s).

64. (3) (b) (i) the arbitral award shall state item wise, the sum and reasons upon which it is based. The analysis and reasons shall be detailed enough so that the award could be inferred there from.

64.(3)(b)(ii) A party may apply for corrections of any computational errors, any typographical or clerical errors or any other error of similar nature occurring in the award of a tribunal and interpretation of a specific point of award to tribunal within 60 days of receipt of the award.

64.(3)(b)(iii) A party may apply to tribunal within 60 days of receipt of award to make an additional award as to claims presented in the arbitral proceedings but omitted from the arbitral award.

64. (4) In case of the Tribunal, comprising of three Members, any ruling on award shall be made by a majority of Members of Tribunal. In the absence of such a majority, the views of the Presiding Arbitrator shall prevail.

64.(5) where the arbitral award is for the payment of money, no interest shall be payable on whole or any part of the money for any period till the date on which the award is made.

64.(6) The cost of arbitration shall be borne by the respective parties. The cost shall inter-alia include fee of the arbitrator(s), as per the rates fixed by Railway Board

from time to time and the fee shall be borne equally by both the parties, provided parties sign an agreement in the format given at **Form No. 25** to these conditions after/ while referring these disputes to Arbitration. Further, the fee payable to the arbitrator(s) would be governed by the instructions issued on the subject by Railway Board from time to time irrespective of the fact whether the arbitrator(s) is/are appointed by the Railway Administration or by the court of law unless specifically directed by Hon'ble court otherwise on the matter.

64.(7) Subject to the provisions of the aforesaid Arbitration and Conciliation Act 1996 and the rules thereunder and relevant para of the Standard General Conditions of Contract and any statutory modifications thereof shall apply to the appointment of arbitrators and arbitration proceedings under this Clause.

64.(8) In case arbitration award is challenged by a party in the Court of Law, 75% of award amount, pending adjudication by Court of Law, shall be made by party to other party. In case payment is to be made by Railway to Contractor, the terms & conditions as incorporated in the Ministry of Railways letter No. 2016/CE(I)/CT/ARB/3(NITI Aayog)/Pt. dated 08th Mar,2017 as amended from time to time, shall be followed. In case Contractor has to pay to the Railway, then 75% of the award amount shall be deducted by the Railway from the Contractor's bills, Performance Guarantee/ Security Deposit or any other dues of Contractor with the Government of India.

PART - I

CHAPTER V

SPECIAL CONDITIONS OF CONTRACT

SPECIAL CONDITIONS OF CONTRACT

1.5.1 This Tender shall be governed by Preamble and General instructions to tenderers, General condition of Contract, Special conditions of contract, Technical Specifications, Additional Technical specifications (if any), Drawings, Forms, Annexures, etc.

1.5.2 If there are varying or conflicting provisions in the documents forming part of the contract, Engineer shall be deciding authority with regard to the intentions of the provision and decision of Engineer will be final and binding on the contractor.

1.5.3 Scheme of work: - Within a period of 10 days beginning from the date of issue of Letter of Acceptance of Tender, the Contractor shall submit the detailed time schedule for execution of work and various documents enumerated in tender papers to the employer.

1.5.4 Quality Assurance Plan for Substructure and foundation

All materials used in the work shall be of the best quality as per codes. Quality Assurance Plan shall include for materials used and for workmanship of work. The contractor shall submit Quality Assurance Plan for the substructure and foundation. The contractor shall also ensure that the Employer's prescribed Quality Assurance Standards are rigidly followed in for the construction of substructure and foundation. These are to be approved from the DFCCIL.

1.5.5 Quality Assurance Plan for Superstructure

(a) All materials used in the work shall be of the best quality as per codes / Specifications

(b) The contractor shall ensure quality at all necessary points, whether at manufacturer's works, or in his depot or at work site as well as during erection through Quality Assurance Plan.

(c) The Contractor shall adopt a suitable Quality Assurance Programme according to approved instructions, drawings, specifications, etc.

1.5.6 The decision of the Engineer shall be final in respect of acceptability or otherwise of any material, fittings, component or equipment required for the work.

1.5.7 This programme of the Contractor shall generally cover the followings: -

1.5.7.1 The organization to manage and implement the Quality Assurance programme.

1.5.7.2 The documentation control system:

(i) Basic control system.

(ii) Adopted at manufacturer's work

(iii) Adopted at the Contractor Depot and work site.

1.5.8.3. Procedure adopted for:

(i) Source Inspection.

(ii) Incoming raw material inspection.

(iii) Verification of material purchased.

(iv) Fabrication Controls.

(v) Site erection controls.

1.5.8.4 Inspection and Test Procedure for:

(i) Manufacture and quality control procedure.

(ii) Field activity.

1.5.8.5 System of handling and storage.

1.5.8.6 System of quality audit.

1.5.8.7 System of maintenance of records.

1.5.8.8 For the purpose of obtaining "On Account Payment", the Contractor shall submit along with the invoice, the documents indicated in the prescribed quality Assurance standards which should inter alia cover the following as may be applicable in each case.

(i) Material test reports on raw materials used.

(ii) Material type and routine test report on components specification.

(iii) Inspection Plan with reports of the inspection Plan check points.

(iv) Routine test report.

(v) Factory test results as required under the specification.

(vi) Quality audit report including test check report of Employer's representative if any.

1.5.9 Deleted

1.5.10 Work By Other Agencies

(a) Any other works undertaken at the same time by the Engineer direct or through some other agency at the same time or section where the contractor is carrying out his work will not entitle the contractor to prefer any claim regarding any delays or hindrances he may have to face on this account but the Employer shall grant a reasonable extension of time to the contractor. The contractor shall comply with any instruction which may be given to him by the Employer in order to permit simultaneous execution of his own works and those undertaken by other contractors or the DFCCIL without being entitled on this account on any extra charge.

(b) The contractor shall not be entitled to any extra payment due to hindrance resulting from normal Railway operations, such as delay on account of adequate number of and duration of blocks not being granted, operational delay in movement of work trains extension of time to the contractor.

1.5.11 Infringement of patents:

(a) The Contractor is forbidden to use any patents or registered drawings, process or pattern in fulfilling his contract without the previous consent in writing of the owner of such patent, drawing, pattern or trade mark, except where these are specified by the Employer himself. Royalties where payable for the use of such patented processes, registered drawings of patterns shall be borne exclusively by the Contractor. The contractor shall advise the Employer of any proprietary right that may exist on such processed drawings or patterns which he may use of his own accord.

(b) In the case of patent taken out by the Contractor of the drawings or patterns registered by him, or of those patents, drawings, or patents for which he holds a licence, the signing of the Contract automatically gives the Employer the right to repair by himself the purchased articles covered by the patent or by any person or body chosen by him and to obtain from any sources he desires the component parts required by him in carrying out the

repair work. In the event of infringement of any patent rights due to above action of the Employer, he shall be entitled to claim damages from the contractor on the grounds of any loss of any nature which he may suffer e.g. in the case of attachment because of counterfeiting.

(c) **Indemnification by contractor:-** In the event of any claim or demand being made or action being brought against the Employer for infringement of later patent in respect of any equipment, machine, plant, work or thing used or supplied by the Contractor under this contract or in respect of any methods of using or working by the Employer of such equipment machine, plant work or thing, the contractor shall indemnify the employer and keep him indemnified and harmless against all claims, costs, charges and expenses arising from or incurred by reason of such claim provided that the Employer shall notify the contractor immediately any claim is made and that the contractor shall be at liberty, if he so desires with the assistance of the Employer if required but at the Contractor's expense, to conduct all negotiations for the settlement of the same or any litigation that may arise there from and provided that no such equipment, machine, plant work or thing, shall be used by the Employer for any purpose or in any manner other than that for which they have been supplied by the Contractor and specified under this contract.

1.5.12 Insurance (CAR Policy) -

Before commencing of works, it shall be obligatory for the contractor to obtain, at his own cost, insurance cover (car policy) in the joint name of the contractor and employer from reputed companies under the following requirements:

(a) Liability for death of or injury to any person/ employer's staff / animals or things or loss of or damage to any property / things / the work of other contractor (other than the work) arising out of the performance of the Contract.

(b) Construction Plant, Machinery and equipment brought to site by the Contractor.

(c) Any other insurance cover as may be required by the law of the land.

The contractor shall provide evidence to the employer / Engineer before commencement of work at site that the insurances required under the contract have been effected and shall within 60 days of the commencement date, provide the insurance policies to the Employer/Engineer, the contractor shall, whenever, called upon, produce to the engineer or his representative the evidence of payment of premiums paid by him to ensure that the policies indeed continue to be in force.

The Contractor shall also obtain any additional insurance cover as per the requirements of the Contract.

The Employer/Engineer shall not be liable for or in respect of any damages or compensation payable to any workman or other person in the employment of the Contractor or his sub-contractor or petty contractor / other contractor working there. The Contractor shall indemnify and keep indemnified the employer / Engineer against all such damages and compensation for which the contractor is liable.

The Policies of the contractor shall remain in force throughout the period of execution of the works and till the expiry of the defect liability period except

for any specific insurance covers necessary for shorter period.

If the Contractor fails to effect or keep in force or provide adequate cover as acceptable to the engineer in the insurance policies mentioned above, then in such cases, the engineer may effect and keep in force any such insurance or further insurance on behalf of the Contactor. The recovery shall be made at the rate of 1.5 times the premium/premiums paid by the engineer in this regard from the payment due to the Contractor or from the contractor's Performance security. However, the Contractor shall not be absolved from his responsibility and /or liability in this regard.

1.5.13 Accident:-

(a) The contractor shall, in respect of all staff engaged by him or by his sub-contractor, indemnify and keep the employer at all times indemnified and protected against all claims made and liabilities incurred under Workman's Compensation Act, the Factories Act and the Payment of Wages Act, and rules made there under from time to time or under any other labour and Industrial Legislation made from time to time.

(b) The contractor shall indemnify and keep the employer indemnified and harmless against all actions, suits, claim demands, costs, charges or expenses arising in connection with any death or injury sustained by any person or persons sustained due to the acts or omission of the contractor, his sub-contractors, his agents or his staff during the executions of this contract irrespective of whether such liability arises under the Workman's Compensation Act, or Fatal Accident Act or any other statute in force for the time being.

(c) The contractor‟ liability to meet third party claims of the type outlined above will be applicable only in cases where accidents have been caused by workmanship, material, execution or negligence on the part of the contractor and further the liability of the contractor will be limited to Rs.5 lakh for any one accident.

(d) The contractor shall be responsible for all repairs and rectification of damages to completed works or works under execution due to DFCCIL accidents, thefts, pilferage or any other cause, without delay to minimize or to avoid traffic detentions, in a section until the installation are provisionally handed over to the employer.

1.5.14 Safety Measures:-

(a) The contractor shall take all precautionary measures in order to ensure the protection of his own personnel moving about or working on the Railway/DFCCIL premises, but shall then conform to the rules and regulations of the Railway/DFCCIL if and when, in the course of the work there is likely to be any danger to persons in the employment of the contractor due to running traffic while working in the Railway/DFCCIL siding and premises, the contractor shall provide flagman or look out men for protection of such persons. The employer shall remain indemnified by the contractor in the event of any accident occurring in the normal course of work, arising out of the failure of contractor or his men to exercise reasonable precaution at all places of work. Before execution of work beside / nearby Railway/DFCCIL track the contractor shall get approved the safety

and protection plan from the DFCCIL if applicable and required.

(b) Blasting of rocks for foundation work shall be done only after due notice is given to the employer and time/s and date /s for blasting operations agreed to by the employer. Blasting, if required to be done in the vicinity of the track, shall not be undertaken until the Employer's flagmen on duty take necessary step to protect trains and the track is adequately protected by the contractor against damage by blasted rock. The contractor shall follow detailed instructions which will be issued to him regarding blasting operations in the vicinity of tracks.

(c) The contractor shall abide by all Railway/DFCCIL regulations in force for the time being and ensure that the same are followed by his representatives, Agents or sub -contractors or workmen. He shall give due notice to his employees and workers about provision of this para.

(d) The works must be carried out most carefully without any infringement of the Indian Railway Act or the General and Subsidiary Rules in force on the Railway, in such a way that they do not hinder Railway operation or affect the proper functioning of or damage any DFCCIL equipment, structure or rolling stock except as agreed to by the employer, provided that all damage and disfiguration caused by the contractor at his own cost failing which cost of such repairs shall be recovered from the contractor.

(e) If safety of track or track drainage etc. is affected as a consequence of works undertaken by the contractor, the contractor shall take immediate steps to restore normal conditions. In case of delay, the employer shall, after giving due notice to the contractor in writing, take necessary steps and recover the costs from the contractor.

1.5.15 Guarantee / Defect Liability Period:-

(a) The Contractor shall guarantee that all the works executed under this contract shall be free from all defects and faults in material, workmanship and manufacture and shall be of acceptable standards for the contracted work and in full conformity with the technical specifications, drawings and other contract stipulations, **for a period of 6 months from the date of taking over by the DFCCIL.**

(b) During the period of guarantee the Contractor shall keep available an experienced engineer / man power to attend to any defective works / installations resulting from defective erection and/or defect in the installation supplied by the Contractor. This engineer shall not attend to rectification of defects which arise out of normal wear and tear and come within the purview of routine maintenance work. The contractor shall bear the cost of modifications, additions or substitutions that may be considered necessary due to faulty materials or workmanship for the satisfactory working of the equipment. The final decision shall rest with the Engineer his successor(s)/Nominee.

(c) During the period of Guarantee the Contractor shall be liable for the replacement at site of any parts which may be found defective in the executed work whether such parts / structural elements of his own manufacture or those of his sub-contractor / supplier whether arising from faulty materials, workmanship or negligence in any manner on the part of the Contractor provided always that such defective parts as are not repairable at site are promptly returned to the Contractor if so required

by him at his (Contractor's) own expenses. In case of parts of executed work detected during guarantee period, contractor should replace all such items irrespective of the fact whether all such items have failed or not. The Contractor shall bear the cost of repairs carried out on his behalf by the Employer at site. In such a case, the contractor shall be informed in advance of the works proposed to be carried out by the Employer.

(d) If it becomes necessary for the Contractor to replace or renew any defective portion of the structural elements until the expiration of six month from the date of such replacement or renewal or until the end of the above mentioned period whichever is later.

Such extension shall not apply in case of defects of a minor nature, the decision of the Chief General Manager or his successor/nominee being final in the matter. If any defect be not remedied within a reasonable time during the aforesaid period the Employer may proceed to do work at the Contractor's risk and expense, but without prejudice to any other rights and remedies which the Employer may have against the Contractor in respect of such defects or faults.

(e) The repaired or renewal parts structure shall be delivered / supplied and erected / executed on site free of charge to the employer/DFCCIL.

(f) Any materials, fittings, components or equipments / structure supplied under items for supplying / providing and fixing in schedule shall also be covered by the provisions of this paragraph. The liability of the Contractor under the guarantee will be limited to re-supply of components / structure installation and fittings.

1.5.16 Final Acceptance:-

(a) The final acceptance of the entire work executed shall take effect from the date of expiry of the period of guarantee / Defect Liability period as defined in paragraph 1.5.15 above of the expiry of the last of the respective periods of guarantee, provided in any case that the Contractor has complied fully with his obligations under clause 1.5.15 in respect of each work, provided also that the attention has been paid by way of maintenance by the Employer/DFCCIL.

(b) If on the other hand the contractor has not so complied with his obligation under Para 1.5.15 above in respect of any work, the Employer may either extend the period of guarantee in respect of that work until the necessary works are carried out by the Contractor or carry out those works or got them carried out suo moto on behalf of the Contractor at the Contractor's expenses. After expiry of the period of guarantee for each work, a certificate of final acceptance for the section shall be issued by the Employer and the last of such certificate will be called the last and final acceptance certificate. The contract shall not be considered as completed until the issue of final acceptance certificate by the Employer.

(c) The Employer shall not be liable to the Contractor for any matter arising out of or in connection with the contract or execution of the work unless the Contractor shall have made a claim in writing in respect thereof before the issue of final acceptance certificate under this clause.

Notwithstanding the issue of final acceptance certificate the Contractor and the Employer (subject to sub-clause as above) shall remain liable for fulfilment of any obligation incurred under the provision of the contract prior

to the issue of final acceptance certificate which remains unperformed at the time such certificate is issued and for determining the nature and extent of such obligation the contract shall be deemed to remain in force between the parties hereto.

1.5.17 Payment:-

Payment will be governed by the terms specified in Part-I, Chapter IV and in accordance with accepted schedule of prices, read with relevant para of the other parts and Chapters of the Tender Papers. The DFCCIL retains the right to withhold money due to the contractor arising out of this contract for any default of the contractor.

(i) The Contractor shall, whenever required, produce or cause to be produced for examination by the Employer any quotation / invoice, cost of other account, book of account, voucher, receipt letter, memorandum paper or writing or any copy of or

extract from any such document and also furnish information and returns verified in such manner as may be required in anyway relating to the execution of this contract or relevant for verifying or ascertaining the cost of the execution of this Contract (the decision of the employer on the question of relevancy of any documents, information or return being final and binding on the parties). The Contractor shall similarly produce vouchers etc., if required, to prove to the Employer that materials supplied by him are in accordance with the specifications laid down in the contract.

(ii) If any portion of the work be carried out by a sub-contractor or any subsidiary or allied firm or company the Employer shall have power to secure the books of such sub-contractor or any subsidiary or allied firm or company, through the Contractor, and such books shall be open to his inspection. The Contractor should seek prior permission from the employer for subletting whole and/or part of the work to any sub-contractor.

(iii) The obligations imposed by sub-clause (i) and (ii) above are without prejudice to the obligation of the Contractor under any statute, rules or order binding to the Contractor or other conditions of the contract.

(iv) It is an agreed term of the contract that the employer reserves t h e right to carry out post-payment Audit and/or technical examination of the works and the final bill, including all supporting vouchers, abstracts etc. and to make a claim on the Contractor for the refund of any excess amount paid to him if as a result of such examination any over payment to him is discovered to have been made in respect of any work done or alleged to have been done by him under the contract.

1.5.18 All payments in respect of the contract during the currency of the contract shall be made through Electronic Clearing System (ECS) / National Electronic Funds Transfer (NEFT/RTGS). The successful tenderer on award of contract must submit ECS/NEFT/RTGS Mandate Form complete in all respects as detailed at Form No. 8 of the tender document. However, if the facility of ECS/NEFT/RTGS is not available at a particular location, the payments shall be made by cheque.

1.5.18.1 The Contractor and concerned staff/Engineer shall ensure that every Running

bill & Final Bill shall be technically checked by DFCCIL before making payment. The Contractor shall produce the original documents/Register for which copy is attached with "On Account" Bill at time of checking and/or Technical Scrutiny of the "On Account Bill" as and when asked by Engineer/ representative of DFCCIL / Investigating Agency to do so.

1.5.19 Performance Guarantee:- As per Para 16.(4) Part –I Chapter-IV of GENERAL CONDITIONS OF CONTRACT

1.5.20 Mobilization Advance:- (Applicable for Advertised tender of value more than Rs.25.00 crore)

(a) The Tenderer/Contractor may be granted a recoverable interest bearing mobilisation advance up to 10% of the contract value provided mobilisation advance is admissible as per the tender conditions and he specifically applies for it while tendering. If the tenderer fails to apply specifically for Mobilisation Advance while giving his offer at the tendering stage in case where grant of Mobilisation Advance is permissible, no subsequent requests from him for grant of this advance will be entertained. The rate of interest is 4.5% per annum above the Base Rate of State Bank of India, as effective on the date of approval of payment of Mobilisation Advance by the competent authority.

(b) The advance will be granted in two instalments viz., 5% of the contract value on signing of the contract agreement and the balance 5% on Mobilisation of site establishment, setting up offices, bringing in equipment and actual commencing of work. Each instalment will be released on submission of a security in a form acceptable to the DFCCIL (similar to Performance Guarantee notified in Clause 16.(4) (b) of General conditions of contract for the amount of the at least 110% of the value of the sanctioned advance amount covering instalment together with interest charges calculated up to the end of the contract period. The tenderer who seeks Mobilisation Advance should be specific about the course of action proposed to be followed in producing the security to the satisfaction of the Railway. Each security should be at least not less than one lakh rupees. These securities shall be returned as and when the value of the advance plus interest is recovered from the running bill.

(c) The recovery of the advance and interest thereon will be made through the every on account bills, pro-rata, commencing from the time the value of the work executed under the contract reaches 15% of the contract value and completed when the value of the work executed under the contract reaches 85% of the contract value or assessed value whichever is less.

(d) The Mobilisation Advance granted shall be returned back to the DFCCIL in case the work is not completed in the original contract completion period.

(e) The Bank Guarantee shall be from a Nationalised Bank in India or State Bank of India, in a form acceptable to DFCCIL. (Tender Form No. 19 of the tender

documents).

Note: The instruments as listed under Performance Guarantee vide Clause 16 (4) (b) of General Conditions of contract will also be acceptable for Guarantee in case of Mobilisation Advance.

1.5.21 Arbitration:- Refer to clause 63 & 64 of GCC.

1.6 GST

GST as applicable from time to time on taxable value of each running account bill shall be paid. **Contractor should bear the fact in mind while quoting the rates that GST will not be paid extra; rates are inclusive of GST as per prevailing rates. Documentary evidence of deposition of** GST will be produced by contractor.

1.6.1 PERMITS, FEES, TAXES & ROYALTIES

Unless otherwise provided in the contract documents, the contractor shall secure and pay for all permits, Government fees and licenses necessary for the execution and completion of the works. The contractor shall pay all taxes and duties including GST tax.

The DFCCIL authorities will not take any responsibility of refund of such taxes/fees. Any violation, in the legal provision of taxes, duties, permits and fees, carried out by the Contractor and detected subsequently shall be sole responsibility of the Contractor and his legal heirs.

1.6.2 STATUTORY INCREASE IN DUTIES, TAXES ETC

Tenderers will examine the various provisions of the central Goods and services Tax Act, 2017 (CGST)/ Integrated goods and service tax Act, 2017 (IGST)/ Union Territory Goods and services tax Act, 2017/(UTGST)/respective state's state Goods and services tax Act (SGST) also, as notified by central/state Govt & as amended from time to time and applicable taxes before bidding. Tenders will ensure that full benefit of input Tax Credit (ITC) likely to be availed by them is duly considered while quoting rates.

All the taxes and duties levied by the State and Central Govt. and by Local Bodies at the prevailing rates applicable on the date of receipt of tender shall be fully borne by the Contractor and shall not be reimbursed to him on any account.

Further DFCCIL shall not honour any claim arising out of any increase in any of the prevailing statutory duties, taxes, levies, octroi, etc. At the time of quoting/bidding contractor should bear the above fact in mind.

The successful tenderer who is liable to be registered under CGST/IGST/UTGST/SGST Act shall submit GSTIN along with other details required under CGST/IGST/UTGST/SGST Act to DFCCIL immediately after the award of contract, without which no payment shall be released to the contractor. The contractor shall be responsible for deposition of applicable GST to the concerned authority.

1.6.3 EXCISE DUTY OR ANY OTHER TAXES/DUTIES:

The contractor shall bear full taxes / duties levied by state government and / or Central Government/ Local bodies from time to time. This would be entirely a matter between the contractor and the State / Central Government/ Local bodies. No claim, what so ever, on this account shall be entertained by DFCCIL.

1.6.4 ROAD TAX CHARGES:

Road Tax/Charges levied by Government for movement of vehicles of contractor, used in transportation, shall be borne by the contractor and no re-imbursement on this account will be made by the DFCCIL.

1.6.5 FOREIGN EXCHANGE REQUIREMENTS:

Any demand of foreign exchange for importing of equipment's and materials shall not be accepted.

1.6.6 ANTI PROFITEERING CLAUSE.

The contractor should adhere to anti profiteering provisions as per section 171 of the CGST Act. Where due to change in the rates GST/Change in law, the contractor gets any credits/benefits, the same shall be passed on to DFCCIL by way of reduction in prices.

1.6.7 INTEGRITY PACT:-

As per office memorandum no F.No DPE/13(12)/11-Fin Dated 09.09.2011 issued by Ministry of Heavy Industries (DPE) all PSU should enter into Integrity pact in the required proforma in their procurement transaction/ Contracts with suitable changes specific to the situation in which the pact is to be used. The pact, entering into which would be a preliminary qualification for any bidder, essentially envisages an agreement between the prospective vendors / bidders and the DFCCIL, committing the persons/ officials on both sides not to resort to any corrupt practices in any aspect / stage of the contract.

A copy of pre contract integrity pact is enclosed as Form no. 20 for signature of bidder as acceptance, as and when Independent External monitor is appointed.

PART-II

TECHNICAL SPECIFICATION

TECHNICAL SPECIFICATIONS

2.0 The Materials, workmanship, technical specification refer

(i) Standard General Conditions of Contract-2022 of Indian Railways and Standard Specifications (Works and Materials) of CPWD-2019 as amended/corrected upto latest correction slips are to be followed.

(ii) CPWD Delhi Schedule of Rates (Vol-I & Vol-II) of 2021, Delhi Schedule of Rates (E&M)-2022, DSR horticulture & land scaping 2020, SOR 2022-23 R&B Electrical works as amended / corrected upto latest correction slips are to be followed. Non schedule items and their specification shall be followed. Apart from the basic data, specifications etc. all items of works shall be governed by the Codes & Specifications as detailed and as revised / corrected / amended up to 28 days before the due date of submission of the Bid Proposal.

Further, if any specification(s) mentioned above not available, GOOD industrial practices and/or Manufacturer's catalogue are to be referred in consultation with DFCCIL and decision of DFCCIL shall be final & binding to contractor.

2.1 Inspection and Rectification

During execution of said work, the contractor shall provide all facilities to inspect the site to the Engineer-in-charge or his representative.

2.2 Erection & Equipment:

2.2.1 -- Deleted --

2.2.2 -- Deleted --

2.2.3 Before starting the work, the Contractor shall advise the Engineer fully as to the method he/she proposes to follow and the amount and character of equipment he/she proposes to use, which shall be subjected to the approval of the Engineer. The approval of the Engineer shall not be considered as relieving the Contractor of the responsibility for the safety of his/her method or equipment or from carrying the work in full accordance with the drawings and specifications.

2.2.4 All temporary work shall be properly designed and substantially constructed for the loads, which it will be called upon to support. Adequate allowance and provision of a lateral forces and wind loads shall be made according to local conditions and ensure that support shall not settle during erection.

2.3 Further Drawing and Instructions:

(i) Chief General Manager/Dy.CPM DFCCIL shall have full power to make and issue

further drawings or instructions or direction from time to time as may appear necessary and proper to the contractor for efficient construction, completion and maintenance of the works. The contractor shall be bound by the same as fully as be if they had been mentioned or referred to in the contract, and the contractor shall not be entitled to any extra payment in respect of any work or materials shown or directed to be done supplied by such further drawings or instructions required for completion of unless the Chief General Manager/Dy. CPM DFCCIL have given an extra order for the same in writing. The contractor shall be responsible for close scrutiny of the drawings.

(ii) If the works are required to be done in Railway/DFCCIL Yards and Tracks are to be crossed, the tenderer shall inspect the site and make himself thoroughly acquainted with site condition and quote rate considering these aspects.

(iii) The work shall have to be done in such a manner that the normal working of the Railway/DFCCIL within the railway/DFC yard does not get disturbed. No material/temporary structures should be kept adjacent to the running track which may infringe rail traffic. The contractor shall take necessary precaution to prevent/cause damage to the Railway/DFCCIL property & staff during the execution of the work.

(iv) All the work to be executed as per approved drawings, design and instruction of site Engineer/consultant of work no any extra payment shall be made for protection etc.

(v) The contractor shall execute the work as per the detailed design and drawing of the work.

2.4 Commencement of the Erection Work at site:

The contractor shall commence the erection work when and as soon as, but not until, he receives instructions from Engineer to do so.

2.5 Contractor to Study Drawing & Specification etc. and His Liability:

The contractor shall be responsible for close scrutiny of the approved drawings supplied by the DFCCIL, For any discrepancies, error or omission in the drawings or other particulars indicated therein, the contractor shall approach the DFCCIL immediately for rectification of indicated therein, the contractor shall approach the DFCCIL immediately for rectification of such discrepancies, errors and omission. If any dimension/figure/features etc. on approved drawings or plans differ from those drawings or plans issued to the contractors at the time of calling the tender, the dimensions as figured upon the approved drawings or plans shall be taken as correct.

2.6 Contractor to Submit his Time Table:

The contractor shall submit a monthly progress of work done during the month by the 4th day of the following month. He will also give the programme of coming month by 25th of each month. The programme will be subject to alteration at the discretion of the DFCCIL officials.

2.7 Any Doubted Points to be referred to **the Chief General Manager/Dy. CPM/PM, DFCCIL**:

Should there be any doubt or obscurity as to anything to be done or not to be done by the contractor or as to these instructions or as to any matter or thing, the contractor must set forth such doubt or obscurity in writing and submit the same to Chief General Manager/Dy. CPM/PM DFCCIL. Only such reply as the said Chief General Manager/Dy. CPM/PM DFCCIL may be in writing given shall be taken as the authoritative interpretation of the point in doubt or obscurity.

2.8 Contractor'(s) Liability:

Any fitting, accessory or apparatus which may not have been mentioned in this specification or the drawings, but which are usual or necessary in the execution of such work, are to be provided by the Contractor without extra payment. The whole work must be completed in all details, whether mentioned in this specification or not, with the exception of such work as has been specified in the schedule of items to be separately provided for in the Contract.

Notwithstanding the specifications and conditions stated in the contract, the contractor shall keep the Engineer/ Employer authority fully indemnified and free from all liabilities and risks consequential to any lapse on his part in respect of material quality, standard of workmanship, accuracy of fabrication and the like. He shall provide all labour and material required for execution of the work as per all standards and specifications.

2.9 Contractor shall establish fully equipped laboratory for all the tests required on materials/processes/products as per provisions of the contract, Specifications and the direction/approval of the Engineer. Costs of these are deemed to be included in the quoted rates. Prior approval of the engineer shall be obtained for non-installation of such testing equipments which cannot be installed in normal course due to any reason. However, engineer's decision (for installation and non-installation) in this regard shall be final **binding and conclusive.**

2.10 Site Facilities by the Contractor:

Contractor shall provide office / site facilities at the approach site / other locations for ensuring smooth and efficient communication and work execution. Cost of these facilities deemed to be included in the quoted rates and nothing extra shall be paid for this item.

Contractor shall (at his own cost) depute / nominate safety officers(s) for supervising safety aspects of all works/process including enabling arrangements for execution and inspection of the work. Safety systems/arrangements should be made for each activity of fabrication/erection and its inspection and same should be certified by nominated safety officer.

2.11 METHOD OF MEASUREMENT FOR PAYMENT

The method of measurement and payment for the schedule items shall be done according to SOR/DSR/NS and their specifications.

PART-III (A)
ADDITIONAL TECHNICAL SPECIFICATION

1.1 GENERAL:
In these Special Conditions of Contract the following terms shall have the meaning hereby assigned to them except where the context otherwise requires:
"General Condition of Contract" shall mean General Conditions of Contract – as contained in this Tender/ Bid document vide Part I, chapter IV .
Standard Specifications shall mean specifications of CPWD DSR.
Standard Schedule Items/Rates shall mean the Items/Rates in the CPWD DSR.
Standard Schedule Items/Rates shall mean the Items/Rates in the CPWD Delhi Schedule of Rates (Vol-I & Vol-II) of 2021, Delhi Schedule of Rates (E&M)-2022, DSR horticulture & landscaping, SOR 2022-23 R&B Electrical works

All other terms shall have the same meaning as assigned to them in the General Conditions of Contract and Standard Specifications.
Where there is any conflict in conditions/Specifications contained in various parts, order of precedence will be as given below-
• Any foot note given by the CPWD SOR/ IRUSSOR in the schedule of quantities and rates.
• Description of item in the Schedule of Quantities and rates.
• Special Specifications.
• Additional Special Conditions/of Contract.
• Standard Specifications.
• Special Conditions of Contract.
• General Conditions of Contract.

Where there is any conflict in the description, Unit, rate etc. of items based of CPWD DSR Vol-I & Vol-II as included in the “Schedule of items shall prevail for the respective items of tender.
In the event of conflict between special condition /Technical specification /other guidelines, (available in the tender), the decision of the DFCCIL administration is final and binding to the contractor. No claim in this regard shall be entertained.
Every endeavour has been made to avoid any error which can materially affect the basis of the Bid and it is understood that the Contractor has taken upon himself and provided for the risk of any error which may be subsequently and shall make no subsequent claim on account thereof.

1.2 Production of Test Certificates:
The contractor shall have to produce Test Certificates for any items of material procured by him for use in the work as may be called for by the Engineer or his representative to establish that the materials conform to the specification for the works. The Contractor shall produce Test Certificates issued by an authority acceptable to the Engineer in regard to the relevant properties of high tensile steel wires, reinforcement steel or structural steel (as supplied and used by the Contractor) including the country name of manufacturer) .

1.3. Payment of Royalty Charges:
All taxes, royalty charges, etc. of whatever nature in connection with the work including extraction and supply of rubble stone/stone ballast/sand/Moorum/earth or any other material used on the work shall have to be borne by the Contractor. The Contractor will be required to obtain a royalty clearance certificate from the concerned Revenue Authorities/Collector and produce the same to the Engineer when asked.

1.4. Royalties And Patent Rights:
The Contractor shall defray the cost of all royalties, fees and other payments in respect of patents, patent rights and licenses which may be payable to patentee, licensee or other person or corporation and shall obtain all necessary licenses. The contractor shall indemnify, the Railway or any agent, servant or employee of the Railway against any action, claim or proceedings relating to infringement use of any patent or design any alleged patent or design rights and shall pay any royalties or other charges which may be payable in respect of any articles or materials or part thereof included in the contract. In the event of any claim being made or action being brought against the Railway /DFCCIL or employee of the Railway/DFCCIL in respect of any such matters , as aforesaid, The contractor shall indemnify notified thereof. Provided that such indemnify shall not apply when such infringement has taken place in complying with the specific direction issued by the Railway but the contractor shall pay any royalties or other charges payable in respect of any such use.

1.5. Income Tax
Income Tax as per rates applicable/amended under the Income Tax Act of work shall be deducted at source unless the contractor is exempted by Income Tax Authorities.

1.6 Cutting/Up Rooting Of Trees:
No extra rate shall be paid for cutting or up-rooting trees but the contractor would be authorised to take away the tree observing the forest laws of the land.

1.7 Observance of Bonded Labour System (Abolition Ordinance Act, 1975):
The “Bonded Labour System (Abolition Ordinance, 1975)” would apply to the present contract. The contractors shall duly observe the provisions thereof.

2.1. **Precautions While Working In The Vicinity Of Track:**

2.1.1 The contractor shall not commence any work in the vicinity of Railway track without presence of authorised DFCCIL official/ concerned Railway supervisor or his representative and contractor’s supervisor at site.

2.1.2 The look out and whistle caution orders shall be got issued to the trains and speed restrictions where considered necessary shall got imposed, from Railway by DFCCIL. In this regard the contractor shall assist by deploying manpower, providing speed restriction and safety board’s etc. No extra payment shall be made to the contractor in this regard.

2.1.3 The supervisors/Workmen should be counselled about safety measures. Supplementary site specific instructions, wherever considered necessary shall be issued by the Engineer/Engineer's representative. The methodology along with safety plan proposed to be adopted by the contractor for execution of the work shall be prepared by the contractor and to be submitted to the Engineer for necessary approval. The Engineer shall approve the Methodology for ensuring safety at Site. The Contractor shall co-operate the Engineer in obtaining approval of said safety method statement. No extra payment shall be made to the contractor in this regard.

2.1.4 The contractor shall keep an assurance register at each site which will have to be signed by Engineer/DFCCIL's authorised official/Engineer's Representative and the Contractor/ his authorised Representative for respective Site.

2.1.5 The contractor shall not allow any road vehicle belonging to him or his suppliers etc., to ply in railway land next to the running line. If for execution of certain works viz. Earthwork for parallel railway line and supply of ballast for new or existing rail line gauge conversion etc. road vehicles are necessary to be used in railway land next to the railway line, the contractor shall apply to the engineer in-charge for permission giving the type and no. of individual vehicles, names and license particulars of the drivers, location, duration and timings for such work/movement. The engineer-in charge or his authorised representative will personally counsel examine & certify, the road vehicle drivers, contractor's flagmen and supervisor and will give written permission giving names of road vehicle drivers, contractor's flagmen and supervisor to be deployed on the work, location, period and timing of the work. This permission will be subject to the following obligatory conditions:

The road vehicles and drivers will ply only between sunrise and sunset. Nominated vehicles and drivers will be utilized for work in the presence of at least one guardman/flagman and one supervisor certified for such work.

The contractor shall provide the suitable barricading at distance not less than 3.5m from centre line of the adjoining track, as directed by Engineer/ Engineers representative according to approved safety plan and the Method statement. No extra payment shall be made to the contractor for such barricading. The vehicles shall ply 6m. Clear of track. Any movement/work at less than 6m and upto minimum 3.5 clear of track centre shall be done only in the presence of DFCIL / Railway employee authorised by the Engineer-incharge. No part of the road; vehicle will be allowed at less than 3.5m from track centre. Cost of such railway employee shall be borne by the railway.

The contractor shall remain fully responsible for ensuring safety & in case of any accident, shall bear cost of all damages to this equipment & men and also damages to railway and its passengers.

Semi-permanent fencing as approved by the DFCCIL/Railway Engineer should be provided by the contractor at his own cost along the running line at a distance of 3.5 metres from the centreline of the nearest track at work sites where vehicles/machineries are likely to ply close to the track. This fencing should remain in position till the vehicles/machinery are required to work adjacent to running line.

Engineer-inch rage may impose any other condition necessary for a particular work or site.
Suitable scaffolds should be provided for workmen for all works that cannot safely be done from the ground or from solid construction except for such short period work as can be done safely from ladders. when a ladder is used an extra labour shall be engaged for holding the ladder and if the ladder is used for carrying materials as well, suitable foot holds and hand-holds shall be provided on the ladder and the ladder shall be given an inclination not steeper than 1/4 to 1 (1/4 horizontal to one vertical).

2.1.6 Joint procedure for undertaking digging work in the vicinity of underground signalling, electrical and telecommunication cables.

1	Prior to commencement of the digging work in Railway boundary the contractor shall seek the identification of the underground cables and utilities from the Engineer. The Engineer shall arrange for the joint site inspection with the concerned officers/officials of the relevant departments to locate/identify the underground cables and utilities at site underground cables and utilities. The contractor through Engineer shall approach in writing to Sr.DSTE / DSTE or Sr.DEE/DEE of the section for permitting to undertake the work, after ensuring that the concerned executing agencies, including the contractor have fully understood the S&T and Electrical cable route plan shall permit the work in writing.
2	After getting the permission from S&T or Electrical Deptt. as the case may be, the relevant portion of the cable route plan shall be attached to the letter through which permission is issued to the contractor by Engineer for commencement of work.
3	Engineer/Engineer's representative shall ensure that the contractors have fully understood the cable route plan and the precautions have been taken by the contractor to prevent damage to the underground cables. The contractor shall be asked to study the cable plan and follow it meticulously to ensure that the safety of the cable is not endangered.
4	The Engineer/Engineer's representative shall pass on the information to the concerned SE (P. Way), SE (Works), SE (Sig), SE (Tele), SE (Elect) & Rail Tel official about the works being taken up by the contractors in their sections at least 3 days in advance of the day of the work.
5	On receiving the above information, SE (P. Way), SE (Works), SE (Sig), SE (Tele), SE (Elect) & Rail Tel official shall visit the site on or before the date of taking up the work and issue permission to the contractor to commence the work after checking that adequate precautions have been taken to avoid the damage to the cables. The permission shall be granted within 3 days of submission of such requests. The permission letter shall indicate the contact numbers of Test Room / Network Operations Centre of Rail Tel / TPC/ Elect. Control.
6	Where the nature of the work taken up is such that the OFC or other S&T cables or Electrical cables is to be shifted and relocated, notice of minimum one week shall be given so that the Division / Rail Tel / Construction can plan the works properly for shifting. Such shifting works shall, in addition, for security and integrity of the cables, be supervised by S&T supervisors / Tail Tel supervisors / Electrical Supervisors.

7	The concerned SE(P. Way), SE(Works / SE(Sig) / SE (Tele) SE (Elect) or Rail Tel supervisors, supervising the work of the contractor shall ensure that the existing emergency sockets are not damaged in view of their importance in providing communication during accident / emergency.
8	In case of minor nature of works where shifting of cable is not required, in order to prevent damage to the cable, the Contractor shall take out the S&T or optical fibre cable or Electrical cable carefully from the trench and place it properly alongside at a safe location before starting the earthwork under the supervision of SE (Sig) or SE (Tele) or SE (Electrical). The cable shall be reburied soon after completion of excavation with proper care including placement of the brick over the cable by the concerned S&T supervisors or Electrical Supervisors. However, the work will be charged to the concerned engineering works.
9	In all the sections where major project are to be taken up / going on Rail Tel / S&T Deptt. shall deploy their official to take preventive / corrective action at site of work. The Engineer / Engineer's representative shall help contractor for co-ordination
10	Any damage caused to OFC/Quad cable or Electrical cable during execution of the work, due to negligence of the contractor or his manpower-resources deployed for execution of work necessary debit for corrective action as advised by Railway shall be raised on Contractor and recovery of such debit shall be made from his on account bill or any amount payable for the said work or any other work in DFCCIL.

3. Special condition for contractor's Vehicle plying near Railway track.

3.1 The contractor shall not allow any road vehicle belonging to him or his suppliers etc. to ply in railway land next to the running line. If for execution of certain works viz. earthwork for parallel railway line and supply of ballast for new or existing rail line gauge conversation etc. road vehicle are necessary to be used in railway land next to the Railway line, the contractor shall apply to the engineer-in-charge for permission giving the type and number of individual vehicles, names and license particulars of the drive, location, duration and timings for such work / movement. The engineer in charge or his authorized representative will personally counsel, examine and certify, the road vehicle drivers, contractor's flagmen and supervisor and will give written permission giving names of road vehicles drivers, contractor's flagmen and supervisor to be deployed on the work, location, period and timing of the work. This permission will be subject to the following obligatory conditions:

3.2 Road vehicles can ply along the track after suitable cordoning of track with minimum distance of 6 m from the centre of the nearest track. For plying of road vehicles during nig hours, adequate measures to be communicated in writing along with a site sketch to the contractor / contractor's representative and controlling engineers / supervisors in charge of the work including officers and the in charge of the section.

3.3 Nominated vehicles and drivers will be utilized for the work in the presence of at least one flagman and one supervisor certified for suck work.

3.4 The vehicles shall ply 6m clear of track. Any movement / work at less than 6 m and up to minimum 3.5 m clear track centre shall be done only in the presence of railway

employee authorized by the engineer-in-charge. No part of the road vehicle will be allowed at less than 3.5 m from track centre. Cost of such railway employee shall be born by the railway.

3.5 The contractor shall remain fully responsible for ensuring safety and in case of any accident, shall bear cost of all damages to this equipment and men and also damages to Railway and its passengers.

3.6 Engineer-in-charge may impose other condition necessary for a particular work or site.

3.7 The staff engaged by the contractor at site should be competent enough for the job. They should possess the certificate of competency certificate, necessary training will be arranged by the contractor at his cost by an expert to enable officer nominated by sectional Sr. DEN/ DEN/Dy CPM- DFCCIL in-charge to accord permission for the job. Without a suitable competency certificate, the contractor's supervisors shall not be allowed to carry out concreting and earthwork.

4. Issue of Identity Cards by Contractors:

4.1 The contractor is bound to issue identity card to each and every person employed by him and deployed for execution of contract work as per the prescribed format provided in the tender at his cost. Failure on part of the contractor to issue of identity cards to their employees will be treated as breach of contract conditions.

It is mandatory on part of every employee, deployed by the contractor to keep in his possession the identity card, issued by the contractor throughout the execution of the work. Failure to possess such identity card will be treated as unauthorized presence in the railway premises and such person shall be liable for prosecution as per law. It is mandatory for the contractor to submit the list of the employee issued with the identity cards and deployed for the particular contract, to Railway/DFCCIL Engineer at site before commencement of the work and also for any changes made during the execution of the work.
No claims whatsoever arising out of implementation of special conditions pertaining to issue of identity cards shall be admissible.

4.2 Site Lab

The contractor shall be set up a site lab with minimum equipment listed below;

1. IS sieve sets for sieve analysis.
2. 15 X 15 X15 cms cubes minimum 15 nos.
3. Cubes for cement test of 7.09 X 7.09 X cm
4. Vicate apparatus.
5. Cube testing machine of minimum 100 T capacities.
6. Measuring cylinder.

In case they have not brought the aforesaid articles or have not set up the lab, DFCCIL shall set up the same and actual cost plus 10% shall be recovered from the bills.

4.3 Disaster management

"All the available vehicles and equipment of the contractor can be drafted by the DFC/Railway Administration in case of accidents/natural calamities involving human lives. The payment for such drafting shall be made according to the rates as shall be fixed by the Engineer. However, if the contractor is not satisfied with the decision of the Engineer in this respect he may appeal to the Dy CPM/CGM-DFCCIL/ within 30 Days of getting the decision of the Engineer, supported by analysis of the rates claimed. The Dy CPM/CGM-DFCCIL/'s decision after hearing both the parties in the matter would be final and binding on the contractor and the Railway."

(1) Non- employment of labourers below the age of 15:- the contractor shall not employ children below the age of 15 as labourers directly or through petty contractors or sub-contractors for the execution of work.

(2) Medical certificate of fitness for Labour:- It is agreed that the contractor shall not employ a person above 15 and below 19 years of age for the purpose of execution of work under this contract unless a medical certificate of fitness in the prescribed form (proforma at Form No. 15) granted to him by a certifying surgeon certifying that he is fit to work as an adult is obtained and kept in the custody of the contractor or a person nominated by him, in this behalf and he person carries with him, while at work, a token giving a reference to such certificate. It is further agreed that the responsibility for having the adolescent examined medically at the time of appointment or periodically till he attains the age of 19 years shall devolve on the contractor and all the expenses to be incurred on this account shall be borne by him, and no fee shall be changed from the adolescent or his parent for such medical examination.

(3) Period of validity of Medical fitness certificate: - A certificate of fitness granted or renewed for the above said purposes shall be valid only for a period of one year at a time. The certifying surgeon shall revoke a certificate granted or renewal if in his opinion the holder of it is, no longer for work in the capacity stated therein. Where a certifying surgeon refuses to grant or renew a certificate or revoke a certificate, he shall, if so required by the person concerned state his reasons in writing for doing so.

(4) Medical Re-examination of Labourer:- Where any official appointed in this behalf by the Ministry of Labour is of the opinion that any person employed in connection with the execution of any work under this contract in the age group 16-19 years is without a certificate of fitness or is having a certificate of fitness but no longer fit to work in the capacity stated in the certificate, he may serve on the contractor or the person nominated by him in this regard, a notice requiring that such person shall be examined by a certifying surgeon and such person shall not, if the concerned official so directs, be

employed or permitted to do any work under this contract unless he has been medically examined and certified that he has been granted a certificate of fitness or a fresh, as the case may be.

4.4 **Submission of Photographs:**

4.4.1 The contractor shall arrange to submit two sets of minimum 6 Nos. of photographs of size 5”x7” showing various stages of different activities. The photograph shall be taken for every important activity during execution of work as decided by the Engineer for display and record purpose. In addition, the contractor will submit 2 sets of 2 laminated photographs of size 12”x18”. If the photograph as listed above are not submitted then recovery of Rs. 50,000/- shall be made from the contractor’s bill.

5. Special Conditions for working of Road Cranes:

5.1. No machine shall be selected to do any lifting on a specific job until its size and characteristics are considered against the weights, dimensions and lift radii of the heaviest and largest loads.

5.2. The contractor shall ensure that a valid Certificate of Fitness is available before use of Road Cranes.

5.3. Contractor can utilise the services of any competent person as defined in Factories Act, 1948 and approve by Chief Inspector of Factories.

5.4. The laminated photocopies of fitness certificate issued by competent person, the operator’s photo, manufacturer’s load chart and competency certificate shall always be either kept in the operator cabin or pasted on the visible surface of the lifting appliances.

5.5. All lifting appliances including all parts and gears thereof, whether fixed or movable shall be thoroughly tested and examined by a competent person once at least in every six months or after it has undergone any alterations or repairs liable to affect its strength or stability.

5.6. In addition, it is also advised that for all the works being executed by the Road Cranes, the above stipulations should be checked. These instructions should be strictly observed.

6. **FOREIGN EXCHANGE REQUIREMENTS**:

Any demand of foreign exchange for importing of equipments and materials shall not be accepted.

7. EMERGENCY WORKS

In the event of any accident or failure occurring in the execution of work/ arising out of it which in the opinion of the Engineer requires immediate attention, the DFCCIL/Railway may bring its own workmen or other agency/agencies to execute or partly execute the necessary work or carry out repairs if the Engineer-in-charge considers that the contractor(s) is/are not in a position to do so in time without giving any notice and charge the cost thereof, to be determined by the Engineer-in-charge, to the contractor.

8. CUTTING/UP ROOTING OF TREES:

No extra rate shall be paid for cutting or up-rooting trees but the contractor would be authorised to take away the tree observing the forest laws of the land.

9. JURISDICTION OF COURTS:

If any dispute arises between the parties with respect to this contract, any application or suit shall be instituted only in the court within the local limits of jurisdiction, the CGM / Ahmedabad DFCCIL Office is situated and both the parties shall be bound by this clause.

EXTRA SAFETY PRECAUTIONS

10. SAFE METHODS:

The Contractor shall at all times, adopt such safe methods of working as will ensure safety of structures, equipment and labour. Safety rules that should be adhered to are given as guidelines in Annexure C. If at any time, the DFCCIL finds the safety arrangements inadequate or method of working unsafe, the Contractor shall take immediate corrective actions as directed by the Engineer's representative. Any directions in the matter shall in no way absolve the Contractor of his sole responsibility to adopt safe working methods. The Contractor is responsible for providing skilled personnel and adequate expert supervision so as to ensure complete safety.

It is the responsibility of the Contractor to ensure safe loading, transportation and unloading of materials and equipment etc. Any loss or damage caused to adjacent Railway/DFCCIL property will have to be made good by the contractor at his/their own cost, failing which recoveries shall be effected from the running bill of the contractor as per the Clause No. 46(1) of the General Conditions of Contract.

The liability arising out of accidents, if any, to persons will be met by the contractors and the Railway/DFCCIL will not be responsible for any damage or compensation thereof. The contractor shall follow the provisions laid down in Contract Labour Act, 1972.

The contractor shall be entirely responsible for ensuring safety of his labour, vehicles, plant or equipment while working along or near the track and highways and shall programme his working so as not to interfere with the movement of trains and road traffic. No extra payment shall be allowed to the contractor for all safety precautions to be observed during the execution of the work. The cost of all such precautions shall be deemed to be included in the rates for all items of the schedule.

10.1	**SAFE WORKING METHODS:**
10.1.1	All or some of the works executed under this contract involve works on or alongside the Railway /DFCCIL track on which the railway/DFCCIL traffic is kept operative during or immediately after the completion of one or more phases of the contract work. In view of this position maintaining safe working conditions at the work site at all times for the safe passage of the train traffic is a primary over-riding condition required to be fulfilled by the contractor at all times.
10.1.2	For this purpose, it is understood and agreed to by the contractor that the work executed by him under this contract shall at all times fulfill all the safety conditions in force on the railway from time to time to operate the train traffic.
10.2	**PROTECTION OF THE WORK SITE**
10.2.1	On railway track where the train traffic will be operational during the execution of the contract work the protection of the works site as considered appropriate and adequate shall be arranged by the Engineer's Representative at the Railway's cost.
10.2.2	Contractor shall be responsible for providing appropriate and adequate system for warning the contractor's workmen about the train traffic on or in the vicinity of the site of work
10.2.3	The contractor shall remain fully responsible for ensuring safety & in case of any accident, shall bear cost of all damages to the equipment & men and also damages to railway & its passengers.

10.3 Scaffolding or staging more than 3.5 meters above the ground or floor, swung or suspended from an overhead support or erected with stationary support shall have a guard rail properly attached bolted, braced and otherwise secured at least 1 meter high above the floor or platform or staging and extending along the entire length thereof with only such opening as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.

10.4 Working platform gangways and stairways should be so constructed that they should not sag unduly or unequally, and where the height of the platform or the gangway or the stairway is more than 3.5 meters above ground level or floor level, they should be closely boarded, should have adequate width and should be suitably fastened as described in the para above.

10.5 Safe means of access shall be provided to all working platform and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 10

metres in length while the width between side rails in swung ladder shall in no case be less than 300 mm for ladders upto and including 3.5 metres in length. For longer ladders this width should be increased by at least 20 mm for each additional metre of length. Uniform steps spacing shall not exceed 300 mm. Adequate precautions shall be taken to prevent danger from electrical equipments. No materials on any of the sites of work shall be so stacked or placed as to cause danger or inconvenience to any persons or the public. The contractor shall provide all necessary fencing and lights to protect the public from accident and shall be bound to bear the expenses of the defense. of every suit, action or other proceeding at Law that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay any damages and cost which may be awarded in any suits, action or proceedings to any such persons or which may with the consent of the contractor be paid to compromise any claim by any such persons.

10.6 Demolition: Before any demolition is commenced and also during the process of the work:
All roads and open areas adjacent to the work site shall either be closed or suitably protected;
No electric cable or apparatus which is liable to be a source of danger over a cable or apparatus used by the operator shall remain electrically charged;
All practical steps shall be taken to prevent danger to persons employed from risk of fire or explosion or flooding;
No floor, roof or other part of the building shall be so overloaded with debris or materials as to render it unsafe.
All necessary personal safety equipment as considered adequate by the Engineer should be kept available for the use of the persons employed on the site and maintained in a condition suitable for immediate use, and the Contractor should take adequate steps to ensure proper use of equipment by those concerned. In addition, workers employed on mixing asphalted materials, cement and lime mortar shall be provided with protective goggle.
workers engaged in white-washing and mixing or stacking of cement bags or any materials which is injurious to the eyes shall be provided with protective goggles;
workers engaged in welding works shall be provided with protective goggles;
stone breakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.
10.7 The contractor shall submit the methodology proposed to be adopted for execution of works for approval of the DFCCIL/Railway Engineer with a view to ensure safety of trains, passengers & workers and he shall also ensure the methods and arrangements are actually available at site before start of work and contractor's supervisors and workers have clearly understood the safety aspects and requirements to be adopted / followed while executing the work.

10.8 The contractor shall maintain an assurance register at each site, which shall be got signed by both DFCCIL supervisor as well as contractor's supervisor in token of their having understood the safety precautions to be observed at site.

10.9 FORM FOR ENGINEERING WORK PERMIT (EWP)

1. Name of the Railway/DFCCIL Supervisor
2. Location of work
3. Nature of work
4. Agency
5. Machineries deployed
6. Working hours
7. I have personally checked the arrangements of rope barricading, fencing at turning locations, posting of staff of Contractor, erection of display boards, training of staff, issue of permits to drivers and I am satisfied that it shall adhere to the standard safety precautions at site as reproduced in the enclosed Annexure 'C' and all relevant.

Executive/ DFCCIL

Remarks of APM/DFCCIL

Remarks of Dy. CPM/PM/DFCCIL

Based on the above certificate, I hereby permit the above work for a period of _____ days i.e. upto _____.

Dy. CPM/Engg/DFCCIL
Date:

Notes

1. A copy of this permit on issue shall be pasted on the site order book.
2. Each work location shall require separate EWP

10.10 ANNEXURE 'C'

Safety precautions: General

Safe working of contractors: A large number of men and machinery are deployed by the contractors for track renewals, gauge conversions, doublings bridge rebuilding etc. it is therefore essential that adequate safety measures are taken for safety of the trains as well as the work force. The following measures should invariably be adopted.

i) The contractor shall not start any work without the presence of DFCCIL / Railway supervisor or his representative and contractors supervisor at site.

ii) Where ever the road vehicles and/or machinery are required to work in the close vicinity of railway line, the work shall be so carried out that there is no infringement to the railway's schedule of dimensions. For this purpose the area where road vehicles and/or machinery are required to ply, shall be demarcated and acknowledged by the Contractor. Special care shall be taken for turning/reversal of road vehicles/machinery without infringing the running track. Barricading shall be provided wherever justified and feasible as per site conditions.

iii) The look out and whistle caution orders shall be issued to the trains and speed restrictions imposed where considered necessary. Suitable flagmen/detonators shall be provided where necessary for protection of trains.

iv) The supervisor/workmen should be counselled about safety measures. A competent certificate to the contractor's supervisor as per proforma annexed shall be issued by APM which will be valid only for the work for which it has been issued.

v) The unloaded ballast/rails/sleepers/other P. Way materials after unloading along track should be kept clear off moving dimensions and stacked as per the specified heights and distance from the running track.

vi) Supplementary site specific instructions, wherever considered necessary, shall be issued by the Engineer-in-charge.

(vii) The Engineer-in-charge shall approve the methodology proposed to be adopted by the contractor, with a view to ensure safety of trains, passengers and workers and he shall also ensure that the methods and arrangements are actually available at site before start of the work and the contractor's supervisors and the workers have clearly understood the safety aspects and requirements to be adopted/followed while executing the work.

There shall be an assurance register kept at each site, which will have to be signed by both, i.e. DFCCIL Supervisor or his representative as well as the contractor's supervisor as a token of their having understood the safety precautions to be observed at site."

10.11 Supplementary Precautions for working at ROB/RUB site. :- -- Deleted--

11.0 Note :-

a. In the event of conflict between special condition/Technical specifications /other guidelines, (available in the tender) the decision of the DFCCIL administration is final and binding to the contractor. No claim in this regard shall be entertained.

b. The Contractor and concerned staff/official of DFCCIL shall ensure that every Running bill & Final Bill shall be technically checked before making payment.

c. Earthwork register, level books, steel registers, Test certificates/Reports etc. whereas required shall be maintained carefully and shall submit along with all Running / final bill for technical checking

12.0 PRE CONTRACT INTEGRITY PACT

12.1 The pact, entering into which would be a preliminary qualification for any bidder, essentially envisages an agreement between the prospective vendors / bidders and

the DFCCIL, committing the persons/ officials on both sides not to resort to any corrupt practices in any aspect / stage of the contract.

12.2 Integrity pact shall be implemented in this contract, pre-bid pre contract agreement (Integrity Pact) shall be made within 30 days after issue of LOA. The Form-20 is attached in this documents and shall be made on stamp paper of appropriate cost and shall form part of contract agreement.

PART – III (B)

ADDITIONAL TECHNICAL SPECIFICATIONS-II

DETAILED SPECIFICATIONS AND SPECIAL CONDITIONS FOR SCHEDULE "A"

The work shall be carried out as per DSR-2021 item descriptions and specifications of CPWD DSR and latest instruction/guideline issued.

DETAILED SPECIFICATIONS AND SPECIAL CONDITIONS FOR SCHEDULE "A1"

(Item no. 1 to 5)

Item No.1 9-4-2 :- Providing & erecting open well horizontal mono block pump set with cast iron body, complete for three phase submersible motor having [D] For 5 HP 3 phase open well horizontal mono block pump set suitable for 1350 LPM to 310 LPM @ 10 to 42 Mtr head suitable for 50/65 mm dia delivery pipe Cat.II
General

This work shall consist of **supplying and installing 5.00 H.P. open well horizontal mono block pump set suitable for 1350 LPM to 310 LPM @ 10 to 42 Mtr head suitable for 50/65 mm dia delivery pipe** conforming to these specifications of an approved brand and make as approved by the Engineer in charge.

1.1. Horizontal mono block pump Submersible pump set of specified capacity and of I.S.I. mark of approved brand and make and quality shall be supplied.

2.0 Workmanship

2.1. Horizontal mono block pump set shall be approved quality and as per IS standard make. Material used in manufacturing tank shall be confirmed to relevant IS code.

2.2. Horizontal mono block pump set shall be fitted and installed properly in a desired position and making all required necessary connection as specified and as directed by the Engineer in charge.

3.0 Mode of Measurement & Payment:

3.1. The unit rate of Horizontal mono block pump set shall include the cost of all materials, tools and plant required for fitting, the same to specified position as per drawings, and as directed by Engineer in charge finishing structure etc. and all other incidental expenses for producing item of Horizontal mono block pump set work to complete the structure or its components as shown on the drawings, and as directed by Engineer in charge and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

The rate of Horizontal mono block pump set shall include the cost of all labour,

materials, tools and plant scaffolding and all incidental expenses as described herein above.

3.2. The Horizontal mono block pump set shall be measured for its number, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one **No.**

3.3. The payment will be made on **No.** basis of the finished work.

Item No.2 9-5-3 :- Supplying & erecting approved make motor control cubical panel [Star delta] made from 16G CRCA sheet duly epoxy powder painted inside and outside with hinged doors and locking with suitable size of ON - OFF isolator (AC 3 / 23 duty) main fuses. Digital volt and current meter (in a single unit) with micro controller based control unit and current sensing single phasing preventer electronic overload protection, over voltage (Programmable) protection and under voltage (Programmable) protection, prod less dry run protection programming facility for setting of all parameter like overload current, high voltage limit, low voltage limit, dry run limit with digital indication on seven segment LED display for any fault like over load, high voltage, low voltage, dry running single crimped, electronic star delta timer, feather touch start / stop push buttons to be erected on angle iron frame. Grouted on wall the contactors will be of L& T, Siemens, BCH make only) (A) DOL up to 5.0 H.P.

Item No.3 9-6-14 :- Supplying submersible pump set for bore of 200 mm. dia. or more having 3 phase motor capacity about 50-55 H.P discharge capacity having (A) (13 Stage) 100 to 400 L.P.M. discharge at the head 182 to 265 mtrs. suitable for 80 mm dia. Delivery pipe Cat.III
General

This work shall consist of **supplying and installing 50-55.00 H.P. three phase 13 stage 100 to 400 L.P.M discharge at the head 182 to 265 mtrs. Submersible pump set suitable for boring 150 to 200 mm dia. bore** conforming to these specifications of an approved brand and make as approved by the Engineer in charge.

1.0 Submersible pump set

1.1 Submersible pump set of specified capacity and of I.S.I. mark of approved brand and make and quality shall be supplied.

2.0 Workmanship

2.1. Submersible pump set shall be approved quality and as per IS standard make. Material used in manufacturing tank shall be confirmed to relevant IS code

3.0 Mode of Measurement & Payment:

3.1. The unit rate of Submersible pump set shall include the cost of all materials, tools and

plant required for fitting, the same to specified position as per drawings, and as directed by Engineer in charge finishing structure etc. and all other incidental expenses for producing item of Submersible pump set work to complete the structure or its components as shown on the drawings, and as directed by Engineer in charge and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

The rate of Submersible pump set shall include the cost of all labour, materials, tools and plant scaffolding and all incidental expenses as described herein above.

3.2. The Submersible pump set shall be measured for its number, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one **No.**

3.3. The payment will be made on **No.** basis of the finished work.

Item No.4 9-6-18:- Lowering of submersible motor pump set at the depth of following, complete with required. Nos. and size of casing pipes erected by means of proper chain pulley block &pe wrenches after checking of threads of each pipe with coupling to take the load of the pump set and pipe assembly filled up with water

The Submersible pump set shall be fitted and installed properly in a desired position and making all required necessary connection including all scaffolding works as specified and as directed by the Engineer in charge.

Item No.5 9-7-1 :- Providing and erecting ISI marked PVC insulated PVC Sheathed Flat flexible Submersible copper cable approved make of following Size. (G)3 Core x 25 Sq. mm

1.0 Materials

The water proof straight joint in PVC insulated flat flexible copper cable as per requirement should be of best quality I.S. standard and make as approved by the Engineer in charge and shall be tested quality.

2.0 Workmanship

Water proof straight joint in PVC insulated flat flexible copper cable by using insulating materials, water proofing material & making the joint complete as per satisfaction of Engineer in charge.

3.0 Mode of Measurement & Payment:

The rate includes cost of all labours, insulating materials and water proofing material, tools and plant at site etc. required for satisfactory completion of this item.

The payment shall be done on Rmt. basis.

DETAILED SPECIFICATIONS AND SPECIAL CONDITIONS FOR SCHEDULE "B"

The work shall be carried out as per DSR-2021 item descriptions and specifications of CPWD DSR and latest instruction/guideline issued.

DETAILED SPECIFICATIONS AND SPECIAL CONDITIONS FOR SCHEDULE "C"

(Item no. 1 to 38)

Item No. NS-1: Supplying, installation, testing and commissioning of electric driven Main Fire Pump suitable for automatic operation and consisting of following, complete in all respects, as required: (a) Horizontal type, multistage, centrifugal, split casing pump of cast iron body & bronze impeller with stainless steel shaft, mechanical seal conforming to IS 1520. (b) Suitable HP Squirrel cage induction motor, TEFC, synchronous speed 1500 RPM, suitable for operation on 415 volts, 3 phase 50 Hz, AC supply with IP 55 protection for enclosure, horizontal foot mounted type with Class-"F" insulation, conforming to IS-325. (c) M.S. fabricated Common base plate, coupling, coupling guard, foundation bolts etc. as required. (d) Suitable cement concrete foundation duly plastered with anti vibration pads. 1.1 / 1180 lpm at 70 m Head.

This work shall consist of providing and installations of electric driven Main fire pump confirming to these specifications or approved by the Engineer in charge.

Materials:

No.	**1**
Application	Motor Driven Pump
Liquid to be pumped	Water
Specific gravity	1.00
Working temperature	Ambient
Suction condition	Flooded
Suction pressure (kg/cm2_g)	< 2.00
Solid Handling size	Nil
Capacity (M3/Hr)	171
Total head (M)	70
Quantity (Nos.)	1
Pump model	SCP 100 - 280 HA
Pump type	HSC
No. of Stages	Single
Pump size (Suc X Del) _ mm	125 X 100
Efficiency @ duty point	79.03%
BKW at shaft @ duty point	47.14 KW
NPSH (R) @ DP	5.00 M
Shut off head (Approx)	~ 85 M

Approximate Performance at 150% Discharge

Capacity (M3/Hr)	256.5
Total head (M)	71
Efficiency	85%
BKW at shaft	58.35 KW
NPSH (R)	6.80 M
Motor Rating	60 KW
Speed (RPM)	2955 (Nominal)
Flange drilling standard	As per maker's standard
Painting	
Packing	
Pump Name Plate / Motor Name Plate Details	
Material of Construction	
Casing	Cast Iron
Impeller	Bronze Gr. II
Neck Ring	Bronze Gr. V
Shaft	SS 410
Shaft sleeve	SS 410
Shaft Sealing	Gland Pack
Scope of Supply	
1) Bare shaft pump as per maker's standard	Yes
2) Suitable accessories consisting of :	
a. Coupling	Yes
b. M.S. Base frame	
c. M.S. Coupling guard	
d. Set of foundation bolts	
3) CGL / BBL / KEC / ABB / Jyoti/ Marathon (Any one) make foot mounted, TEFC, Non Flame Proof, Sq. cage induction motor (Eff 2) as per maker's standard suitable for 3ph, 415V, 50 Hz, A.C. supply, Degree of Protection IP : 55, Class of Insulation `F`, Temperature rise limit upto Class `B`, Duty `S1`.	Yes

1.0 <u>Mode of Measurement and payment.</u>

The payment of work shall be taken per **number** basis of the finished work.

The rate shall be for a unit of **No.**

<u>Item No. NS-2:</u> Supplying, installation, testing and commissioning of electric driven pressurisation pump suitable for automatic operation and consisting of following, complete in all respects, as required : (Jockey Pump) Horizontal type, multistage, centrifugal pump of cast iron body and bronze impeller with stainless steel shaft, mechanical seal conforming to IS : 1520. Suitable HP squirrel cage induction motor TEFC type suitable for operation on 415 volts, 3 phase 50 Hz AC supply with IP 55 class of protection for enclosure, horizontal foot mounted type with Class-"F" insulation, conforming to IS : 325. M.S.fabricated Common base plate, coupling,

coupling guard, foundation bolts etc. as required. Suitable cement concrete foundation duly plastered and with anti vibration pads. 3.1 180 lpm at 70 m Head

This work shall consist of providing and installations of electric driven pressurization pump confirming to these specifications or approved by the Engineer in charge.

Materials:

No.	**1**
Application	Motor Driven Pump
Liquid to be pumped	Water
Specific gravity	1.00
Working temperature	Ambient
Suction condition	Flooded
Suction pressure (kg/cm2_g)	< 2.00
Solid Handling size	Nil
Capacity (M3/Hr)	171
Total head (M)	80
Quantity (Nos.)	1
Pump model	SCP 100 - 280 HA
Pump type	HSC
No. of Stages	Single
Pump size (Suc X Del) _ mm	125 X 100
Efficiency @ duty point	79.03%
BKW at shaft @ duty point	47.14 KW
NPSH (R) @ DP	5.00 M
Shut off head (Approx)	~ 70 M

Approximate Performance at 150% Discharge

Capacity (M3/Hr)	256.5
Total head (M)	71
Efficiency	85%
BKW at shaft	58.35 KW
NPSH (R)	6.80 M
Motor Rating	60 KW
Speed (RPM)	2955 (Nominal)
Flange drilling standard	As per maker's standard
Painting	
Packing	
Pump Name Plate / Motor Name Plate Details	
Material of Construction	
Casing	Cast Iron
Impeller	Bronze Gr. II
Neck Ring	Bronze Gr. V
Shaft	SS 410
Shaft sleeve	SS 410

Shaft Sealing	Gland Pack
Scope of Supply	
1) Bare shaft pump as per maker's standard	Yes
2) Suitable accessories consisting of :	
a. Coupling	Yes
b. M.S. Base frame	
c. M.S. Coupling guard	
d. Set of foundation bolts	
3) CGL / BBL / KEC / ABB / Jyoti/ Marathon (Any one) make foot mounted, TEFC, Non Flame Proof, Sq. cage induction motor (Eff 2) as per maker's standard suitable for 3ph, 415V, 50 Hz, A.C. supply, Degree of Protection IP : 55, Class of Insulation `F`, Temperature rise limit upto Class `B`, Duty `S1`.	Yes

2.0 Mode of Measurement and payment.

The payment of work shall be taken per **number** basis of the finished work.

The rate shall be for a unit of **No.**

Item No. NS-3 Fabrication, supply, Installation testing & commissioning of Electrical control panel of cubical construction, floor mounted type, fabricated out of 2mm thick CRCA sheet, compartmentalised with hinged lockable doors, dust and vermin proof, powder coated of approved shade after 7 tank treatment process, cable alley, interconnection with suitable size copper conductor cable/solid copper strip, having switchgears and accessories, mountings and internal wiring, earth terminals, numbering etc. complete in all respect, suitable for main fire pump, pressurisation pump & diesel pump set complete as per CPWD specification with following in coming and Outgoings, suitable for operation on 415V, 3 phase, 50Hz Ac Supply with enclosure protection class IP 42 as required : 5.1 INCOMING - 250A, 50kA 4 Pole MCCB, Ics=100% Icu rating Digital Voltmeter 0-500V with selector switch Digital Ammeter (0-250 A) with selector switch & CTs etc. LED type RYB phase indicating lamps, ON, OFF, trip indicating lamps Set of Copper Bus Bar 300A. OUTGOING (Note : All outgoing feeders for pumps should have digital Ammeter with selector switches and LED type ON, OFF, trip indicating lamps) Main Fire Pump 125 A, 50kA TPN MCCB, Ics=100% Icu, with fully automatic Star/Delta starter suitable for 60 HP pump with overload protection, current sensing type single phase preventer complete with all accessories and internal wiring required for automatic operation, selector switch for local/remote, auto/manual/OFF operation. Jockey Pump 63 A, 50kA TPN MCCB, Ics=100% Icu, with suitable HP fully automatic Star/Delta starter with overload protection, current sensing type single phase preventer complete with all accessories and internal wiring required for automatic operation, selector switch for local/remote, auto / manual / OFF operation. DIESEL ENGINE CONTROL Control for diesel engine comprising - Automatic / Manual selector switch & 3 attempts starting device, timers and relays as required, push buttons, start/stop in manual mode Indicating lamp for high/ Low Lub. Oil pressure, High Water Temp and Engine on indication Battery charger suitable for 12V/24 V DC with boost and trickle selector switch, 0-30 V DC volt

meter, and 0- 20 A DC Ammeter All standard relays and accessories for automatic operation of diesel engine system controller. Designing, Supply, Installation, Testing and commissioning of system controller to control operation of main electric fire pump, diesel pump, Pressurization pump, Terrace pump in sequence as per specification consisting of relays, timers. Sensors, annunciation window for fault indication, complete as per specification.

General

This work shall consist of supplying and installing of **Electrical control panel of cubical construction for fire fighting pumps** of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by Engineer in charge.

1.0 Material

1.0 Electrical control panel of cubical construction of fire fighting pumps

1.1 **Electrical control panel of cubical construction of fire fighting pumps** nominal bore shall conform to I.S. 2171. The **Electrical control panel of cubical construction of fire fighting pumps** shall be best Indian make and quality.

1.2 Control Panel suitable for automatic operation of fire fighting pumps consisting (1 no. of Hydrant, 1 no. of Pressurize pump & 1 no. of standby Diesel engine pump) (a) Necessary Power & Control Cabling, cable carrier system, termination of cable, earthing from panel to individual equipment shall be included in the quoted price. (b) Facility for more selections i.e. auto or manual. (c) Protection failure and control cabling. (d) interlocking of pressure switch with pumps (e) IBMS Compatible with necessary Potential free contacts for monitoring on/off status & trip status in BMS as directed by Engineer in charge.

1.2 It shall be as per standard specification of Fire Safety work.

2.0 Mode of Measurement & Payment

2.1 The unit rate of **Electrical control panel of cubical construction of fire fighting pumps** shall include the cost of all materials, tools and plant required for fitting, the same to specified position as per drawings and as directed by Engineer in charge finishing structure etc. and all other incidental expenses for producing **Electrical control panel of cubical construction of fire fighting pumps** work to complete the structure or its components as shown on the drawings and as directed by Engineer in charge and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

The rate of **Electrical control panel of cubical construction of fire fighting pumps** shall include the cost of all labour, materials, G.I. fittings as required, tools and plant scaffolding and all incidental expenses as described herein above.

2.2 The **Electrical control panel of cubical construction of fire fighting pumps** shall be measured for its Number, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one **each**.

2.3 The payment shall be made on **No.** basis of the finished work.

Item No. NS-4 Supply, installation testing and commissioning of priming tank-1000 litre from PVC suitable supporting, with required necessary valve and connection with required accessories.

1.0 Material

1.1 Priming tank-1000 litre from PVC suitable supporting material

1.2 It shall be as per standard specification of Fire Safety work.

2.0 Mode of Measurement & Payment

2.1 The rate of Priming tank shall include the cost of all labour and materials.

2.2 The payment shall be made on **No.** basis of the finished work.

Item No. NS-5 Supply, Installation, Testing and Commission of Pressure switches for Automation of fire pumps. Pressure switches shall be SPDT type suitable for single phase supply with diaphram, with IP 66 protection as required.

1.1 The specification covers the supply and installation of Pressure switches for Automation of fire pumps including all accessories for the same

1.2 Pressure switches shall be SPDT type suitable for single phase supply with diaphram, with IP 66 protection as required.

Mode of Measurement & Payment

2.1 The payment shall be made on **No.** basis of the finished work.

Item No. NS-6 Providing, fixing, testing & commissioning of 3.5 Core Alluminium Armoured Cable of required size from Panel to Pump.

The specification cover the supply and installation of medium voltage, cables either in ground in trenches depending on site conditions and include installation with accessories for the same. The work considering of supplying jointing terminating and connection P.V.C. power cables.

The Contractors shall supply cables as required to make the installation works

including diggings and back filling of the trenches as required.

All power cable shall be for Fire Pumps (Only from Panel to Pumps) and shall comply with I.S. 1554 Part- 11964 and I.S. 1554 Part 111976. Al) cable shall be of I.S.I. marks all cabling materials such as cable layer taps shall be of approved quality acceptable of the type recommended by the manufacture or the cable for which it is and approved by the Engineer in charge brass cable glad of chromium plated with rubber washer and switch for earthing terminal shall be used.

Installation of all equipment shall also conform to the applicable code and particles as per the LS and shall be executed to comply with the latest Indian Electricity rules as regard safety.

Rate shall be paid on Rmt. basis.

Item No. NS-7 Providing, fixing, testing & commissioning of 3 C x 1.5 Sqmm flexible cable for Pressure Switch.

The specification cover the supply and installation of medium voltage, cables either in ground in trenches depending on site conditions and include installation with accessories for the same. The work considering of supplying jointing terminating and connection P.V.C. power cables.

The Contractors shall supply cables as required to make the installation works including diggings and back filling of the trenches as required.

All power cable shall be PVC insulated and PVC sheathed flat flexible submersible copper cable and shall comply with I.S. 1554 Part- 11964 and I.S. 1554 Part 111976. Al) cable shall be of I.S.I. marks all cabling materials such as cable layer taps shall be of approved quality acceptable of the type recommended by the manufacture or the cable for which it is and approved by the Engineer in charge brass cable glad of chromium plated with rubber washer and switch for earthing terminal shall be used.

Installation of all equipment shall also conform to the applicable code and particles as per the LS and shall be executed to comply with the latest Indian Electricity rules as regard safety.

Rate shall be paid on **Rmt.** basis.

Item No. NS-8 Providing, fixing, testing & commissioning of suitable Cable Tray for Fire Hydrant Electric wiring 150 x 50 mm.

The specification cover the supply and installation of medium voltage, cables either in

ground in trenches depending on site conditions and include installation with accessories for the same. The work considering of supplying jointing terminating and connection P.V.C. power cables.

The Contractors shall supply cable tray for Fire Hydrant Electric wiring as required to make the installation works including diggings and back filling of the trenches as required.

All power cable shall be for Fire Pumps and shall comply with I.S. 1554 Part- 11964 and I.S. 1554 Part 111976. Al) cable shall be of I.S.I. marks all cabling materials such as cable layer taps shall be of approved quality acceptable of the type recommended by the manufacture or the cable for which it is and approved by the Engineer in charge brass cable glad of chromium plated with rubber washer and switch for earthing terminal shall be used.

Installation of all equipment shall also conform to the applicable code and particles as per the LS and shall be executed to comply with the latest Indian Electricity rules as regard safety.

Rate shall be paid on Rmt. basis.

Item No. NS-9 Supply, Installation, Testing and Commissioning of 100 mm dia Pressure Gauge (for all pipes) of range 0 - 15 Kg/cm² conforming to IS - 3624 having bourdon tube of stainless steel 310 in cast aluminium, stove enameled, black, weather proof case with outer, screwed aluminium bezel and complete with necessary U-type stainless steel siphon tube and cock including providing suitably painted angle iron support to the tube etc. as per required.

1.0 Materials:

The components of the Header assembly shall confirm to the I.S / International standards.

2.0 Workmanship:

The different components of systems shall be connected as per the information provided by the manufacturer or as per the technical details of the system provided by the company.

All the necessary precautions while connecting the components shall be taken.

Some further additional information for the setup of the Header assembly unit:

The Header Distribution Manifold of Inlet – Outlet size of 3.00 inch dia.

The supply of header shall include all necessary / required fittings & accessories for

the connection & installation of header at the site. It may be made of Sch-80 PVC Pipe fittings or Galvanized Pipes.

The header is to be installed at a location as suggested in the layout / engineer in charge.

The outlets in which valve is not installed will have to be sealed with a threaded end cap.

3.0 Mode of Measurement and payment.

The rate includes all labour, materials, tools and plant, etc., required for satisfactory completion of this item. The rate shall be for a unit of **No.**

Item No. NS-10 Supply, Installing, Testing and Commissioning of C.I. Heavy duty foot valve with flanges, Nut bolts, Gaskets etc. with necessary complete accessories. (a) 150 mm dia.

General

This work shall consist of providing of **150 mm dia. C.I. heavy duty Foot valve with flange** of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by Engineer in charge.

1.0 Material

1.0 C.I. heavy duty Foot Valve

1.1 **C.I. heavy duty Foot Valve** of specified 150 mm dia. nominal bore shall conform to I.S. 781-1977. The **C.I. heavy duty Foot Valve** shall be best Indian make and quality.

1.2 **C.I. heavy duty Foot Valve** shall be chromium polished of best quality.

1.3 **C.I. heavy duty Foot Valve** is a draw off tap with horizontal inlet and free outlet. A stop cock is a valve with a suitable means of connection of insertion in a pipe line for controlling or stopping the flow.

1.4 It shall be as per standard specification of Fire Safety work.

2.0 Workmanship

Fitting, Laying & Jointing

2.1 When the C.I. heavy duty foot valves are to fitted, the ends shall be carefully filled out so that no obstruction to bore in offered. The Foot Valve shall be fitted with pipes carefully in such a manner as will not result in slackness of joints when the two pieces are screwed together.

2.2 In jointing the C.I. heavy duty Foot Valve the inside of the socket and the screwed end of the C.I. heavy duty Foot Valve shall be oiled and smeared with the white or red lead and wrapping around with a few turns of fine spun yarn round the screwed end of the bib cock. The end shall then be tightly screwed in the socket, Tees etc. with a pipe wrench care shall be taken that all items are free from dust, dirt and rust during fixing burr from the joints shall be removed after screwing. After laying the open ends of the **C.I. heavy duty Foot Valve** shall be temporarily plugged to prevent excess of water soil or any other foreign matter.

2.3 Any threads exposed after jointing shall be painted or in the case of underground piping thickly coated with approved anti corrosive paint to prevent corrosion.

3.0 Testing of Joints

3.1 After fitting, the foot valve shall be inspected under working conditions of pressure and flow. Any joints found liken shall be redone, and all leaking Foot valve shall be removed and replaced without extra cost.

The Foot valve after they are fitted shall be tested to hydraulic pressure of 6.0 Kg/Sq.cm. The bib cock shall be slowly and carefully charged with water allowing all air to escape and avoiding all shock and water hammer. The draw off takes and stop cock shall then be closed specified hydraulic pressure shall be applied gradually. The foot valve shall be tested in sections as the work laying proceeds, veeping the joints exposed for inspection during the testing.

4.0 Mode of Measurement & Payment

4.1 The unit rate of **C.I. heavy duty Foot Valve** shall include the cost of all materials, tools and plant required for fitting, the same to specified position as per drawings and as directed by Engineer in charge finishing structure etc. and all other incidental expenses for producing **C.I. heavy duty Foot Valve** work to complete the structure or its components as shown on the drawings and as directed by Engineer in charge and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

The rate of **C.I. heavy duty Foot Valve** shall include the cost of all labour, materials, G.I. fittings as required, tools and plant scaffolding and all incidental expenses as described herein above.

4.2 The **C.I. heavy duty Foot Valve** shall be measured for its Number, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one **Number**.

4.3 The payment shall be made on **Number** basis of the finished work.

Item No. NS-11 Supply, Installing, Testing and Commissioning of C.I. Heavy duty foot valve with flanges, Nut bolts, Gaskets etc. with necessary complete accessories. (b) 80 mm dia.

The relevant specifications of **Item No. NS-10** shall be followed except for the work of **supply installing, Testing and Commissioning of C.I. Heavy duty foot valve with flanges, Nut bolts, Gaskets etc. with necessary complete accessories. (b) 80 mm dia.**

Item No. NS-12 Providing, fixing, testing and commissioning of G.I. ERW C Class heavy duty pipes as per IS: 1239 (upto 150 mm dia.) and IS: 3589 (upto 200 mm dia. and above) including cutting, screwing, welding etc. and providing all fittings like flanges, bends, tees, elbows, reducers, clamps, hangers etc. with painting of one coat of primer and 2 or more coats of synthetic enamel paint of approved make / shade complete as per specification. 150mm, 100mm, 80mm, 50mm, 25mm. dia.

1.0 Materials

G.I. ERW C Class heavy duty pipe confirming to IS: 1239 (upto 150 mm dia.) and IS: 3589 (upto 200 mm dia. and above) with latest amendments in random length of 4 to 7 mt. (b) 200mm dia min. and above shall be required of standard make.

2.0 Workmanship

2.1 G.I. ERW C Class Heavy duty pipe of 200mm dia. and above shall be used for bore required as directed by Engineer-in-charge.

2.2 Drilling 200mm dia bore hole for 250 to 300mm dia E.R.W. pipe up to required depth in over burden strata and further drilling 165mm dia bore hole in remaining rocky strata up to required Depth from Ground level. The drilling shall be done by the down the hole type drilling Rig. Bore cap to be provided by Agency free of cost. Carting of material as shown in Schedule “A” should be carried out by contractor from stores to site of work at his own risk and cost.

2.3 Drilling work shall be carried out at the sites shown by the Department. The diameter of the hole should be 200mm in over burden strata and 165mm dia in rocky strata up to over all specified depth of 0 to 90 mts. The drilling shall be carried out in over burden strata up to maximum 30mts. Depth. If further drilling cannot be done due to

over burden or in rocky strata due to mechanical failure up to specified depth the drilling shall have to be stopped in consultation with the Engineer in charge and no payment shall be made for the drilling carried out by the Contractor.

2.4 The 200mm dia. G.I. ERW C Class Heavy duty pipe should be lowered by the contractor in overburden strata. The joining of pipes if required will be carried out by Contractor as desired by the Engineer in charge. Necessary jointing materials, steel banded plates etc. should be provided by the contractor at extra cost is not available with Deptt.

3.0 Mode of Measurement & Payment

The item shall be measured in running meter.

The rate shall be for a unit of running **meter.**

Item No. NS-13: Wrapping & coating of Underground pipe with Pypkote pipe coating etc. suitable for pipe size

Material

The materials shall be used as per the general specifications of Pypkote pipe.

The materials shall be used as per description of item given and as directed by the Engineer in charge.

Workmanship

Workmanship shall be as per description given above and to the satisfaction of the Engineer in charge.

It shall be as per standard specification of Fire Safety work.

Mode of Measurement and Payment

The rate shall be includes cost of all materials and labour required for satisfactory completion of this item as described above.

The work shall be measured for the finished work.

The rate shall be for a unit of **Rmt.**

Item No. NS-14: Supply, installation, testing and commissioning of C.I. Butterfly valve (PN 1.6) with flanges, nut bolts, gaskets complete as required. 150 mm, 100mm, 80mm, 50mm dia.

Butterfly valve as per I.S: 780 & 2906/1984.

1.0 GENERAL

The contractor shall be covering manufacturing, supplying and delivery of:

Butterfly valve conforming to IS: 2906-1984 & IS: 780-1984 or its latest revision (Specification for butterfly valves (150 mm size) with ISI certification.

2.0 STANDARDS

The C.I. butterfly valves to be manufactured, supplied and delivered under the scope of this contract shall be manufactured in accordance with and conforming to Indian standard specifications as given below with ISI certification mark on each butterfly valves.

3.0 TEMPERATURE VARIATION

All butterfly valves manufactured, supplied and delivered shall be subjected to drinking water under variable temperature condition ranging from 4^0 to 45^0 C.

4.0 MARKING

The legible and in deniable marking upon each valve shall indicate the following:

(1) ISI certification mark on each butterfly valve only.

(2) Manufacture's brand name and/or trade mark.

(3) Size of valve and nominal pressure of valve.

(4) Serial number of cast.

(5) Serial number in punch

(6) Where a valve has been tested for only open and test, it should be marked '0' distinctly and permanently.

(7) Any other important matter that the manufacturer deems fit to be inscribed embossed.

5.0 TEST CERTIFICATE

5.1 The contractor shall always provide manufacture's test certificate in accordance with every batch/ lot as valves so manufactured and supplied.

5.2 The contractor shall also produce in addition to manufacture's test certificate the inspection certificate issued by the authorized person /agency appointed by Engineer/board for the same purpose. The inspection charges of the authorized person/agency as fixed by G.W.S.S.B shall have to be borned by the contractor and the necessary payment to the inspecting agency shall be paid by the contractor as per the terms and condition of G.W.S.S.B.

6.0 NOMINAL PRESSURE

6.1 Butterfly valves shall be designed by nominal pressure (PN) defined as the maximum permissible gauge working pressure in Mpa as "PN-II" (Mpa= 10 kgf/m^2 approx)

The nominal size shall refer to the nominal bore at any point, shall not be less than the nominal size required.

7.0 MATERIAL:

7.1 The materials for the different component parts of the butterfly valve shall confirm to requirements given in Table.

Materials for components parts of butterfly valve

Sr. No.	Component	Material	Ref. to	Grade of designation
1	Body, bonnet wedge stuffing box, gland thrust plate, cap.	Grey cast iron	210-FG 1978(1)	
2	Steam	High tensile brass	320-1962(2)	Ally 1 of 2
3	Wedge nut	Leaded tin bronze	318-1962(3)	2
4	Body seat ring, wedge facing ring	Leaded tin bronze	318-1962(3)	2
5	Bolts	Carbon steel	1367-1967(4)	Class 4.6
6	Nuts	Carbon steel	1367-1967(4)	Class 4
7	Bonnet gasket	Compressed fiber Board	2712-1971(5)	C
8	Gland packing	Jute & hemp	5414-1969(6)	--

(1) Specification for grey iron castings (third revision).

(2) Specification for high tensile brass roads and sections (revised).

(3) Specification for leaded tin bronze ingots and casting (revised).

(4) Specification for technical supply condition threaded fasteners (first revision)

(5) Specification for compressed asbestos fiber jointing (first revision)

(6) Specification for glan packing, jute and hemp.

8.0 MANUFACTURE

Butterfly valve bodies for 80 mm to 900 mm size valves shall be provided with double flanged ends connection.

9.0 FLANGES

The flanges and their dimensions of drilling shall be in accordance with part IV and VI of I.S. 1538 (Part I to XXII) 1976 (Specification for cast iron fittings for pressure pipes for water gas and sewage) or its latest revision.

10.0 MODE OF MEASUREMENT AND PAYMENT

The payment shall be paid after completion of whole item as mentioned in price bid on unit of **No.** basis as per relevant dia. of the item of the schedule.

Item No. NS-15 : Supply, Installation, Testing and Commissioning of Cast iron Dual plate Check valve (PN 1.6) 100mm, 80mm.

Materials:

The C.I. Dual plate type Check Valve class PN1.6 rating shall be specified make and with IS specifications. All working parts shall be S.S. Non Return Valve shall be cast iron double flange with cast iron body.

Workmanship:

The C.I. Dual plate type Check Valve class PN1.6 rating should be installed between the flanges with correct alignment. Proper gasket & nut bolt to be used for the fixing as directed Engineer in charge.

Mode of Measurement and Payment:

Measurement shall be taken on no. basis of completed item. Rate shall be for a unit of one No.

Item No. NS-16: Supply, installation, testing and commissioning S.S. Single Headed Fire Hydrant Valve with 80mm N.B. flanged inlet, 63mm dia. female instantaneous outlet type. S.S. coupling, blank cap, chain, twist release type lug & all accessories conforming to IS:5290.

General

This work shall consist of providing of **63mm dia. I.S.I. mark S.S. Single Headed Fire Hydrant Valve** of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by Engineer in charge.

1.0 Material

1.0 S.S. Single Headed Fire Hydrant Valve

1.1 **S.S. Single Headed Fire Hydrant Valve** of specified 63 mm dia. nominal bore shall

conform to IS:5290 Type-A. The **S.S. Single Headed Fire Hydrant Valve** shall be best Indian make and quality.

1.2 **S.S. Single Headed Fire Hydrant Valve** shall be chromium polished of best quality and shall be ISI marked.

1.3 It shall be as per standard specification of Fire Safety work.

2.0 Mode of Measurement & Payment

2.1 The unit rate of **S.S. single Headed Fire Hydrant Valve** shall include the cost of all materials, tools and plant required for fitting, the same to specified position as per drawings and as directed by Engineer in charge finishing structure etc. and all other incidental expenses for producing **S.S. single Headed Fire Hydrant Valve** work to complete the structure or its components as shown on the drawings and as directed by Engineer in charge and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

The rate of **S.S. single Headed Fire Hydrant Valve** shall include the cost of all labour, materials, G.I. fittings as required, tools and plant scaffolding and all incidental expenses as described herein above.

4.2 The **S.S. single Headed Fire Hydrant Valve** shall be measured for its Number, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one **Number**.

4.3 The payment shall be made on **Number** basis of the finished work.

Item No. NS-17: Supply, Installation, Testing and Commissioning of Weather proof Standard Fire Hose Cabinet wall mounting type (750 mm x 600 mm x 250 mm deep) having single or double opening with necessary locking arrangement by allan key suitable for housing 2 nos. hose pipe, 1 no. branch pipe & nozzle spanner.

Cabinet should be suitable for Fire hose Cabinet wall mounting type (750 mm x 600 mm x 250 mm deep) as directed by manufacturer of hose pipe & as per instruction given by local fire Authority i.e. Chief Fire Officer.

Weather proof Standard Fire Hose Cabinet wall mounting type (750 mm x 600 mm x 250 mm deep) having single or double opening with necessary locking arrangement by allan key suitable for housing 2 nos. hose pipe, 1 no. branch pipe & nozzle spanner as per

instruction of C.F.O.

The payment shall be made on Number basis of the finished work.

Item No. NS-18: Supply, installation, testing and commissioning non-percolating rubber reinforced lined fire Hose pipe (as per IS : 636) of 63 mm dia and 2 x 15 mtrs long. The hose shall be rated for burst pressure of 35.7 Kg/sqcm. Hose shall be complete with ISI marked SS male & female coupling (IS:903) bound & riveted to hose pipe with copper rivets & 1.5 mm copper wire.

General

This work shall consist of providing of **I.S.I. mark Fire Hose pipe (as per IS : 636) of 63 mm dia.** of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by Engineer in charge.

1.0 Material

1.0 Fire Hose pipe (as per IS : 636) of 63 mm dia.

1.1 **Fire Hose pipe (as per IS : 636) of 63 mm dia.** nominal bore shall conform to I.S. 781-1977. The **2 x 15 mtr. long I.S.I. mark 63mm dia. Fire hose pipe** shall be best Indian make and quality.

1.2 **Fire Hose pipe (as per IS : 636) of 63 mm dia.** shall be chromium polished of best quality and shall be ISI marked.

1.3 It shall be as per standard specification of Fire Safety work.

2.0 Mode of Measurement & Payment

2.1 The unit rate of **Fire Hose pipe (as per IS : 636) of 63 mm dia.** shall include the cost of all materials, tools and plant required for fitting, the same to specified position as per drawings and as directed by Engineer in charge finishing structure etc. and all other incidental expenses for producing **Fire Hose pipe (as per IS : 636) of 63 mm dia.** work to complete the structure or its components as shown on the drawings and as directed by Engineer in charge and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

The rate of **Fire Hose pipe (as per IS : 636) of 63 mm dia.** shall include the cost of all labour, materials, G.I. fittings as required, tools and plant scaffolding and all incidental expenses as described herein above.

4.2 The **Fire Hose pipe (as per IS : 636) of 63 mm dia.** shall be measured for its

Number, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one **Number**.

4.3 The payment shall be made on **Number** basis of the finished work.

Item No. NS-19: Supply, Installation, Testing and commissioning of 63 mm dia instantaneous pattern SS short branch pipe, 20 mm dia nozzle conforming to IS 903, suitable for inter connection to hose pipe coupling complete as required by the Local Fire Authority.

1.0 63 mm dia. instantaneous pattern branch Short S.S. pipe

Branch Short S.S. pipe of 63mm dia. should be as per IS : 903 and Test Pressure of 21 Kgf/cm2. Branch pipe shall be of copper and jet spray type of bore diameter less than 16mm.

2.0 Mode of Measurement & Payment

The Rate shall be for unit of one Number.

Item No. NS-20: Supply, installation, testing and commissioning of First Aid Hose Reel equipment conforming to IS:884 comprising of hose reel drum, 8 mm shut off nozzle, Rubber hose of 25 mm dia x 30 mtr. long, painting, swinging type fixing bracket, anchor fastener, bolts & nuts etc.

1.0 Fire Hose Reel

The construction and material of wall mounting swing type first aid fire hose reel shall conform to IS : 884. Fire Hose reel shall be of 25mm dia. bore. The fire hose reel shall be of reinforced rubber as per IS : 5232 of length 30 meter and fitted with jet and shut-off nozzle. The fire hose reel shall be provided with swinging type reel drum (swing angle 180 degree). The reel drum shall be provided packing gland of gun metal adjustable by means of nuts. The bearings shall be of gun metal. The reel drums shall be red enamel painted. Shut-off nozzle shall be of lead tin bronze.

2.0 Mode of Measurement & Payment

The payment shall be made on **no.** basis.

Item No. NS-21: Supply, Installation, Testing and Commissioning of Gun Metal Air Release Valve with necessary fittings. Size: 25 mm dia.

Materials:

The body of Gun Metal Air Release Valve is cast iron to BS 1452 Gr. 200 and body liner is Nitrile Rubber with SG Iron / SS disc.

Workmanship:

The Air Release Valve should be installed between the flanges with correct alignment. Proper gasket & nut bolt to be used for the fixing as directed Engineer in charge.

Mode of Measurement and Payment:

Measurement shall be taken on Number basis of completed item. Rate shall be for a unit of one number.

Item No. NS-22: Supply, installation, testing and commissioning of Gun Metal Ball Valve. (a) 25mm dia.

Materials:

The body of Gun Metal ball valve is cast iron to BS 1452 Gr. 200 and body liner is Nitrile Rubber with SG Iron / SS disc.

Workmanship:

The ball valve should be installed between the flanges with correct alignment. Proper gasket & nut bolt to be used for the fixing as directed Engineer in charge.

Mode of Measurement and Payment:

Measurement shall be taken on Number basis of completed item. Rate shall be for a unit of one number.

Item No. NS-23: Fire Service In-let (In-let Connection for Fire Brigade) - 4 Way Type. Supply, Installation and Testing of: Fire Service Inlet with necessary hardware and consumables. MOC: - Body: Heavy-duty CI Couplings / NRV: Gun metal. Standard: - Made as per IS Standard- Heavy duty quality. Size: - Couplings: 63 mm, 150 mm E-table Flange End.

General

This work shall consist of providing of **4 way Fire brigade Inlet valve** of the shape and

dimensions shown on the drawings and conforming to these specifications or as approved by Engineer in charge.

1.0 Material

1.0 4 way Fire brigade Inlet valve

1.1 **4 way Fire brigade Inlet valve** of specified 63 mm dia. nominal bore shall conform to I.S. 781-1977. The **4 way Fire brigade Inlet valve** shall be best Indian make and quality.

1.2 **4 way Fire brigade Inlet valve** shall be chromium polished of best quality.

1.3 **4 way Fire brigade Inlet valve** with 1 no. of NRV and 1 no. of butterfly valve shall be provided to the system. A stop cock is a valve with a suitable means of connection of insertion in a pipe line for controlling or stopping the flow.

1.4 It shall be as per standard specification of Fire Safety work.

2.0 Workmanship

Curing, Laying & Jointing

2.1 When the **4 way Fire brigade Inlet valve** is to fitted, the ends shall be carefully filled out so that no obstruction to bore in offered. The bib cock shall be fitted with pipes carefully in such a manner as will not result in slackness of joints when the Two pieces are screwed together.

2.2 In jointing the **4 way Fire brigade Inlet valve** the inside of the socket and the screwed end of the **4 way Fire brigade Inlet valve** shall be oiled and smeared with the white or red lead and wrapping around with a few turns of fine spun yarn round the screwed end of the bib cock. The end shall then be tightly screwed in the socket, Tees etc. with a pipe wrench care shall be taken that all items are free from dust, dirt and rust during fixing burr from the joints shall be removed after screwing. After laying the open ends of the **4 way Fire brigade Inlet valve** shall be temporarily plugged to prevent excess of water soil or any other foreign matter.

2.3 Any threads exposed after jointing shall be painted or in the case of underground piping thickly coated with approved anti corrosive paint to prevent corrosion.

3.0 Testing of Joints

3.1 After fitting, the bib cocks shall be inspected under working conditions of pressure and flow. Any joints found liken shall be redone, and all leaking bib cocks shall be

removed and replaced without extra cost.

The bib cocks after they are fitted shall be tested to hydraulic pressure of 6.0 Kg/Sq.cm. The bib cock shall be slowly and carefully charged with water allowing all air to escape and avoiding all shock and water hammer. The draw off takes and stop cock shall then be closed specified hydraulic pressure shall be applied gradually. The bib cocks shall be tested in sections as the work laying proceeds, veeping the joints exposed for inspection during the testing.

4.0 Mode of Measurement & Payment

4.1 The unit rate of **4 way Fire brigade Inlet valve** shall include the cost of all materials, tools and plant required for fitting, the same to specified position as per drawings and as directed by Engineer in charge finishing structure etc. and all other incidental expenses for producing **4 way Fire brigade Inlet valve** work to complete the structure or its components as shown on the drawings and as directed by Engineer in charge and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

The rate of **4 way Fire brigade Inlet valve** shall include the cost of all labour, materials, G.I. fittings as required, tools and plant scaffolding and all incidental expenses as described herein above.

4.2 The **4 way Fire brigade Inlet valve** shall be measured for its Number, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one **Number**.

4.3 The payment shall be made on **Number** basis of the finished work.

<u>Item No. NS-24:</u> FIRE EXTINGUISHER Supply, installation, testing and commissioning of Carbon Dioxide (CO2) type Fire Extinguisher of 4.5 kg confirm to IS:15683, with ISI marked / TAC approved fitted with required accessories including wall suspension brackets.

General

This work shall consist of supplying and installing of **Carbon dioxide (CO2) type fire extinguisher 4.5 Kg. capacity** of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by Engineer in charge.

1.0 Material

1.0 Carbon dioxide (CO2) type fire extinguisher 4.5 Kg. capacity

1.1 **Carbon dioxide (CO2) type fire extinguisher 4.5 Kg. capacity** nominal bore shall conform to I.S. 2171. The **Carbon dioxide (CO2) type fire extinguisher 4.5 Kg. capacity** shall be best Indian make and quality.

1.2 **Carbon dioxide (CO2) type fire extinguisher 4.5 Kg. capacity** shall be chromium polished of best quality and shall be ISI marked.

1.3 It shall be as per standard specification of Fire Safety work.

2.0 Mode of Measurement & Payment

2.1 The unit rate of **Carben dioxide (CO2) type fire extinguisher 4.5 Kg. capacity** shall include the cost of all materials, tools and plant required for fitting, the same to specified position as per drawings and as directed by Engineer in charge finishing structure etc. and all other incidental expenses for producing **Carben dioxide (CO2) type fire extinguisher 4.5 Kg. capacity** work to complete the structure or its components as shown on the drawings and as directed by Engineer in charge and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

The rate of **Carben dioxide (CO2) type fire extinguisher 4.5 Kg. capacity** shall include the cost of all labour, materials, G.I. fittings as required, tools and plant scaffolding and all incidental expenses as described herein above.

4.2 The **Carben dioxide (CO2) type fire extinguisher 4.5 Kg. capacity** shall be measured for its Number, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one **Number**.

4.3 The payment shall be made on **Number** basis of the finished work.

<u>Item No. NS-25:</u> Supply, installation, testing and commissioning of ABC type 6 kg confirm to IS:15683, with ISI marked / TAC approved fitted with required accessories including wall suspension brackets.

General

This work shall consist of supplying and installing of **ABC type 6 kg Fire Extinguisher** of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by Engineer in charge.

1.0 Material

1.0 ABC type 6 kg Fire Extinguisher

1.1 **ABC type 6 kg Fire Extinguisher** nominal bore shall conform to I.S. 15683. The

ABC type 6 kg Fire Extinguisher shall be best Indian make and quality.

1.2 **ABC type 6 kg Fire Extinguisher** shall be chromium polished of best quality and shall be ISI marked.

1.3 It shall be as per standard specification of Fire Safety work.

2.0 Mode of Measurement & Payment

2.1 The unit rate of **ABC type 6 kg Fire Extinguisher** shall include the cost of all materials, tools and plant required for fitting, the same to specified position as per drawings and as directed by Engineer in charge finishing structure etc. and all other incidental expenses for producing **ABC type 6 kg Fire Extinguisher** work to complete the structure or its components as shown on the drawings and as directed by Engineer in charge and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

The rate of **ABC type 6 kg Fire Extinguisher** shall include the cost of all labour, materials, G.I. fittings as required, tools and plant scaffolding and all incidental expenses as described herein above.

4.2 The **ABC type 6 kg Fire Extinguisher** shall be measured for its Number, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one **no**.

4.3 The payment shall be made on **no.** basis of the finished work.

Item No. NS-26: Providing & fixing photo luminescent Signage"s as per IS standard in Block / Small Letters on rigid sheet with necessary wall or Ceiling fittings as specified Sizes : For Fire Extinguisher (8" x 4")

The item includes for providing & fixing photo luminescent Signage's as per IS standard in Block / Small Letters on rigid sheet of specified sizes (a) For Fire Extinguisher 8" x 4" displaying letters having fonts, colour as directed / approved by Engineer in charge. It also including all labours tools like chain, screw as required.

Sample to be approved by competent authority.

The mode of measurement & payment shall be on **No.** basis of item executed.

Item No. NS-27: Fire Fighting equipments sign (8" x 12")

The item includes for providing & fixing photo luminescent Signage's as per IS standard in Block / Small Letters on rigid sheet of specified sizes (a) Fire Fighting equipments sign (8" x

12") displaying letters having fonts, colour as directed / approved by Engineer in charge. It also including all labours tools like chain, screw as required.

Sample to be approved by competent authority.

The mode of measurement & payment shall be on **No.** basis of item executed.

Item No. NS-28: Emergency Exit Sign (4" x 12")

The item includes for providing & fixing photo luminescent Signage's as per IS standard in Block / Small Letters on rigid sheet of specified sizes (a) Emergency Exit Sign (4" x 12") displaying letters having fonts, colour as directed / approved by Engineer in charge. It also including all labours tools like chain, screw as required.

Sample to be approved by competent authority.

The mode of measurement & payment shall be on **No.** basis of item executed.

Item No. NS-29: Case of Fire do not use Lift, Use Staircase Sign (8" x 8")

The item includes for providing & fixing photo luminescent Signage's as per IS standard in Block / Small Letters on rigid sheet of specified sizes (a) Case of Fire do not use Lift, Use Staircase Sign (8" x 8") displaying letters having fonts, colour as directed / approved by Engineer in charge. It also including all labours tools like chain, screw as required.

Sample to be approved by competent authority.

The mode of measurement & payment shall be on **No.** basis of item executed.

Item No. NS-30: Fire Lift Sign (4" x 12")

The item includes for providing & fixing photo luminescent Signage's as per IS standard in Block / Small Letters on rigid sheet of specified sizes (a) Fire Lift Sign (4" x 12") displaying letters having fonts, colour as directed / approved by Engineer in charge. It also including all labours tools like chain, screw as required.

Sample to be approved by competent authority.

The mode of measurement & payment shall be on **No.** basis of item executed.

Item No. NS-31: Fire Pump Room Sign (8" x 12")

The item includes for providing & fixing photo luminescent Signage's as per IS

standard in Block / Small Letters on rigid sheet of specified sizes (a) Fire Pump Room Sign (8" x 12") displaying letters having fonts, colour as directed / approved by Engineer in charge. It also including all labours tools like chain, screw as required.

Sample to be approved by competent authority.

The mode of measurement & payment shall be on **No.** basis of item executed.

Item No. NS-32: Fire Alarm Panel Sign (4" x 12") The item includes for providing & fixing photo luminescent Signage's as per IS standard in Block / Small Letters on rigid sheet of specified sizes (a) Fire Alarm Panel Sign (4" x 12") displaying letters having fonts, colour as directed / approved by Engineer in charge. It also including all labours tools like chain, screw as required.

Sample to be approved by competent authority.

The mode of measurement & payment shall be on **No.** basis of item executed.

Item No. NS-33: Floor Number Sign (4" x 12") The item includes for providing & fixing photo luminescent Signage's as per IS standard in Block / Small Letters on rigid sheet of specified sizes (a) Floor Number Sign (4" x 12") displaying letters having fonts, colour as directed / approved by Engineer in charge. It also including all labours tools like chain, screw as required.

Sample to be approved by competent authority.

The mode of measurement & payment shall be on **No.** basis of item executed.

Item No. NS-34: FIRE ALARM SYSTEM SITC of conventional type Fire Alarm Control Panel for required zone.

General

This work shall consist of supplying and installing of **Fire Alarm system** of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by Engineer in charge.

1.0 Material

1.0 Fire Alarm system

1.1 **Fire Alarm system** nominal bore shall conform to I.S. 2171. The **Fire Alarm system** shall be best Indian make and quality.

1.2 **Fire Alarm system** of addressable in loop type fire alarm system, it often occurs that partial short circuit of loop affects the whole system. Loop Isolator can isolate the shorted circuit from the whole system to ensure normal operation of other parts and locate the isolated part. The isolator is applicable to all kinds of loop fire alarm

systems, suitable for Class A and Class B. Polarity-sensitive external connections. Input and output can be used inversely without direction. Delayed power-up to output end devices, avoids strong transient current when the load is heavy. Plug-in structure. Standards: EN 54-17:2005 / UL864/NFPA [70, 72]; Operating Voltage 24VDC (16VDC~28VDC); Standby Current ≤3mA; Action Current ≤15mA; Capacity Maximum 32 devices every two isolators Indicator; Yellow, flashes when polling, illuminates in action. Ingress Protection Rating IP30; Operating Temperature 32°F (0°C) ~ 120°F (+49°C); For indoor use / dry locations Relative Humidity ≤93%; Non condensing Material of Enclosure ABS; Dimension (L×W×H) 20mm × 80mm × 39mm (with base) etc completed as directed by Engineer in charge.

1.2 It shall be as per standard specification of Fire Safety work.

2.0 Mode of Measurement & Payment

2.1 The unit rate of **Fire Alarm system** shall include the cost of all materials, tools and plant required for fitting, the same to specified position as per drawings and as directed by Engineer in charge finishing structure etc. and all other incidental expenses for producing **Fire Alarm system** work to complete the structure or its components as shown on the drawings and as directed by Engineer in charge and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

The rate of **Fire Alarm system** shall include the cost of all labour, materials, G.I. fittings as required, tools and plant scaffolding and all incidental expenses as described herein above.

2.2 The **Fire Alarm system** shall be measured for its Number, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one **no.**

2.3 The payment shall be made on **no.** basis of the finished work.

<u>Item No. NS-35:</u> Manual Call Point with re-settable glass (No need to replace the broken glass).

General

This work shall consist of supply of **Manual Call point** of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by Engineer in charge.

1.0 Material

1.0 Manual Call point

1.1 **Manual Call point** as per instructed of Engineer in charge.

1.2 **Manual Call point** shall be chromium polished of best quality and shall be ISI marked.

1.3 It shall be as per standard specification of Fire Safety work.

2.0 Mode of Measurement & Payment

2.1 The unit rate of **Manual Call point** shall include the cost of all materials, tools and plant required for fitting, the same to specified position as per drawings and as directed by Engineer in charge finishing structure etc. and all other incidental expenses for producing **Manual Call point** work to complete the structure or its components as shown on the drawings and as directed by Engineer in charge and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

The rate of **Manual Call point** shall include the cost of all labour, materials, G.I. fittings as required, tools and plant scaffolding and all incidental expenses as described herein above.

2.2 The **Manual Call point** shall be measured for its Number, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one **Number**.

2.3 The payment shall be made on **Number** basis of the finished work.

Item No. NS-36: Electronic Hooter Conventional Sounder (Hooter).

General

This work shall consist of supply of **Electronic Hooter** of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by Engineer in charge.

1.0 Material

1.0 Electronic Hooter

1.1 **Electronic Hooter** as per instructed of Engineer in charge.

1.2 **Electronic Hooter** shall be chromium polished of best quality and shall be ISI marked.

1.3 It shall be as per standard specification of Fire Safety work.

2.0 Mode of Measurement & Payment

2.1 The unit rate of **Electronic Hooter** shall include the cost of all materials, tools and plant required for fitting, the same to specified position as per drawings and as directed by Engineer in charge finishing structure etc. and all other incidental expenses for producing **Electronic Hooter** work to complete the structure or its components as shown on the drawings and as directed by Engineer in charge and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

The rate of **Electronic Hooter** shall include the cost of all labour, materials, G.I. fittings as required, tools and plant scaffolding and all incidental expenses as described herein above.

2.2 The **Electronic Hooter** shall be measured for its Number, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one **Number**.

2.3 The payment shall be made on **Number** basis of the finished work.

<u>Item No. NS-37:</u> Pump On-Off Switch General

This work shall consist of providing and fixing of Pump on off switch conforming to these specifications of an approved brand and make as approved by the Engineer in charge.

1.2 Pump on off switch

1.3 Pump on off switch of I.S.I. mark of approved brand and make and quality shall be supplied.

1.4 Specification of Electrical S.O.R. item from specification booklet of Electrical work shall be followed for this item.

2.0 WORKMAN SHIP

2.1. Pump on off switch shall be approved quality and as per IS standard make. Material used in manufacturing shall be confirmed to relevant IS code.

2.2. The Pump on off switch shall be fitted and installed properly in a desired position and making all required necessary connection as specified and as directed by the Engineer in charge

3.0 MODE OF MEASUREMENT & PAYMENT:

3.1. The unit rate of Pump on off switch shall include the cost of all materials, tools and plant required for fitting, the same to specified position as per drawings, and as

directed by Engineer in charge finishing structure etc. as directed by Engineer in charge and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

The rate of Pump on off switch shall include the cost of all labour, materials, tools and plant scaffolding and all incidental expenses as described herein above.

3.2. The Pump on off switch shall be measured for its Number, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one no.

3.3. The payment will be made on **No.** basis of the finished work.

Item No. NS-38: Supply, installation, testing and commissioning of Flexible Copper Conductor Cable in PVC Conduit for Fire Alarm System with all necessary accessories. Size: 2 core x 1.5 sq.mm.

1.0 Material

The Flexible Copper Conductor Cable in PVC Conduit for Fire Alarm System as per requirement should be of best quality I.S. standard and make as approved by the Engineer in charge and shall be tested quality.

2.0 WORKMAN SHIP

Flexible Copper Conductor Cable in PVC Conduit for Fire Alarm System by using insulating materials, water proofing material & making the joint complete as per satisfaction of Engineer in charge.

3.0 MODE OF MEASUREMENT & PAYMENT:

The rate includes cost of all labours, insulating materials and water proofing material, tools and plant at site etc. required for satisfactory completion of this item.

The payment shall be done on Rmt. basis.

DETAILED SPECIFICATIONS AND SPECIAL CONDITIONS FOR SCHEDULE "D"

SCHEDULE-D: ITEM NO. 1 to 7, 9 to 13, 15 to 27, 39 to 44, 51 to 59, 65, 67, 73, 75)

Items which are taken from DSR-2022, the work shall be carried out as per DSR-2022 item descriptions and specifications of CPWD DSR and latest instructions/guideline issued.

Note:

1. Only concealed (recessed) wiring should be acceptable, whereas surface / recess wiring mentioned in schedule.
2. Guarantee/Warranty certificate if applicable shall be handover to DFCCIL after completion and testing of work/item.

(Schedule D: ITEM NO. 8)

Modular Buzzer

Specification:

Modular Type Buzzer mounted with PVC / metallic box, single mounting base frame covered with textured / metallic / white front plate, modules erected with necessary connections as per site situation directed by Engineer In charge.

Mode of measurement:

This item is measured on No. basis

(Schedule D: ITEM NO. 14)

Fan Box

Specification:

For erecting a ceiling fan, Fan hook Box provided in slab. Fan hook box of 10 mm M.S. round bar bounded to the RCC bars up to 50mm length each side and pierced through a 16 Gauge M.S. box / Heavy Duty PVC box complete erected concealed in Ceiling with necessary finishing.

Mode of measurement:

This item is measured on No. basis

(SCHEDULE-D: ITEM NO. 28 to 38)

L. T. PANEL, SWITCHGEAR, METER, CTs

1.1 TYPE OF PANEL:

All the PCC's / PDB's / MCC's shall be metal clad, totally enclosed, rigid, floor mounted, Air-insulated, cubical type suitable for operation on three phase / single phase, 415 / 230 volts, 50 Hz.

The PCC's / MCC's shall be designed to withstand the and heaviest condition at site, with minimum expected ambient temperature of 45 degree Celsius, 80 percent humidity and dusty weather.

Should conform to Indian Electricity Act and rules (till last amendment) & approved as per FIA norms.

II. VARIOUS CODES FOR ELECTRICAL PANELS

A. APPLICABLE IS STANDARDS

1.	METERS (MEASURING) FOR ANALOG METERS	IS: 1248-1958
2.	INSTALLATION AND MAINTENANCE OF SWITCH GEARS	IS: 3072-1975
3.	H.D. AIR BREAKER, SWITCH GEARS AND FUSES FOR VOLTAGE NOT EXCEEDING 1000 VOLTS	IS: 4047-1977
4.	SELECTION, INSTALLATION AND MAINTENANCE OF FUSES UP TO 650 VOLTS	IS: 8106-1966
5.	GENERAL REQUIREMENTS FOR SWITCH GEAR AND GEAR FOR VOLTAGE NOT EXCEEDING 1000 VOLTS	IS: 4237-1967
6.	DEGREE OF PROTECTION PROVIDED BY ENCLOSURES FOR LV S/GEARS	IS: 2147-1962
7.	INSULATED CONDUCTOR RATING	IS: 8084-1972
8.	ENCLOSED DISTRIBUTION FUSE BOARDS AND CUT-OUTS FOR VOLTAGE NOT EXCEEDING 1000 VOLTS	IS: 2675-1983
9.	FUSE WIRE USED IN RE-WEARABLE TYPE ELECTRIC FUSES UP TO 650 VOLTS	IS: 9926-1981
10.	CONDUCTOR FOR INSULATED ELECTRIC CABLES AND FLEXIBLE CORDS	IS: 8130
11.	SHUNT CAPACITORS FOR POWER SYSTEMS	IS: 2834-1954
12.	HRC CARTRIDGE FUSES AND LINKS UP TO 660 VOLTS	IS: 2208

13.	HRC FUSES HAVING RUPTURING CAPACITY OF 50 KA	IS: 9224
14.	AC ELECTRICITY METERS: PART – 1 GENERAL REQUIREMENETS AND TESTS IS: 772 PART1	
15.	DIRECT ACTING ELECTRICAL INDICATING INSTRUMENTS	IS: 1248
16.	CURRENT TRANSFORMERS	IS: 2705
17.	ELECTRICAL RELAYS FOR POWER SYSTEMS PROTECTION	IS: 3231
18.	PHOSPHATE TREATMENT OF IRON AND STEEL FOR PROTECTION AGAINST CORR0SION	IS: 3618
19.	GUIDE FOR MARKING OF INSULATED CONDUCTOR	IS: 5578
20.	CODE OF PRACTICE OF PHOSPHATING OF IRON AND STEEL	IS: 6005
21.	FACTORY BUILT AASEMBLIES OF SWITCHGEAR AND CONTROL-GEAR FOR VOLTAGES UPTO AND INCLUDING 1000V AC AND 1200V D	IS: 8623
22.	GUIDE FOR UNIFORM SYSTEM MARKING AND IDENTIFICATION OF CONDUCTORS AND APPARATUS TERMINALS	IS: 11353
23.	LOW VOLTAGE FUSES	IS: 13703
24.	LV SWITCHGEAR AND CONTROL GEAR (PART 1 TO PART 5)	IS: 13947
25.	STRUCTURE CONSTRUCTION (IP-54)	IS: 2147
26.	MINIATURE CIRCUIT BREAKER (MCB) BS: 3871 (PART-1) 1965	IS: 8825 (1996)
27.	FUSE	IS: 2000-1962
28.	AIR CIRCUIT BREAKER	IS: 2516PART 1, 2, 3
29.	CONTACTORS	IS: 2959 & BS: 775
30.	DIGITAL METER	IS: 13779
31.	ELECTRICAL POWER & CONTROL WIRING CONNECTION WIRING INSIDE THE MODULE FOR POWER, CONTROL PROTECTION	IS: 694 & IS: 8130
32.	DANGER NOTICE PLATE	IS: 2551-1982 & IS: 5-1978
33.	MCCB	IEC 60439-2/IS: 8623-2
34.	SFU	IS: 13947 (PART-3) & IEC 60947-3
35.	ELCB	BS 3871 & 4293, IS., CEE 27

1.2 STRUCTURE :

The PCCs, MCCs & PDBs shall be metal clad enclosed and be fabricated out of high quality CRCA sheet, suitable for indoor installation, front operated and floor mounting type.

CRCA sheet steel used in the construction of PCCs / MCCs / PDBs shall be 2 mm thick for structure, 1.6 mm thick for doors, covers shrouds and 3 mm thick for gland plate and shall be folded and braced as necessary to provide a rigid support for all components. Joints of any kind in sheet shall be seam welded, all welding slag grounded off and welding pits wiped smooth with plumber metal.

The PCCs / MCCs / PDBs shall be totally enclosed, completely dust and vermin proof and degree of protection being no less than IP-54 confirming to IS 2147. Gaskets between all adjacent units and beneath all covers shall be provided to render the joints dust proof. All doors and covers shall be fully gasketted with neoprene gaskets and shall be lockable.

All panels and covers shall be properly fitted and secured with the frame, and holes in the panel correctly positioned. Fixing screw shall enter into holes taped into an adequate thickness of metal or provided with bolts and nuts. Self-threading screws shall not be used in the construction of PCCs / MCCs / PDBs.

A base channel of 75 mm x 75 mm x 5 mm or as per the weight of the panel shall be provided at the bottom.

PCCs / MCCs /PDBs shall be arranged in multi-tier formation. The PCCs / MCCs / PDBs shall be of adequate size to facilitate enough space for maintenance and cooling. The size of the PCCs / MCCs / PDBs shall be designed in such a way that the internal space is sufficient for hot air movement, and the electrical component does not attain temperature more than 40 degree Celsius. Openings shall provide for natural ventilation, but the said openings shall be screened with fine weld mesh.

Knockout holes of appropriate size and number shall be provided in the PCCs / MCCs/ PDBs in conformity with number, and size of incoming and outgoing conduits / cables.

Alternatively the PCCs / MCCs / PDBs shall provide with removable sheet plates at top and

bottom to drill holes for cable / conduit entry at site.

The PCCs / MCCs / PDBs shall be designed to facilitate easy inspection, maintenance and repair.

The PCCs / MCCs / PDBs shall be sufficiently rugged in design and shall support the equipment without distortion under normal and short circuit condition they shall be suitable braced for short circuit duty

1.3 PROTECTION CLASS:

All the indoor/outdoor PCCs / MCCs / PDBs shall have protection class as per mentioned in BOQ schedule.

1.4 POWDER COATING:

All sheet steel material shall undergo seven-tank process after all the necessary shearing and other mechanical works are completed. After the seven-tank process powder coating treatment shall be adopted using powder of reputed make. After the powder coating is complete welding in the panel or any sort of shearing, bending or cutting activity shall not be done. The colour shall be Siemens Grey 631

1.5 CIRCUIT COMPARTMENT:

Each circuit breaker and switch fuse units shall be housed in separate compartments and shall be enclosed an all sides. Sheet steel hinged lockable door shall be duly inter locked with the breaker / switch fuse units in ON and OFF position. Safety interlocks shall be provided for non-opening of the door when the breaker is in ON position.

The door shall not form integral part of the draw out position of the circuit breaker. All instruments and indicating lamp shall be mounted on the compartment door. Sheet steel barriers shall be provided between the tires in a vertical section.

1.6 INSTRUMENT COMPARTMENT :

Separate and adequate compartment shall provide for accommodating instruments, indicating lamp, control contactors, relays and control fuses etc. These components shall be accessible for testing and maintenance without any danger of accidental contact with live parts of the circuit breaker, switch fuse units, busbars and connections.

1.7 BUSBARS :

The busbar shall be air insulated and made high quality, high conductivity, high strength aluminium and as per relevant IS code. The busbar shall be for three phases and neutral system with separate neutral and earth bar. The busbar and interconnection between busbar and various components shall be of high conductivity, hard drawn aluminium. The busbar shall be of rectangular cross section designed to withstand full load current for phase busbar and full rated current for neutral busbar and shall be extensible type on either side. The busbar shall be rated for the frame size of the main incoming breaker. The busbar shall have uniform cross section throughout the length. Ratio of 1 sqmm = 0.8 A shall be adopted for aluminium busbars.

The busbar and interconnection shall be insulated with heat shrinkable PVC sleeves and be colour coded in red, Yellow, Blue and Black to identify the three phases and neutral of the system. The busbar shall be supported on unbreakable, non-hygroscopic DMC insulated supports at sufficiently close interval to prevent busbar sag and shall effectively withstand electromagnetic stresses in the event of short circuit capacity of 50 KA RMS symmetrical for one second and a peak short circuit withstand of 105 KA minimum.

The busbar shall be housed in a separate compartment. The busbar shall be isolated with 3 mm thick FRC sheet to avoid any accidental contact. The busbar shall be arranged such that minimum clearances between the busbar are maintained as per below.

Between phases	:	27 mm min.
Between phases and neutral	:	25 mm min.
Between phases and earth	:	25 mm min.
Between neutral and earth	:	23 mm min.

All busbar connection shall be done by drilling holes in busbars and connecting by chromium plated bolt and nuts. Additional cross section of busbar shall be provided in all PCCs / MCCs / PDBs to cover-up the holes drilled in the busbars. Spring and flat washers shall be used for tightening the bolts.

All connection between busbar and circuit breaker / switches and between circuit breaker/

switches and cable terminals shall be through solid copper strips of proper size to carry full rated current. These strips shall be insulated with insulating strips.

1.8 ELECTRICAL POWER & CONTROL WIRING CONNECTION :

Terminal for both incoming and outgoing cable shall be suitable for 1100 volts grade, copper conductor PVC insulated and sheathed, armoured cable and shall be suitable for connections of solder less sockets for the cable size as indicated on the appended drawing for the PCCs, MCCs, and PDBs.

Both control and power wiring shall be brought out in cable alley for ease of external connections, operation and maintenance.

Both control and power terminals shall be properly shrouded.

10% spare terminal shall be provided on each terminal block. Sufficient terminals shall be provided on each terminal block so that not more than one outgoing wire connected per terminal.

Terminal strip for power and control shall preferably be separated from each other by suitable barriers of enclosures.

Wiring inside the module for power, control protection and instrument etc. shall be done with use of 660/1100 V confirming to IS 694 and IS 8130. Power wiring inside the starter module shall be rated for full current rating of contactor, but not less than 4 sq.mm cross section area. For current transformer circuits, 2.5 sq.mm-copper conductor wire shall be used. Other control wiring shall be done with 1.5 sq.mm copper conductor wires. Wires for connections to the door shall be flexible. All conductors shall be crimped with solder less sockets at the ends before connections are made to the terminals.

Control power for the motor starter module shall be taken from the respective module switchgear outgoing from R phase and Neutral. Control wiring shall have control fuse (HRC type).

Particular care shall be taken to ensure neat and orderly laying of the wiring. Identification

ferrules shall be tagged to all the wire termination for ease of identification and to facilitate and testing.

"CUPAL" washers shall be used for all copper and aluminium connections.

Final wiring diagram of the PCC, MCC, PDB power and control circuit with ferrules number shall be submitted along with the PCC/MCC/PDB as one of the documents.

1.9 TERMINALS :

The outgoing terminals and neural link shall be brought out to a cable alley suitably located and accessible from the panel front. The current transformer for instrument metering shall be mounted on the disconnecting type terminal blocks. No direct connection of incoming and outgoing cables to internal components connection of the distribution board is permitted. Only one conductor may be connected in one terminal.

1.10 WIREWAYS :

A horizontal PVC wire way with screwed covers shall be provided at the top to take interconnecting control wiring between different vertical sections.

1.11 CABLE COMPARTMENT:

Cable compartment of adequate size shall be provided in the PCCs, MCCs, and PDBS for easy termination of all incoming and outgoing cables entering from top. Adequate support shall be provided in the cable compartment.

1.12 EARTHING :

Copper earth busbar of minimum 35 mm x 6 mm size shall be provided in the PCCs, MCCs, PDBS for the entire length if panel. As per the rating of the main busbars the size of earthing busbar shall be decided. The framework of the PCCs, MCCs, and PDBs shall be connected to this earth busbar. Provisions shall be made for connection from earth busbar to the main earthing bar coming from the earth pit on both sides of the PCCs, MCCs, and PDBs.

The earth continuity conductor of each incoming and outgoing feeder shall be connected to this earth bar. The armour shall be properly connected with earthing clamp and the clamp shall be ultimately bounded with the earth bar.

1.13 LABELS:

Engraved Aluminium sheet labels shall be provided on all incoming and outgoing feeders. Single line circuit diagram showing the arrangements of circuit inside the distribution board shall be pasted on inside of the panel door and covered with transparent laminated plastic sheet.

1.14 NAME PLATE :

A name plate with panel designation in bold letter shall be fixed at top of the central in panel. A separate name plate giving feeder details shall be provided for each feeder module door.

Inside the feeder compartment, the electrical component, equipments, accessories like switchgear, contactor, lamp, relays etc. shall suitably be identified by providing stickers.

Engraved nameplates shall be of Aluminium strip of black colour and silver letters format.

Nameplate shall be fastened by counter sunk screws / riveted and not by adhesives.

1.15 DANGER NOTICE PLATE :

The danger plate shall be affixed in a permanent manner on operating side of the panel.

The danger notice plate shall indicate danger notice both in Hindi and English and with a sign of skull and bones.

The danger notice plate in general shall meet to requirements of local inspecting authorities.

Overall dimension of the danger notice plate shall be 200 mm wide and 150 mm high. The danger notice plate shall be made from minimum 1.6 mm thick mild steel sheet and after due pre-treatment to the plate, the same shall be painted white with vitreous enamel paint on both front and rear surface of the plate.

The letter, the figure, the conventional skull and bones shall etc. shall be positioned on the plate as per recommendations of IS: 2551-1982.

The said letter, the figure and the sign of skull and bones be painted in single red colour as per

IS: 5-1978.

The danger plate shall have rounded corners. Locations of fixing holes for the plate shall be decided to suit design of the panel.

The danger notice plate, if possible, be of ISI certification mark.

1.16 INTERNAL COMPONENTS:

The PCC / MCC / PDB shall be equipped complete with all type of required number of air circuit breakers, switch fuse unit, contactor, relays, fuses, meters, instruments, indicating lamps, push buttons, equipment, fittings, busbar, cable boxes, cable glands etc. and all the necessary internal connections /wiring as required and as indicated on relevant drawings. Components necessary for proper complete functioning of the PCC / MCC / PDB but not indicated on the drawings shall be supplied and installed on the PCC / MCC / PDB.

All part of the PCC / MCC/ PDB carrying current including the components, connections, joints and instruments shall be capable of carrying their specified rated current continuously, without temperature rise exceeding the acceptable values of the relevant specifications at any part of the PCC / MCC / PDB.

All units of the same rating and specifications shall be fully interchangeable.

1.17 INSPECTIONS / TESTING:

Each equipment should inspect and witness by client & consultant.

The PCC / MCC / PDB shall be inspected and checked as per inspection manual of the PCC / MCC / PDB manufacturer.

Various electrical components and accessories of the PCC / MCC / PDB shall be checked as per drawing for the respective PCC / MCC / PDB.

The PCC / MCC / PDB shall be checked for rigid mounting, earthing connections, proper rating and size of components, internal wiring, etc.

All mechanical fasteners and electrical connections shall be checked and tightened before installation.

Type test:

Type test certificates for all switchgears shall be provided.

Routine Test:

Prior to dispatch of the PCC / MCC / PDB following tests shall be carried out.

a) Mechanical endurance test shall be carried out by closing and opening of all the ACB's, MCB's switches etc.

b) Over voltage and Insulation resistance test shall be carried out between phases and between phase to earth bus, keeping the isolating switch in ON position. Similar test shall be carried out keeping the isolating switch in closed position.

c) All the interlocks, controls and tripping mechanism of the switchgears shall be tested for their proper functioning.

d) High voltage test, Continuity test, Control circuit test shall be carried out.

1.18 L. T. SWITCHGEARS:

1.18.1 GENERAL:

The type, size, and rating of the components shall be as indicated on the relevant single line diagrams.

1.18.2 MINIATURE CIRCUIT BREAKER (MCB):

Miniature circuit breakers shall be quick make and break and break type conform with British standard BS: 3871 (Part-I) 1965 and IS: 8825 (1996). The housing of MCBs shall be heat resistant and having high impact strength. The fault current of MCBs shall not be less than 10000 amps, at 230 volts. The MCBs shall be flush mounted and shall be provided with trip free manual operating mechanism with mechanical "ON" and "OFF" indications.

The circuit breaker dollies shall be of trip free pattern to prevent closing the breaker on a faulty current.

The MCB contact shall be silver nickel and silver graphite alloy and tip coated with silver. Proper arc chutes shall be provided to quench the arc immediately. MCB's shall be provided with magnetic fluid plunger relay for over current and short circuit protection. The over load or short circuit devices shall have a common trip bar in the case of DP and TPN miniature circuit breakers. All the MCB's shall be tested and certified as per Indian Standard, prior to Installation.

1.18.3 FUSE:

Fuses shall be of high rupturing capacity (HRC) fuse links and shall be in accordance with IS: 2000-1962 and having rupturing capacity of not less than 35 MVA at 415 Volts.

1.18.4 AIR CIRCUIT BREAKER:

The ACB shall meet with IS: 2516 part I, II and III. Each pole of the ACB's shall be equipped with and over current, earth fault and short circuit release. The ACB's shall be equipped with under voltage trip only on those used as main incomer of all sources, bus coupler and inter connector. The trip devices shall be direct acting.

Disconnecting devices of approved type shall be provided to facilitate the removal of the circuit breakers from the housing for test and maintenance purpose.

The ACB's shall have an arc-quenching device on each pole. The ACB's shall have auxiliary contacts for signaling, interlocking etc. The ACB's shall have slow close facilities for checking contact operation and contact gap adjustment.

All contacts subject to arcing shall be tipped with arc resisting material. Main contacts shall be silver plated, multi-finger and spring-loaded type. Facilities shall be provided to isolate the circuit breaker for inspection purpose.

Interlocks shall be provided to:
Prevent the breaker from being isolated unless it is in the "OFF" position.
Prevent the breaker from being racked in to the service position unless it is in the "OFF" position.

Prevent the breaker from being accidentally pulled completely "OFF" the guide rail. Safety shutters of insulating material shall be provided to prevent access to all live contacts, when the breaker is in the inspection position or completely withdrawn.

Facilities shall be provided for earthing the circuit breaker.
Air circuit breaker shall be capable of clearing the maximum fault current, which can occur.

The breaker plates shall have an ON-OFF indicators, spring charge indicators, provision to padlock manual handle and provision to lock draw-out mechanism. Electrically operated breaker shall have provision for emergency manual closing by inserting a tool through the fuse plate. A control isolating switch shall be provided on the fuse plate to isolated the supply to the charging motor.

1.18.5 MOULDED CASE CIRCUIT BREAKER:

The MCCB shall be air break type and having quick make quick break with trip free operating mechanism.
Housing of the MCCB shall be of heat resistant and flame retardant insulating material.

Operating handle of the MCCB shall be in front and clearly indicate ON / OFF / TRIP positions.

The electrical contact of the circuit breaker shall be of high conducting non-deteriorating silver alloy contacts.

The MCCB shall be provided with microprocessor based trip units. All the releases shall operate on common trip busbar so that in case of operation of any one of the releases in any of the three phases, it will cut off all the three phases and thereby single phasing of the system is avoided.

The MCCB whenever called for in the drawings shall provide an earth fault relay.

The MCCB shall provide two sets of extra auxiliary contacts with connections for additional controls at future date.

1.18.6 CONTACTORS:

The contactor shall meet with the requirements of IS: 2959 and BS: 775.

The contactors shall have minimum making and breaking capacity in accordance with utilization category AC 3 and shall be suitable for minimum class II intermittent duty.

If the contactor forms part of a distribution board then a separate enclosure is not required, but the installation of the contactor shall be such that it is not possible to make an accidental contact with live parts.

1.18.7 TRIVECTOMETER:

Flush mount 96 x 96 x 80 mm load manager type Enercon EM 6400 or equivalent meter of accuracy class 1 as per IS 13779 shall be provided. The meter shall be accurate on distorted waveforms; simultaneous sampling of voltage and amperes shall be done. It shall have low burden on PT and CT shall have bright display, shall view 3 parameters together shall have auto scaling from kilo to mega to giga units, shall have programmable CT, PT ratios with built in phase analyser. Auto scrolling shall be programmable as per user choice and communication with PC; PLC DCS shall be possible through RS 485 serial port. It shall be dust proof, tamper proof with data import export option and 10 years back up of integrated data.

Parameters to be monitored shall be Frequency, Line to line and average and line to neutral and average voltage, phase wise and average current, phase wise and total KVA, KW and P.F. reading and KWH monitoring.

User programmable facility for delta 2e and star 3e measurement, C.T. and P.T. ratios, sliding window auto sync. And auto scrolling of parameters shall be available.

Sensing shall be 3 phase, 4 wire measuring True RMS with voltage input range of 110 to 415 V nominal and current input of 5 amps or 1 amps as per field configuration. Current range shall be from 50 mA to 7.5 A and burden on PT or CT shall be app 0.2 VA.

Accuracy for kW / kWh shall be as per IS 1377 / CBIP88 and for all other parameters shall be +/- 0.5% of full scale + 0.5% of reading + 1 digit. Digital readout shall be of 3 rows of 4 digits

each (12.5 mm size) with 7 segments bright red LED. Input frequency shall be 50Hz / 60Hz +/- 5%. Power factor range shall be 0.5 lag – unit – 0.8 lead.

Resolution for power parameters shall be for 4 digits and energy parameters shall be 8 digits. Display update shall be at every 15 seconds for demand parameters and 1 sec for other parameters. Display sequence shall be parameter followed by value. Temperature range shall be 0-50^{o}C and humidity <95% non-condensing.

Display pages shall be as follows:
Instantaneous – VLL, A avg., FVLn, A avg., FKVA, kW, PF
Individual pages of above parameters.
Integrated – kV Ah KWh Run hours on hours Interruption

1.18.8 CURRENT TRANSFORMER:

Where called for, CT's shall provided for current measuring. Each phase shall be provided with separate CT of class I accuracy and VA burden as shown in SLD for operation of associated metering and controls. Current transformer shall be in accordance with IS: 2705- 1964 as amended up to date.

1.18.9 PUSH BUTTON:

The push button unit shall comprise of the contact element, a fixing holder, and push button actuator. The push button shall be momentary contact type. The contacts shall be of silver alloy and rated at 10 Amps. Continuous current rating. The actuator shall be of stranded type and colour as per its usage for ON, OFF and Trip.

1.18.10 INDICATING LAMP:

The push button unit shall comprise of the contact element, a fixing holder, and push button actuator. The push button shall be momentary contact type. The contacts shall be of silver alloy and rated at 10 Amps. Continuous current rating. The actuator shall be of stranded type and colour as per its usage for ON, OFF and Trip. Push button shall be of self-glowing type with LED lamp.

Indicating Lamp shall be LED type and shall supplied complete with translucent covers to

diffuse the lamp light. Indicating lamps shall be part of push buttons.

Colour shade for the indicating lamps shall be as below:

ON indicating lamp	:	Green
OFF indicating lamp	:	Red
TRIP indicating lamp	:	Amber
PHASE indicating lamp	:	Red, Yellow, and Blue.

Workmanship

The contractor shall erect the panel at site in co-ordination with the supplier if required. He should check for loose ends on the part of the supplier and shall inform client and consultant for the same. Physical and continuity tests shall be carried out by contractor. Also the field tests carried out by the supplier shall be recorded by the contractor.

Mode of measurement

Contractor shall be paid for one panel erection.

(SCHEDULE D: ITEM NO. 45 to 50)

CABLE LAYING IN TRENCHE / ON TRAY

(A). MATERIALS:

All cables shall be of approved make and ISI marked. The brick shall be modular well burnt clay bricks of compressive strength not less than 25kg / sq.cm. Only fine shall be used.

(B). STORAGE AND HANDLING OF CABLE:

The cable drums shall be stored on, hard and well drained surface, to avoid sinking of drums in the ground causing damage to the cable drums. For long term storage of all types of cable, paved surface is preferred and protection from rain and sun is to be provided.

The drums shall always be stored on their flanges, and not on their flat sides. Both ends of the cable should be properly sealed to prevent ingress/absorption of moisture.

Ventilation should be there between cable drums. Damaged battens of drums etc. should be

replaced at the earliest. Handling: when the cable drums have to be moved over short distance, they should be rolled in the direction of the arrow marked on the drum.

For transportation of cable drums over long distance suitable mechanical transport should be used. If manual transportation is compulsion, the drum should be mounted on the cable drum wheels, strong enough to carry the weight of the drum, and pulled by means of ropes.

For loading and unloading from vehicles, suitable capacity crane or a lifting tackle should be used. Small size cable drums as can also be rolled down carefully on a suitable ramp for unloading, provided no damage is likely to be caused to the cable or the drums.

ROUTE OF CABLE:

Be for cable laying, the rout of the cable shall be decided by the engineering-in-charge considering the following.

The shortest practicable route shall be preferred, the cable rout shall generally follow fixed developments. Such as roads, foot paths etc. with proper offsets so that future maintenance, identification etc. are rendered easy. Cross country run merely to shorted the route length shall not be adopted.

Cable route shall be planned away from drains and near the property, especially in the case of LV/MV cables. Cable route should be avoided from corrosive soils, ground surrounding sewage effluent etc.

Present and likely future requirement of the other services should be taken in to consideration, while deciding the alignment of the cable.

Whenever cables are laid along roads, the LV/MV cable shall be laid further from the kerb line than HV cables.

Where available space is restricted LV/MV cable shall be laid above HV cable in vertical formation.

Cables of different voltages, and also power and control cable shall be kept in different trenches with adequate separation. Where cables cross one another, the cable of higher

voltage shall be laid at a lower level than the cable of lower voltage.
Power and communication cables shall as far as possible cross each other at right angles. The horizontal and vertical clearances between them shall not be less than 60 cm.

Cables under railway tracks, shall be laid in spun reinforced concrete, or cast iron or steel pipes at such depths as may be specified by the Railway/DFCCI authorities, but not less than 1m, measured form the bottom of the sleepers to the top of the pipe.

Inside railway station limits, pipes shall be laid upto the point of the railway boundary or to a point to be decided by the Railway/DFCCI authorities. Outside the railway station limits, pipes shall be laid upto a minimum distance of 3m from the centre of the nearest track on either side.

Necessary way leave for the cable route shall be obtained from appropriate authorities, such as, Municipal authorities, Department of telecommunication, Gas works, railways, Civil Aviation authorities, Owners of properties (in case of private property) etc. and section 12/51 of the Indian Electricity Act shall be complied with.

LAYING OF CABLE:

GENERAL

Cables with kinks, straightened kinks or any other apparent defects like defective armouring etc. shall not be laid.

Cable shall not be bent sharp to a small radius, while handling or laying. The minimum safe bending radius for PVC/XLPE (MV) cables shall be 12 times the overall diameter of the cable.

If cable is cut, the ends of cable shall be sealed with suitable sealing compound/ tape/ heat shrinkable caps immediately.

The cables shall be tested for continuity and insulation resistance.

The cables shall be laid direct in ground, pipe, closed or open ducts, and cables trays or on surface of wall etc. as specified.

UNCOILING OF CABLE BEFORE LAYING

The cable drum shall be properly mounted on jacks, or on a cable wheel of suitable capacity. The spindle should be horizontal in the bearings to prevent creeping of drum to one side while rotating.

PVC/XLPE cables less than 120 sq.mm size may be removed by “flaking” i.e. by making one long loop in the reverse direction.

The cable shall be pulled over on rollers in the trench steadily and uniformly without jerks and strain. The entire cable length shall as far as possible be laid off in one stretch.

For short runs and sizes up to 50 sq.mm of MV cables, any other suitable method of direct handling and lying can be adapted without strain or excess bending of the cables.

LAYING DIRECT IN GROUND

For laying a single cable the minimum width of the trench shall be 35 cm and the depth shall not be less than 75cm. The bottom of the trench shall be level and smooth.

Where more than one cable is to be laid in the same trench in horizontal formation, the width of the trench shall be increased such that the inter-axial spacing between the cables shall be at least 20 cm.

In case of vertical formation of cable laying, the depth of the trench shall be increased by 30 cm for each additional vertical tier.

There shall be a clearance of at least 15 cm between axis of the end cables and the sides of the trench

The trenches shall be excavated in reasonably straight lines. While changing direction of trench, suitable curvature shall be adopted.

The changes in gradients or in depth shall be gradual.

While excavating trench, the excavated soil shall be stacked firmly by the side of the trench such that it may not fall back into the trench.

Adequate precautions should be taken not to damage any existing cable(s), pipes or any other such installations in the route during excavation.

Wherever bricks, tiles or protective covers or bare cables are encountered, further excavation shall not be carried out without the approval of the Engineer-in-charge.

Existing property, if any, exposed during trenching shall be temporarily supported adequately as directed by the Engineer-in-Charge. The trenching in such cases shall be done in short lengths and necessary pipes shall be laid for passing cables therein and then the trench shall be refilled.

Excavation through lawns shall be done in consultation with the Department concerned.

SAND CUSHIONING

The trench shall then be provided with a layer of clean dry sand cushion of not less than 8 cm in depth, before laying the cables therein.

Cables laid in trenches in a single their formation shall have a covering of dry sand of not less than 17 cm above the base cushion of sand before the protective cover is laid.

In the case of vertical multi-tier formation, after the first cable has been laid, a sand cushion of 30 cm shall be provided over the base cushion before the second tier is laid. If additional tiers are formed, each of the subsequent tiers also shall have a sand cushion of 30 cm as started above. Cables in the top most tiers shall have final sand covering not less than 17 cm before the protective cover is laid.

LOOPS

At the time of original installation, approximately 3m of surplus cable shall be left on each terminal end of the cable and on each side of the underground joints. The surplus cable shall be left in the form of a loop. Where there are long runs of cables such loose cable may be left

at suitable intervals as specified by the Engineer-in-Charge.

Where it may not be practically possible to provide separation between cables when forming loops of a number of cables, measurement shall be made only to the extent of actual volume of excavation, sand filling etc. and paid for accordingly.

PROTECTIVE COVERING:

Unless otherwise specified, the cables shall be protected by brick of specified size or 20cmx10cmx10cm or locally available size, placed on top of the sand. The bricks shall be placed breadth-wise for the full length of the cable. Where more than one cable is to be laid in the same trench, one raw of bricks shall use for each cable.

Where bricks are not easily available, or are comparatively costly, there is no objection to use locally available material such as stone tiles or slates or stone/ cement concrete slabs. Where such an alternative is acceptable, the same shall be clearly specified in the tender specifications.

BACK FILLING:

The cable cores shall be tested for continuity, absence of cross phasing, and insulation resistance from conductors to earth / armour and between conductors.

Insulation resistance shall be tested with a 500V megger for cables of 1.1 KV grade, or with a 2500/ 5000V megger of cables of higher voltage. Unless the insulation resistance values are satisfactory, the trench shall not be covered or filled.

The trenches shall be then back-filed with excavated earth, free from stones or other sharp edged debris and shall be rammed and watered, if necessary in successive layer not exceeding 30cm depth.

A crown of earth not less than 50 mm and not exceeding 100m in the centre and tapering towards the sides of the trench shall be left to allow for subsidence unless otherwise specified. The crown of the each however, should not exceed 10 cms so as not to be a hazard to vehicular traffic.

The temporary re-statement of roadways should be inspected at regular intervals, particularly

during wet weather and settlement should be made good by further filling as may be required.

Where it is necessary to cut road berms or displace kerb stones, the same shall be repaired and made good, except for turning/ asphalting, to the satisfaction of the Engineer-in-Charge, and all the surplus earth or rock shall be removed to places as specified.

LAYING OF CABLE IN PIPE:

In locations such as road crossing, entry in to building, paved areas etc., and cables shall be laid in pipes or closed ducts. Metallic pipe shall be used as protection pipe for cables fixed on poles of overhead lines.

GI, CL or spun reinforced concrete pipes shall be used for cables in ground, however only GI pipe shall be used as protection pipe on poles.

The size of the pipe shall not be less than 50mm dia. for a single cable and not less than 150mm for more than one cable.

Where steel pipes are used for protection of single core cables feeding AC load, both cables in the case of single phase system and all cables in the case of poly phase system should be drawn in single pipe of sufficient dia.

Pipes for MV and HV cables shall be independent.

In the case of new construction, pipes for present and anticipated future requirements shall be laid along with the civil works.

Pipes shall be continuous and clear of debris or concrete. Sharp edges if any, at ends shall be smoothened to prevent damage to cable sheathing.

The top surface of pipes shall be at a minimum depth of 1m from the pavement level when laid under roads, pavement etc.

The pipes shall be laid preferable skew to reduce the angle of bend as the cable enters and leaves the crossing.

When pipes are laid by cutting and existing road, after laying the pipes the soil filled up is rammed well in layers with watering to ensure proper compaction. A crown of earth not exceeding 10cm should be left at the top.

The temporary re-instatements of roadways should be inspected at regular at regular intervals upto 10days and any settlement should be made good by further filling as may be required.

After the subsidence has ceased, the top of the filled up trenches in roadways or other paved areas shall be restored. To the same density and material as the surrounding area in accordance with the relevant CPWD Building specifications and to the satisfaction of the Engineer-in-Charge. Suitable size manholes may be provided to facilitate feeding/ drawing in of cables with sufficient working space. Manhole shall be covered by suitable sizes and specified type of manhole.

Pipes for cables entries to the building shall slope downwards from the building. The pipes at the building end shall be suitably sealed to avoid entry of water, after the cables are laid.

Cable-grip / draw-wires, winches etc. may be employed for drawing cables through pipes/ closed ducts.

LAYING IN OPEN DUCTS:

Open ducts with suitable removable covers (RCC slabs or chequered plates) are generally provided in substations, switch rooms, plant rooms, workshops etc. for taking the cables. The cable ducts should be of suitable dimensions for the number of cables involved.

Laying of cables with different voltage ratings in the same duct shall be avoided. Where it is compulsion to take HV & MV cables in same trench, they shall be laid with a barrier between them or alternatively, one of the two (HV or MV) cables may be taken through pipe (s).

Joints of any type shall not be permitted inside the ducts.

The cables shall be laid in the duct such that unnecessary crossing of cables is avoided.

Where specified, cables may be fixed with clamps on the walls of the duct or taken in hooks / brackets / troughs in ducts.

CABLE TRAYS AND ROUT MARKER:

Cable trays shall be fabricated from Hot Dip GI and channels of 14 gauge and shall be

powder coated with 7 tank process if specified. The design shall be ladder type with optional cover. Shall be fixed or suspended from the ceiling with the help of suspenders which shall have adequate diameter to sustain the weight of the cables and channels. Also if necessary anchor fasteners shall be used for grouting purpose

LAYING ON SURFACE / CABLE TRAYS:

This method may be adopted in places like switch rooms. Workshops tunnels, rising (distribution) mains in building etc. This may also be necessitated in the works of additions and / or alterations to the existing installation, where other methods of laying may not be feasible.

Cables may be laid in surface by any of the following methods as specified:

(a) Directly clamped by saddles or clamps,

(b) Supported on cradles,

(c) Laid on troughs / trays, duly clamps.

The size and interval of metal saddle / clamp used for fixing the cables shall be as per table given below.

SR NO	SIZE OF CABLE	CLAMPING BY	FIXING INTERVALS
1	Upto 25 sq mm	Saddle 1mm thick	45 cm
2	35 sqmm to 120 sqmm	Clamp 3mm thick and 25mm wide	60 cm
3	150 sqmm and above	Clamp 3mm thick and 40mm wide	60 cm

Saddles shall be secured with screws to suitable approved plugs. Clamps shall be secured with nuts on to the bolts. Grouted in the supporting structure in an approved manner.

In the case of single core cable, the clamps shall be of non-magnetic material.

Unarmoured cables shall be clamped with suitable non-corrosive packing to prevent damage of the cable sheath.

Cable shall be fixed neatly without undue sag or kinks.

The arrangement of laying the cables in cradles is permitted only in the case of cables of 1.1KV grade of size exceeding 120 sqmm. In such cases, the cables may be suspended on MS flat cradles of size 50mm x 5mm which in turn shall be fixed on the wall by bolts grouted into the wall in an approved manner at a spacing of not less than 60 cm.

All MS components used in fixing the cables shall be either galvanized or given a coat of red oxide primer and finished with 2 coats of approved paint.

(C) JOINTING OF CABLES:

SAFETY PRECAUTION BEFORE JOINTING

A caution board displaying massage “CAUTION CABLE JOINTING WORK IN PROGRESS” shall be displayed to warn the public and traffic where necessary.

Before joining is commenced, all safety precautions like isolation, discharging, earthing, display of caution board on the controlling switchgear etc. shall be taken to ensure that the cable would not be inadvertently charged form live supply.

Metallic armour and external metallic bonding shall be connected to earth.

Where “permit to work” system is in vogue, safety procedures prescribed shall be complied with

LOCATION:

Before laying a cable, most suitable locations for proposed cable joints, if any shall be decide, the water logged locations, carriage ways, and pavement. Proximity to telephone cables, gas or water mains, inaccessible places, ducts, pipes, racks etc. shall be avoided for location the cable joints.

Joints shall be staggered by 2m to 3m when joints are to be done for two or more cables laid together in the same trench.

Joints pits shall be of sufficient dimension as to allow easy and comfortable working. The sides of the pit shall be well protected from loose earth falling into it. It shall also be covered by a tarpaulin/ PVC sheet to prevent dust and other foreign matter being blown on the exposed joint and jointing materials.

Sufficient ventilation shall be provided during jointing operation.

JOINTING MATERIALS AND PROCEDURE:

Only approved make and specified type of cable jointing kit shall be used.

The clamps for the armour shall be clean and tight.

Jointing as well as storing shall be done strictly as per the instructions of the manufacturer of jointing kit.

About 3m long surplus cable shall be left on each side of joints.

Jointing work shall be carried out by a licensed / experienced cable jointer. The sequence of cores should be so arranged as to avoid crossing of cores.

Before jointing cable cores shall be tested for continuity, absence of cross phasing, insulating

resistance from conductors to earth / armour and between conductors.

Insulation resistance shall be tested with a 500V megger for cables of 1.1 KV grade, or with a 2500 / 5000V megger of cables of higher voltage. Unless the insulation resistance values are satisfactory, jointing shall not be done.

If oxide film is formed on aluminium conductor, it should be removed by using appropriate type of flux.

TESTING AFTER LAYING:

After laying and jointing, the cable shall be subjected to a 15 minutes pressure test with 2 KV AC or 3 KV DC pressure. DC pressure testing may normally be preferred to SC pressure testing.

Alternatively pressure test for one minute with 1000V megger for cables of 1.1 KV grade and with 2500 / 5000V megger for cables of higher voltages shall be sufficient.

(D). ROUTE MARKERS:

Route markers shall be provided along the runs of cables at locations approved by the Engineer-in-Charge and generally at intervals not exceeding 100m.

Markers shall also be provided to identify change in the direction of the cable route and at locations of underground joints.

Route markers shall be made out of 100mm x 5mm GI plate welded / bolted on 35mm x 35mm x 6mm angle iron, 60cm long. Such plate markers shall be mounted parallel to and at about 0.5 m away from the edge of the trench.

C.C route marker made of cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate of 20mm in size) shall be laid flat and centered over the cable. The concrete markers, unless otherwise instructed by the Engineer-in-Charge, shall project over the surrounding surface so as to make the cable route easily identifiable.

The works PWD-MV/HV CABLE as the case may, shall be inscribed on the marker.

(E). MEASUREMENT:

Cable laid direct in ground, duct and surface / cable tray shall be measured in running metre straight along trench (excluding ramble length) in running metre correct to 1cm.

Cable laid pipes / closed duct shall be measured in running metre correct to 1 cm taking actual length of the pipe / duct for each run of the cable (excluding ramble length), irrespective of the length of cable drawn through it.

Cable length used in connections shall be measured as item of cable layed in open duct.

Jointing and route marker shall be counted in number.

(F). RATE:

Cost of all material, labour and machinery used in execution of work of shall be in the cost of item.

(SCHEDULE D: ITEM NO. 45 TO 50)

LT CABLES AND CABLE TERMINATION

A. SPECIFICATIONS

GENERAL:

The medium voltage cables shall be supplied, laid, connected, tested and commissioned in accordance with the drawings, specifications, relevant Indian Standards specifications, manufacturer's instructions. The cables shall be delivered at site in the original drums with manufacturer's name, size and type clearly written on the drums.

All cables shall be adequately protected against any risk of mechanical damage to which they may be liable in normal conditions of handling during transportation, loading, unloading etc.

The cable shall be supplied in single length i.e. without any intermediate joint or cut unless specifically approved by the DFCCI.

The cable ends shall be suitably sealed against entry of moisture, dust, water etc. with cable compound as per standard practise.

Materials: All cables shall be of approved make and ISI marked only. The brick shall be modular well burnt clay brick of compressive strength not less than 25kg /sq.cm. Only fine sand shall be used.

Bending of Cable: Cable shall not be bend sharp to a small radius either while handling or in laying. The minimum safe banding radius for PILCA/XLPE, 33KV cable shall be 20 times the overall diameter of the cable.

CONDUCTOR:

Uncoated, annealed copper / aluminium, of high conductivity, upto 4 mm^2 size the conductor shall be solid and above 4 mm^2 the conductors shall be concentrically stranded as per IEC: 228.

INSULATION:

Cross link polyethylene (XLPE) extruded insulation rated at 70^{o}c.

CORE INDENTIFICATION:

Two core	:	Red and Black
Three core	:	Red, Yellow and Blue
Four core	:	Red, Yellow, Blue and Black
Single core	:	Green, Yellow for earthing.

Black shall always be used for neutral.

ASSEMBLY:

Two, three or four insulated conductors shall be laid up, filled with non-hygroscopic material and covered with an additional layer of thermoplastic material.

ARMOUR:

Galvanised steel flat strip / round strips applied helically in single layers complete with covering the assembly of cores.

For cable size up to 10 sq. mm : Armour of 1.4 mm dia G.I. round wire

For cable size above 10 sq. mm : Armour of 4 mm wide 0.8 mm thick GI strip

SHEATH:

ST -2 PVC along with polypropylene fillers to be provided.

Inner sheath shall be extruded type and shall be compatible with the insulation provided for the cables.

Outer sheath shall be of an extruded type layer of suitable PVC material compatible with the specified ambient temp. Of 50^{o}c and operating temperature of cables. The sheath shall be resistant to water, ultra violet radiation, fungus, termite and rodent attacks. The colour of outer sheath shall be black.

Sequential length marking along with size and other standard parameters shall be required at every 1.0 mtr on the outer sheath.

TESTING:

Finished cable tests at manufacturers works: The finished cables shall be tested at manufacturer's works for all the routine tests for all the length and size of cables to be delivered at site and the certificate for the same shall be furnished to DFCCI. If required the cables shall be tested in presence of the DFCCI's representative.

Voltage test: Each core of cable shall be tested at room temperature at 3 KV A.C. R.M.S. for duration of 5 minutes.

Conductor resistance test: The D.C. resistance of each conductor shall be measured at room temperature and the results shall be corrected to 20^{o}c to check the compliance with the values specified in the IS 8130 – 1976.

Cable tests before and after laying cables at site:

Insulation resistance test between phases, phase to neutral and phase to earth.

Continuity test of all the phases, neutral and earth continuity conductor.

Earth resistance test of all the phases and neutral.

All the tests shall be carried out in accordance with the relevant IS code of practise and Indian Electricity Rules. The vendor shall provide necessary instruments, equipments and labour for conducting the above tests and shall bear all the expenses in connection with such tests. All tests shall

be carried out in the presence of DFCCI and the results shall be prescribed in forms and submitted.

All specification for HV cable laying shall be same as that of MV cable laying.

Testing of 2KV HT cable:

Insulation resistance shall be tested with 2500/5000meger, Pressure testing shall be done for 15minutes with 20KV Ac pressure between conductors and with 2.5KV AC pressure between conductor and earth. If facility for pressure testing is not available then testing for one minute with 2500/5000V megger shall be sufficient.

CABLE MARKING:

The outer sheath shall be legibly embossed at every meter with following legend:

ELECTRIC CABLE: 200 V, SIZE: ___C X ____ MM^2 with Manufacturers name, year of manufacturing and ISI symbol.

SEALING DRUMMING AND PACKING:

After tests at manufacturer's woks, both ends of the cables shall be sealed to prevent the ingress of moisture during transportation and storage.

Cable shall be supplied in length of 500 mtrs or as required in non-returnable drums of sufficiently sturdy construction.

Cables of more than 250 meters shall also be supplied in non-returnable drums.

The spindle hole shall be minimum 20 mm in diameter.

Each drum shall bear on the outside flange, legibly and indelibly in the Englist literature, a distinguishing number, the manufacturer's name and particulars of the cable i.e. voltage grade, length, conductor size, cable type, insulation type, and gross weight shall also be clearly visible. The direction for rolling shall be indicated by an arrow. The drum flange shall also be marked with manufacturer's name and year of manufacturing etc.

CABLE TERMINATION:

Cable terminations shall be made with aluminium crimped type solder less lugs for all aluminium cables and stud type terminals. For copper cables copper crimped solder less lugs shall be used.

Crimping shall be done with the help of hydraulically operated crimping tool.

For joints where by cable is with aluminium conductor and busbars are aluminium, bimetallic lugs shall be used with compound. CUPAL type of washers shall be used.

Crimping tool shall be used for crimping any size of cable.

CABLE GLANDS*:*

Cable glands shall be of brass single compression type. Generally single compression type cable glands shall be used for indoor protected locations and double compression type shall be used for outdoor locations.

FERRULES:

Ferrules shall be of self-sticking type and shall be employed to designate the various cores of the control cable by the terminal numbers to which the cores are connected, for ease in identification and maintenance.

CABLE JOINTS:

Kit type joint shall be done and filled with insulating compound. The joint should be for 1.1 KV grade insulation.

B. WORKMANSHIP

Cables shall be laid in the routes marked in the drawings. Where the route is not marked, the Contractor shall mark it out on the drawings and also on the site and obtain the approval of the DFCCI AND/OR ITS ARCHITECT before laying the cable. Procurement of cables shall be on the basis of actual site measurements and the quantities shown in the schedule of work shall be regarded as a guide only.

Cables shall be laid on walls, cable trays, inside shafts or trenches. Saddling or support for the cable shall not be more than 500 mm apart. Plastic identification tags shall be provided at every 30 m.

Cables shall be bent to a radius not less than 12 (twelve) times the overall diameter of the cable or in accordance with the manufacturer's recommendations whichever is higher.

In the case of cables buried directly in ground, the cable route shall be parallel or perpendicular to roadways, walls etc unless marked on drawing by architect / consultant. Cables shall be laid on an excavated, graded trench, over a sand or soft earth cushion to provide protection against abrasion. Cables shall be protected with brick or cement tiles on all the three sides as shown on drawings. Width of excavated trenches shall be as per drawings. Back fill over buried cables shall be with a minimum earth cover of 750 mm to 1000 mm. The cables shall be provided with cables markers at every 10 meters and at all loop points.

All cables shall be full runs from panel to panel without any joints or splices. Cables shall be identified at end termination indicating the feeder number and the Panel/Distribution board from where it is being laid. Cable termination for conductors up to 4 sq.mm. may be insertion type and all higher sizes shall have compression type lugs. Cable termination shall have necessary brass glands. The end termination shall be insulated with a minimum of six half-lapped layers of PVC tape. Cable armouring shall be earthed at both ends.

In case of cables entering the buildings. It would be done duly only through pipes. The pipes shall be laid in slant position, so that no rainwater may enter the building. After the cables are tested the pipes shall be sealed with M. seal & then tarpaulin, shall be wrapped around the cable for making the entry

watertight.

Testing: MV cables shall be tested upon installation with a 500 V Meggar and the following readings established:

Continuity on all phases.
Insulation Resistance.
Between conductors.
All conductors and ground.
All test readings shall be recorded and shall form part of the completion documentation.

Cable joints shall be done as per regular practice and check shall be carried out for loose connections and leakages. Insulation cutting shall be done properly taking care that no area of the conductor remains exposed. Crimping shall be done with the help of hydraulic tool. Proper insulation tape shall be applied at the cable and lug joint.

Format for cable testing certificate:

a. Drum no. from which cable is taken :
b. Cable from _____ to _____
c. Length of run of this cable _____ mtr
d. Insulation resistance test
   Between core 1 to earth _____mega-ohm
   Between core 2 to earth _____mega-ohm
   Between core 3 to earth _____mega-ohm
   Between core 1 to core 2 _____mega-ohm
   Between core 2 to core 3 _____mega-ohm
   Between core 1 to core 3 _____mega-ohm
   Duration used:
e. High voltage test: Voltage Duration
   Between core and earth
   Between individual cores

C. MODE OF MEASUREMENT

The cables shall be measured in rmt and terminations on unit basis.

(SCHEDULE D: ITEM NO. 60)

LIGHT FIXTURES, FAN, EXHAUST FAN AND WATER HEATER

Light fixtures as mentioned in the BOQ with the catalogue no and makes shall be installed. The fixtures shall be complete with driver and shall be prewired by the manufacturer. All light fixtures have LM-79 & LM-80 certification.

LED indoor fittings with LEDs of wattage 0.2 Watt to 0.5 Watt assembled on single MCPCB, with housing used as a heat sink shall be made of thick sheet Steel conforming to IS: 513/CRCA/ aluminium pressure die cast powder coated and high U.V. & corrosion resistance with diffuser housed in aluminium casted body with company mark/name 160V to 270V, Power Factor more than 0.9, THD < 15 %, CCT 3000 K to 6500K, Luminaire efficacy> 100 lumens/watt , LED driver efficiency > 85 % (fitting required LM-79 & LM-80 Certificates) (NOTE: Below description have shown ranges of Wattage capacity of LED fittings. The Engineer in charge may select any wattage capacity between the ranges shown.) (A) Square/ Circular shaped Surface/Recessed Mount Down light with provision for spring loaded mounting clips complete. IP20 (iii) 16-20 watts, Surge-2 KV Cat.III

(SCHEDULE D: ITEM NO. 61)

Light fixtures as mentioned in the BOQ with the catalogue no and makes shall be installed. The fixtures shall be complete with driver and shall be prewired by the manufacturer. All light fixtures have LM-79 & LM-80 certification.

LED indoor fittings with LEDs of wattage 0.2 Watt to 0.5 Watt assembled on single MCPCB, with housing used as a heat sink shall be made of thick sheet Steel conforming to IS: 513/CRCA/ aluminium die cast powder coated and high U.V. & corrosion resistance with diffuser with company mark/name 160V to 270V, Power Factor more than 0.9, THD < 15%,

CCT 3000 K to 6500K, Luminaire efficacy> 100 lumens/watt, LED

LED driver efficiency > 85 % (fitting required LM-79 & LM-80 Certificates) (NOTE: Below description have shown ranges of Wattage capacity of LED fittings. The Engineer in charge may select any wattage capacity between the ranges shown.) (A) Tube Light with integral driver (i) 5-10 Watts, Surge-2 KV, IP-20, conventional 1 to 2 feet Cat.III and

(A) Tube Light with integral driver (iii) 18-20 Watts, Surge - 2KV, IP-20, conventional 4 feet Cat.III0

(SCHEDULE D: ITEM NO. 62)

Light fixtures as mentioned in the BOQ with the catalogue no and makes shall be installed. The fixtures shall be complete with driver and shall be prewired by the manufacturer. All light fixtures have LM-79 & LM-80 certification.

Supplying decorative table lamp with LED lamps of suitable nos equivalent of 2 W light with flexible copper wire cord with plug top. Cat.III

(SCHEDULE D: ITEM NO. 63)

Light fixtures as mentioned in the BOQ with the catalogue no and makes shall be installed. The fixtures shall be complete with driver and shall be prewired by the manufacturer. All light fixtures have LM-79 & LM-80 certification.

Led lamps with following wattage capacity of 220 to 240 voltage, minimum 15000 burning hours life, 500 V in built-surge protection, Polycarbonate diffuser, mounting suitable for E14 / E27 / B22 lamp holders, pf >= 0.5 (A) LED Lamps integral type, with PC diffuser suitable LAMP holder (ii) 5 to 8 watts Cat.III

(SCHEDULE D: ITEM NO. 64)

Light fixtures as mentioned in the BOQ with the catalogue no and makes shall be installed. The fixtures shall be complete with driver and shall be prewired by the manufacturer. All light fixtures have LM-79 & LM-80 certification.

LED indoor fittings with LEDs of wattage 0.2 Watt to 0.5 Watt assembled on single conforming to IS: 513/CRCA/aluminium pressure die cast powder coated and high U.V. & corrosion resistance with diffuser housed in aluminium casted body with company mark/name 160V to 270V, Power Factor more than 0.9, THD < 15 %, CCT 3000 K to 6500K, Luminaire efficacy> 100 lumens/watt , LED driver efficiency > 85 % (fitting required LM-79 & LM-80 Certificates)(NOTE: Below description have shown ranges of Wattage capacity of LED fittings. The Engineer in charge may select any wattage capacity between the ranges shown.) (I) Adjustable spot light with COB led having aluminium reflector of following wattage (iv) 30 Watts Cat.III

(SCHEDULE D: ITEM NO. 66)

Low noise decorative exhaust fan having square frame ABS body with inbuilt lowers & square frame. 200mm with 1310-1350 RPM, power consumption – 27W and air quantity -800 CMM – Crompton make cat no. BRISKAIRNEO10WHT or equivalent

Window frame suitable for erection of Exhaust fan complete covering the remaining portion of window with 15 mm. thick plywood and colour washing to match the colour of the wall.

(Schedule D: ITEM NO. 68)

Water Cooler

Specification

Water cooler having storage capacity 150 Ltr. & cooling capacity 150 Ltr. per hour @ an ambient temp of 45˚ C. The outlet temp. of the water should drop by 15˚C within an hour, The water cooler should be comprising of hermetically sealed compressor, fan motor, condensing unit, water tank surrounded by evaporating, coil, thermostats, relay etc. complete with necessary inlet & outlet connection.

The body of water cooler will be made from Stainless Steel.

Mode of measurement:

Contractor shall be paid as per nos basis.

(Schedule D: ITEM NO. 69)

R.O. machine

Specification

Reverse osmosis (RO) 100 LPH capacity water purification system with M.S. powder coated pedestal frame, prefilter housing carbon filter suitable buster DC pump, auto low & high pressure switches with 100 LPH capacity & erected as directed.

It contains Item as per following:

1 phase / 3 phase raw water pump of 500LPH @ 2.5kg/cm2 - (1No),

Dual media filter 10"x54" - (1 No),

Micron cartridge filter 20" x 2.5" (1No),

High pressure pump 500LPH @ 10kg/cm2 - (1No),

RO Membrane housing with RO membrane of 40*40 - (1No),

RO pressure tube 4" x 1E - (1No),

0 - 1200LPH Rotameter - (2 Nos), with Recovery Rate 50%.

Mode of measurement:

Contractor shall be paid as per nos basis.

(SCHEDULE D: ITEM NO. 70)

Storage type water heater with 10 ltr. capacity rust free container housed in ABS plastic body insulated with glass wool / puff insulation and 3 Kw heating elements, adjustable thermostat 300 C to 850 C with set to operate at 850 C (+ /-60 C) auto reset indication lamps, thermal cut-out, safety valve fusible plug etc. Premium Category (Racold, A.O. Smith, Venus)

PUF Insulation: The high density and thick PUF in your water heater ensures retention of internal heat and temperature and resulting in better energy efficiency and reduced electricity bills

Faster Heating: The high power heating element ensures you get hot water in no time

High Pressure Resistance: High pressure withstanding capacity makes it suitable for high rise buildings and high pressure pump applications

Safety Plus: Pronto neo provides three levels of safety against high temperature and pressure, provided by a high tech adjustable thermostat, cutout and multifunction safety valve conforming to international standards

Auto Cut off: Stem-type thermostat and cutout ensures automatic temperature control and extra safety for your water heater

No Back Flow of Water: The anti-syphoning system prevents the back flow of water from the container, thus avoiding dry heating

Warranty details - Capacity: 10 liter; Mount Type: Vertical / Horizontal; Warranty: 2 years on product, 2 years on heating element and 5 years on tank; Power: 3000 Watts

(SCHEDULE D: ITEM NO. 71, 72, and 74)

Light fixtures as mentioned in the BOQ with the catalogue no and makes shall be installed. The fixtures shall be complete with driver and shall be prewired by the manufacturer. All light fixtures have LM-79 & LM-80 certification.

LED street light / Flood light fittings with High power White LEDs wattage of 3 Watt and above assembled on single MCPCB, efficiency more than 130 lm/w and corrosion free High pressure die cast aluminum housing with smooth finish powder coated and heat sink extruded aluminium with diffuser and Polycarbonate optics/ lenses, with toughened glass with company mark/name engraved or embossed 160 to 270 V, Power Factor more than 0.95, THD < 10 %, CCT 3000 K to 5700K,Uniformity ratio >0.45, Luminaire efficacy> 100 lumens/watt . LED driver efficiency > 85 %.(fittings required LM-79 & LM-80 certificates) (NOTE: Below description have shown ranges of Wattage capacity of LED fittings. The Engineer in charge may select any wattage capacity between the ranges shown.)

(A) Street Light (IP-65), Surge protection -4KV integral and, Light must have 440VAC line supply with over-voltage protection. (ii) Above 48 to 60 Watts Cat-lll and

(B) Flood Light (IP-65), Surge protection -4KV integral and, light must have 440VAC line supply with over-voltage protection. (v) Above 120 to 160 watts Cat-lll

B. WORKMANSHIP FOR ALL ABOVE LIGHT FICTURES, FANS AND EXHAUST FAN

The fixture shall be installed on wall / ceiling as directed and as per manufacturer's instruction, with necessary accessories for surface, concealed, suspended from ceiling, bracket mounting etc. The job also includes connection of fixture with respective outlet point with heat resistant wires through heat resistance sleeve and PVC connector. Proper earthing shall be provided to the fixtures.

C. INSTALLATION WITH ACCESSORIES

Installation, testing & commissioning of standard light fittings and lighting accessories including lamp. The scope shall include, providing of all hardware such as nuts, anchor fasteners, bolts, screws, cleats, clamps, PVC insulated wires / cables from Junction box to lighting fixtures, ball and socket 'arrangement with J.B., suspension conduit pipe for drop for fluorescent fitting The cost for supports (wire ropes etc.) shall be included in the cost.

D. MODE OF MEASUREMENT

The unit rate shall be considered for fitting one fixture. The rate shall include following
All fixing accessories, mounting bracket, ballast condensers and control gear wherever applicable.
Supplying and fixing Ball and socket joints wherever required.

Earthing of fittings.

(Schedule D: ITEM NO. 76)

Power Contactor

Specification

4 pole, 440V, 40 Amp. , AC3 duty Power contactor provide for time switch to control timing of external streetlights.

Contactor contains 230V / 415 V relay coil for operation of contactor.

Input of Relay coil provide through time switch, to switching output power of switching as per timer time set up.

MODE OF MEASUREMENT

The unit rate shall be considered for fitting one fixture.

(Schedule D: ITEM NO. 77 & 78)

Pipe Earthing

Contractor shall Supply, installing, testing and commissioning earth electrode complete in all respect with perforated GI pipe medium "B" class (Blue) confirming to IS 1239 part-I length of 150 CM, dia.25 mm with all accessories like nut bolt, reducer nipple, wire meshed funnel and CC finished chamber covered by CI/RCC frame etc. Digging pit and refilling it with suitable charcoal and salt in successive layers and connection with 8 SWG GI wire and testing of earth resistance as required including civil work.

MODE OF MEASUREMENT

The unit rate shall be considered for nos.

(Schedule D – Item No. 79 to 82)

LIGHTNING PROTECTION SYSTEM

SCOPE

This specification covers the requirement of supply, installation, testing and commissioning of lightning protection system.

General

The Advanced Lightning Protection system shall include components as follow: air-

termination(s), mechanical support(s), down-conductor(s), performance recording equipment(s) and a low impedance grounding system. Installation procedures of the entire lightning protection system shall be governed by the IS/IEC 62305, 1S3043 standard. The manufacturer of the air-termination shall provide designs and instructions for the installation as per the former standards. Prior to the installation of the system, a risk assessment survey shall be conducted to determine: the level of protection required for the structure (according to standards) and the adapted solution and design to be chosen. The Advanced lightning protection system shall be mounted adequately rated for wind shear loading. Guying kits shall be provided as appropriate to local environmental conditions, or based on mast arrangement selected

Zone of Protection

The zone of protection of a lightning conductor defines the space within which Air Terminal provides protection against a direct lightning strike with probability of protection as per **LPL.**

LPL (Lightning Protection Level)

LPL is a number associated with a set of lightning current parameters relevant to the probability that the associated minimum & maximum values do not exceed the normally occurring lightning. LPL can be determined by Risk analysis as explained in IEC 62305-2 .

LPL levels and probability of protection:

Lightning protection	Lightning current	Lightning current	interception
Class	peak value MINIMUM	Peak value MAXIMUM	probability
LPL 1	3 kA	200kA	98%
LPL 2	5 kA	150 kA	95%
LPL 3:	10 kA	100 kA	88%
LPL4	16 kA	100 kA	78%

Components of External LPS

1.) Air terminal (as per rolling sphere or mesh or protective angle method or any combination thereof.)

2.) Down conductor

3.) Earthing

Air termination system:

No drilling or welding is allowed in the terrace for fixing the air terminal.

Values of Rolling sphere radius, Mesh size and protection angle as per Class of LPL/LPS.

Class of LPU LPS	Rolling sphere radius(m)	Mesh size (m)	Protection angle
1	20	5*5	Refer figure 1
2	30	10*10	Refer figure 1
3	45	15*15	Refer figure 1
4	60	20*20	Refer figure 1

If the structure height is more than 60 meters, top 20% of the height of the structure shall be protected with a lateral air termination system. This is needed because, the probability of flashes to the side is generally more for structures more than 60 meters in height. For structures of height more than 120 meters, ring has to be formed for every 20 meters height of the building above 60 meters height.

Material and Dimensions

Material of air terminal, down conductor, earth termination etc. shall be as below:

Material	May be destroyed by galvanic coupling with
Copper(Solid)	GI and Aluminium
Hot galvanized steel(Solid)	Copper
Stainless steel(Solid)	
Aluminium(Solid)	Copper

Dissimilar metals (For eg copper with Aluminium) must be connected only by using bimetal Connectors.

Min Thickness of metal in air termination system for LPL/ LPS -3

Material	Thickness (a) in mm	Thickness (b) in mm
Galvanized steel	4	0.5
Stainless steel	4	0.5
Copper	5	0.5
Aluminium	7	0.65

(a) Prevents puncture, hot spot or ignition

(b) Allowed only if **it is not important to prevent** puncture, hotspot or ignition

Material configuration and Min cross sectional area of air terminal and down conductors

Material	**Type**	**Min cross section area**	**Remarks**
Copper	Solid tape	50 sq mm	2mm min thickness
Copper	Solid round	50 sq mm	8mm dia
Aluminum	Solid tape	70 sq mm	3 mm min thickness
Aluminium	Solid round	50sq mm	8 mm dia
GI	Solid tape	50 sq mm	2.5 mm min thickness
Stainless steel	Solid tape	50 sq mm	2 mm min thickness

Air terminal holder

Conductors shall be securely fixed on the terrace by means of air terminal holder which is fixed on the roof by adhesive of good quality taking care of varying weather conditions. Air conductor holder is an insulator & should be of minimum 50 mm height so that even small amount of water logging on terrace is below the level of conductor holder. Air terminal holder shall not be more than 0.5 m apart for a flat conductor & 1m for round conductor of

At least 8mm diameter & 1.0 meter apart for vertical run.

Recommended distance between air terminal holders.

Arrangement	**Recommended distance for SOLID TAPE**	**Recommended distance for ROUND conductors**
Horizontal conductor on horizontal surface.	500mm	1000 mm
Horizontal conductor on vertical surface	500mm	1000 mm
Vertical conductor from Ground to 20m height	1000 mm	1000 mm
Vertical conductor above 20m height	500mm	1000 mm

If antenna, air cooler or any other electrical equipment is present above terrace level, the same have to be protected by using vertical air terminal after calculating the safety or separation distance. The vertical air terminal has to have suitable supports to hold it. Vertical air terminal must be connected to horizontal air terminal by using suitable connectors.

At the crossings of the horizontal air terminals, suitable T or Cross connector has to be used for secure connection.

Safety or Separation distance.

It is must to calculate safety or separation distance in order to avoid flash over to the electrical equipment when the lightning current is passing through the vertical air terminal.

Safety/Separation distance(S) in m = (ki • **kc*L) / km**

Coefficient ki depends on class of LPL/LPS. Ki = 0.08 for LPL1,

ki = 0.06 for LPL 2,

ki = 0.04 for LPL3 and 4.

Coefficient kc depends on no of down conductors:

kc= 0.66 for 2 down conductors

kc = 0.44 for 3 or more down conductors

Value of coefficient km = 1

Value of L is the total distance between the equipment to be protected (for e.g. Antenna) to the equi-potential bonding bar situated just above the ground.

Need for Expansion piece

In order to take care the expansion of the metal in summer and contraction of the metal in winter, expansion piece with suitable connectors have to be used at every 20m distance of horizontal air terminal.

Joints and Bonds

The lightning protective system shall have as few joints. As far as possible, air terminal & down conductor have to be straight. Where it is not possible, it should NOT be bent at 90 degree (right angles) & should have a curved path of 45 degree.

Down conductor system

In order to reduce the probability of damage to electronic/electrical equipment, the down conductors shall be arranged in such a way that from the point of strike to earth, several parallel current paths should exist & length of the current path should be minimum .Down conductors can be installed separately or more wisely it can be part of natural components of the building Examples are steel reinforcement in RCC columns, metal facades, profile rails, metal doors & windows. Down conductors should be installed at each exposed corner of the structure.

Value of distance between down conductors as per Class of LPL/ LPS.

Class of LPL/LPS	Typical distance (m)
1	10
2	10
3	15
4	20

Test joints:

At the connection of the earth terminal, a test joint should be fitted on each down conductor, except in the case of natural down conductors combined with foundation earth electrode. The purpose of test joint is to measure the earth resistance value.

2) Earth Terminations

Earth mat is most preferable. Where earth mat is not possible, ring earthing is the next best method. Ring earthing must be 1 meter away from the building and 0.5m below the ground level. The resistance of earthling System shall not exceed 10 ohm as per IEC 62305. Lower earth resistance is still better.

For earth termination system, 2 basic types of earth electrode arrangements are applicable. Type A & Type B arrangement.

Type A arrangement: comprises of horizontal or vertical earth electrode installed outside the structure to be protected connected to each down conductor. In type A arrangement, the total number of earth electrodes shall not be less than two.

Type A arrangement is suitable in places where electronic equipments are not located.

Type B arrangement: This type of arrangement comprises either a ring conductor external to the structure to be protected, in contact with the soil for at least 80% of its total length or a foundation earth electrode. Such earth electrodes can also be meshed. For structures with extensive electronic systems or with high risk of fire, type B earthing is most preferable method. Corrosion proofing band has to be used wherever down conductor is connected to earth termination system. Bitumen has to be applied at the point of inter-connection.

In potentially corrosive areas, Stainless steel must always be used.

Performance recording equipment

Each protection system shall be supplied with a lightning strike recorder. The lightning flash

counter shall register a strike for every discharge where the peak current exceeds 1500A The lightning flash counter shall have been tested and certified in a high-voltage laboratory with a 8/20μs or 10/350 μs waveform. The lightning flash counter shall be installed directly on the down-conductor and as per the manufacturer instructions

References:

IEC62305- PROTECTION AGAINST LIGHTNING:

Part 1: General Principles

Part 2: Risk Management

Part 3: Protection of structures

Part 4: Protection of Electrical & Electronic equipments within structure IS3043: 1987: Code of practice for earthing.

(Schedule D: ITEM NO. 83 & 85)

Solar Water Heater

Specification

Supplying, installing, testing & commissioning of SOLAR WATER heating system as per prevailing IS code comprising of Solar flat locket collector, stainless steel hot water Storage Isolated tank with S.S. heat exchanger, absorber made of copper sheet & copper tube of capacity 1000 litre / day (LPD) with "B" size aluminium box collector with appropriate capacity electrical backup arrangement Hot water pipe insulated with Resin bonded flap rock wool / glass wool with conductivity valve 1.67 sq.mm per watt & to with stand the temp. To 100 degree centigrade C thickness 50mm with G I pipe of 20 mm / 40 mm size dia "B" class as per IS: 1239. The plastic sheet to Be used as covering of glass wool. Al. cladding besides other materials like chicken mesh, 26 G Al. Sheet shall be used for cladding the insulation pipe.

Composite pipe 16mm / 20 mm manufactured from polythene material with destructed thermal expansion of 25 10-6 / degree kelvin (low expansion Co-efficient), resistant to freezing thermal conductivity 0.43 watt / (m degree kelvin) UV resistant suitable for continuous operating temperature of 95 degree centigrade & rated pressure of 6.9 kg / sq. cms at 850 degree centigrade. The kitec pipe shall have chemical composition prepared as per ASTMF 1282-02 specifications (Pressure rating of 13.8 kg per sq. cms. & 11 KG per sq. cms at 60 degree) The pipe shall be duly jointed by comprising crimp fitted with internal as well as external end sealing arrangement.

MEASUREMENT:

Solar water Heater system of 1000 LPD shall be counted in number.

Water pipe and Composite pipe for solar water heater shall be counted in running meter.

RATE:

Cost of all material, labour and machinery used in execution of work per unit of 1000 LPD solar water heater of shall be in the cost of item. Cost of Pipe shall be paid separately as per running meter cost.

(Schedule D: ITEM NO. 84)

Specification

Resin bonded flap rock wool / glass wool

Resin bonded flap rock wool / glass wool with conductivity valve 1.67 sq.mm per watt & to with stand the temp. to 100 degree centigrade C thickness 50mm with G I pipe of following size dia "B" class as per IS:1239.

The plastic sheet to be used as covering of glass wool.

Al. cladding besides other materials like chicken mesh, 26 G Al. Sheet shall be used for cladding the insulation pipe.

MEASUREMENT:

Resin bonded flap rock wool / glass wool on Water pipe and Composite pipe for solar water heater shall be counted in running meter.

DETAILED SPECIFICATIONS AND SPECIAL CONDITIONS FOR SCHEDULE "E"

Note :- Guarantee/Warranty certificate if applicable shall be handover to DFCCIL after completion and testing of work/item.

HVAC Specification: - (Schedule – E: Item No. 1 to 8)

SCOPE OF WORK:

The scope of work involves the Design, Engineering, Assembly along with Electrics andInstrumentation,Inspection&Testingatshop/factory,SupplyandDeliveryatsite, Storage at Site, Transportation to the place of installation, Erection, Testing and Commissioning of VRF/VRV energy efficient multi split type A/C Units consisting of Ductable type (Corded remote operated) & Cassette type/Hi wall type Indoor units (Cordless remote operated) controlled individually, along with multi compressor modular outdoor units (working on R410A refrigerant) of matching capacity, interconnecting insulated Refrigerant lines, condensate Drain Piping, wall mounted central Control Panel & DisplayunitallforminganintegratedAirconditioningsystem–indicatedschematically in the enclosed drawing and as per the specifications indicated herein.

Compressors installed in each modular outdoor unit shall be equipped with inverter compressors for higher reliability, improved life, better backup and duty cycling purpose. The system shall be capable of changing the rotating speed of inverter compressor by inverter controller to follow variations in cooling load. All the outdoor units shall be comprising of at least one compressor with inverter technology compressor (All compressors shall be with high efficiency Twin rotary / Scroll compressor with highly advanced oil balancing technology and acoustic covering) Outdoor unit shall be suitable for mix match connection of all indoor units.

The tenderer may select the capacities of the units suitable for the ambient conditions of project location.Thecapacityratiochartperformancewithpowerconsumptioncurveat different loading stage must be submitted by successful tenderer.

There frigerant piping between door units and outdoor unit shall be possible to extend up to 100 m with maximum 20 m level difference without any oil traps. Both indoor units and outdoor unit shall be factory assembled, tested and filled with first charge of refrigerant / nitrogen before delivering at site.

The power supply cable shall be provided at main power panel by department for outdoor units, further all panels & cabling work from main power panel to sub-power panel & from DB to each outdoor unit will be included in the scope of contractor. Similarly, each floor, further cabling work from DB to each indoor unit will be included

in the scope of contractor. Tenderer shall provide all the necessary power requirement details. Laying of control / communication wiring & connecting IDUs &ODUs is in the scope of the tenderer. The scope of the tenderer shall also include PVC drain pipe for condenser water outlet with 13 mm thick Nitrile rubber insulation & clamping as per approved shop drawings. Lifting, shifting, positioning, installation and commissioning of VRF Out Door Units, pressure testing and commissioning with topping up of R410a or equivalent eco- friendly refrigerant gas and Outdoor units supporting arrangement with foundation block, supporting MS platform duly painted with two coats of Black paint is in the scope of tendered.

Safety Codes

The following IS codes shall be followed.

1. Safety code for mechanical refrigeration IS660
2. Safety code for air-conditioning IS659
3. Safety code for scaffolds and ladders IS3696
4. Code of practice for fire precaution in welding & cutting operations IS3016
5. Code for safety procedures & practices in electrical works IS5216

Design, installation, Testing, Commissioning and balancing of the system shall be carried out broadly as per following codes not limited to

INTERNATIONAL/NATIONAL CODES AND STANDARDS APPLICABLE

i. AIRCONDITIONING

1. SME/ANSIB-31.5/1987 : Refrigeration piping

ANSI/ASHRAE/111-1988 : Practices for measurement, testing and balancing of building, heating, ventilation, air- conditioning and refrigeration system.

SMACNA : HVAC System Testing, adjusting and balancing (latest revisions)

ASHRAE100-1989 : Guideline 1-1989Commissioning of HVAC systems.

ii. ELECTRICALS

5. IS 694 -1977 Part I &Part-II : PVC Insulated cables for voltage up to1100V with copper and aluminum conductors respectively
6. IS3043-1966 : Code of practice for earthing

iii. SHEET METALWORK

7. IS 277–1992 : Galvanized Steel sheet (5th rev., Amendment2)
8. IS 655–1991 : Metal air ducts (revised) (Amendment – 3)
9. IS 1977–1992 : Structural steel (ordinary quality)

Note: In case of a conflict in national and international codes, the stringent of the two shall apply. Codes appearing under Volume 2 shall also be covered by Contractor.

Basis of Design

Following are the HVAC Design Basis Parameters for the project

Unit	
Client	
Location	
Application	- Comfort Areas - NMT 55% Rh Areas - Low Rh Areas
Area & Construction	As per Arch / Structural details available
Summer DBT	44.0 deg C / WBT: 25.6 deg C
Monsoon DBT	32.2 deg C / WBT: 28.3 deg C
Indoor Design Conditions	Refer Design Schedule 1
Lighting	1 W/sq.-ft

Quality Assurance

The units shall be rated in accordance with Air-conditioning, Heating, and Refrigeration Institute's (AHRI) Standard 210 and breathe AHRI Certification label; alternative recognition of equally reputable institute shall be acceptable. The units shall be manufactured in a facility registered to ISO9001 and ISO14001, which is a set of standards applying to environmental protection set by the International Standard Organization (ISO). A dry air holding charge shall be providing the indoor section System efficiency shall meet or exceed SEER as prescribed in ECBC Norms Refrigerant shall be R410A/R407 DP GREEN refrigerant

INDOOR UNITS

The indoor unit shall be factory assembled, wired and tested. Contained within the unit shall be all factory wiring and internal piping, control circuit board and fan motor. The unit in conjunction with remote or wired wall mounted controller - shall have a

self-diagnostic function, 3-minute time delay mechanism, an auto restart function, and a test run switch. Indoor unit and refrigerant pipes shall be purged with dry nitrogen before shipment from the factory. The indoor unit sound pressure levels hall not exceed 38dB (A) in high fans peed.

These units shall be comprising of DX coil with finned copper tubes (Evaporator), Low noise design Centrifugal Fan unit with motor & belt drive package; fan unit shall have proper insulated and leak proof condensate base connected to drain piping with suitable trap and laid up to nearest drain point designed to ensure zero leakage; the fan assembly shall be dynamically balanced for low vibration and low noise type design.

Each indoor unit shall have computerized PID control for maintaining design room temperature. Each unit shall be provided with microprocessor thermostat for cooling, wired LCD type remote controller. The remote controller shall memorize the latest malfunction code for easy maintenance. The controller shall have self- diagnostic features for easy and quick maintenance and service. The controller shall be able to change fan speed and angle of swing flap individually as per requirement.

Wall mounted type unit

The unit shall be wall mounted type. The unit shall include pre-filter, fan section & DX coil section. The housing of the unit shall be powder coated. The body shall be light in weight & shall be able to mount on wall.

Ceiling mounted Cassette type unit (Multi flow type)

The unit shall be ceiling mounted type. The unit shall include pre-filter, fan section & DX coil section. The housing of the unit shall be powder coated galvanized steel. The body shall be light in weight & shall be able to suspend from four corners. Unit shall have an external attractive panel for supply and return air. Unit shall have four-way supply air grilles on sides & return grille in center. Each unit shall have high lift drain pump, fresh air intake provision (if specified) low gas detection system and very low operating sound. All the indoor units regardless of their difference in capacity should have same decorative panel size for harmonious aesthetic point of view. It should have provision of connecting branch ducts.

Hide away type Ductable Units

Indoor units as Hide Away type design having galvanized steel casing. The unit shall be with flexible canvass connection at outlet, outlet opposed blade discharge damper, insulated drain pan and insulated with sound absorbing thermal insulation material, Polystyrene / Polyethylene foam. The unit shall be supplied with drain hose, clamp metal, washer fixing plate, sealing pads, screws, clamps, washer for hanging bracket & insulation for fitting. The indoor unit cabinet shall be equipped with a ducted air outlet and ducted return air connection.

Generic Specifications for the Indoor Units common to above shall be as under

- **EVAPORATOR**

  The Indoor unit is of sectionalized construction of corrosion resistant heavy gauge steel, finished with enamel paint and consisting of fan section, coil and filter section, and insulated drain pan.

  The unit shall be internally lined with fiberglass of adequate thickness for thermal insulation and acoustic lining. If the insulation is in damaged condition during transit or otherwise, vendor to repair with either PU foam / Phenolic foam with suitable finish.

- **COOLING COILS**

  DX Cooling coils shall be of fin and tube type having aluminum fins firmly bonded to copper tubes assembled in G.I. Frame. Face surface area of cooling coils should be adequate for the air quantity handled and air velocity across the coil shall not exceed as recommended for the application. Aluminum fins shall be corrugated and collared with mechanical bonding. The coil shall be three rows (or as required) deep and fin spacing is 5 fins/cm. Coil face velocity shall not exceed 450 FPM.

  All tube joints shall be brazed with Phos Copper or silver alloy. The coils shall be pressure tested at the factory. A condensate pan preferably with two (2) drains shall be provided under the coil. In addition to the two (2) gravity drains, the indoor unit shall be provided with an integral condensate lift mechanism able to raise drain water 21 inches above the condensate pan. In DC inverter systems, Lift mechanism shall incorporate a safety sensor system to shut down the indoor fan and the compressor in the outdoor unit in the event of high level of condensate in the drain pan.

- **EVAPORATOR FAN**

  Fan impellers and housing shall be fabricated with heavy gauge steel. Fan impeller shall be forward curved, multi blade type enclosed in housing and mounted on a common shaft. All rotating parts shall be statically & dynamically balanced to run on a motor with permanently lubricated bearings. Vendor to check the condition of Fan at site accordingly prior to stat up and commissioning. The indoor fans shall operate on any of three (3) speeds, High, Mid, and Low.

- **EVAPORATOR MOTOR**

  Fan motor shall be squirrel cage totally enclosed fan cooled type of adequate capacity suitable to operate on three phases, 400/440 volts, 50 cycles AC supply. Fan motor shall be mounted on an adjustable vibration-isolating base located on the casing of the unit. Fan shall be driven directly or through standard v - belts with belt guard. The belt drive package shall be adequately designed to meet the desired design CFM.

- **FILTER**

  Each filter shall be HDP washable or metallic type with adequate thickness. Filter holding frame shall be designed such that leakage of air can be avoided. Velocity across filter shall not exceed 350 FPM

- **COPPER REFPIPING**

  The copper piping shall comply to ASTMB-280 supplied in straight lengths(3/8") to (41/8") OD; and supplied as annealed coils (1/8") to (15/8") OD; Mfr name shall be incised at regular intervals length not exceeding 1 ½'; the coil shall be tubed/capped prior to shipping. Coils shall be supplied along with Test Certificates. Ref Joints Quantities in the BOQ are indicative only; VRF supplier shall provide required joints for safe and smooth operation of the system. Piping shall be supported on the wall with workman like supports including but not

  Limited to anchor fasteners used to fix SS clamps on the wall duly isolated with neoprene / adequate piping insulation layer from the clamps. Span of each clamp when in horizontal orientation shall not exceed 1.5 meter or those minimum required to avoid any overhang or as specified by the OEM Equipment supplier. In no case wooden material shall be used for any supporting at any place. Pipes passing through walls requiring wall core cutting shall be carried out by Contractor with his own tools and tackles and further sealed with HILTI approved model no. sealant from all sides; civil contractor shall not participate in this activity whatsoever.

  Ref Piping insulation shall be OEM supplied specified / as per BOQ and covered with UV layer on all exposed to sun insulation materials.

  Drain Piping

  Condensate from the evaporative unit shall be drained through properly installed drain piping designed to prevent any accumulation of condensate in the drain pan. Drain piping shall be made of ¾" or 1" or 1.1/4" or 2" dia. rigid PVC pipe of 6 Kg / Sq. Cm. pressure rating with water tight threaded connections, leading from the room unit to a suitable drain point. Complete drain piping shall be made leak proof sealant / adhesives. Insulation of drain piping by Nitrile Rubber pipe.

  OUTDOOR UNITS

  The system selected is a modular system, with number of indoors connected to centrally located outdoor units, as per detail designing given in the tender. The outdoor units for all the system shall be air-cooled type and mounted on terrace of the building. Indoor units in various areas shall be as per enclosed drawings / Bill of Quantities.

  The Variable Refrigerant technology can either be Variable Compressor Speed with Inverter compressor type. In Variable Speed type design, adequate measures for oil return at low speeds shall be documented in the bid.

  All the Variable Refrigerant air conditioners shall be fully factory assembled, wired, internally piped & tested. The outdoor unit shall be pre charged with first charge of R

410A refrigerant. Additional charge shall be added as per refrigerant piping at site. All the units shall be suitable for operation with 415V+/-10%, 50Hz+/-3%, 3Phase supply for outdoor units&230V+/- 10 %, 50 Hz +/- 3 %, 1 Phase supply for indoor units.

The Variable Refrigerant system shall provide stable, trouble free & safe operation, with flexibility of operating desired AHU / indoor units. The outdoor units must be capable of delivering exact capacity proportional to the number of indoor units switched on & the heat load in the air-conditioned area. The proportional operation shall be achieved by varying speed of the compressor in the outdoor units/change in compressor configuration or capacity as per load. All units should be suitable to maintain COP of 3.6

“Anti-Corrosive” treatment (Blue Fins) for Al fins of Condenser Coils is mandatory. The treatment should be suitable for areas of high pollution and salt laden air. The outdoor fan can rotate in reverse direction to remove dust on heat exchanger to ensure the heat exchange as performance

Bidder has to furnish the rated /derated capacity of the Indoor units, considering the refrigerant piping of respective outdoor units.

Back up operation, in case of failure of one of the compressors of outdoor unit, for single module out door units or failure of one of them odu lesin case of multiple module out door units shall be possible. The Variable Refrigerant outdoor unit shall always be supplying at least 33% of back up operation, of the full load capacity. The outdoor units shall be suitable to operate temperature range of -15 °C to + 52 °C. The entire operation of outdoor units shall be through independent remotes of indoor units. No separate Start / Stop function shall be required. Starter for the Outdoor Unit compressor shall “Direct on Line” type. Inverter compressor / or equivalent system of the unit shall start first & at the minimum frequency / capacity, to reduce the inrush current during starting. Refrigerant control in the outdoor unit shall be through Electronic Expansion Valve. Complete refrigerant circuit, oil balancing /equalizing circuit shall be factory assembled & tested. Noise level of outdoor units shall not exceed 70 dB (A) at a distance of 1.0 m from the unit. Refrigerant piping design shall be strictly as recommended by OEM / Principal manufacturer for respective makes. Short-listed bidder shall provide refrigerant piping design with calculations to ensure that the recommended practices are not violated.

Outdoor units shall be complete with following safety devices:

- High pressure switch
- Fan driver overload protector
- Over current relay
- Inverter Overload Protector / Digital Protector
- Fusible Plug

Unit shall be supplied with

- Installation manual

- Operation Manual
- Connection Pipes
- Clamps

Units will use R – 410/ R-407 as Refrigerant / Equivalent Green Refrigerant gas.

CONTROLS SYSTEM FOR VARIABLE REFRIGERANT SYSTEM

WIRELESS REMOTE CONTROLLER

Wireless remote controller shall be supplied as specified in the "Bill of Quantities". The same operation modes & settings as with wired remote controllers must be possible. Compact light receiving unit to be mounted into wall or ceiling shall be included.

CENTRALIZED TYPE REMOTECONTROLLER

1 A multifunctional compact centralized controller shall be provided with the system. It shall be able to control up to 64 groups of indoor units with the following functions –
2 Starting/stopping of air–conditioners as a zone or group or individual unit, Temperature Setting for each unit or zone.
3 Switching between temperature control mode, switching of fan speed & direction of air flow, enabling / disabling of individual remote controller operation
4 Monitoring of operation status such as operation mode & temperature setting of individual indoor units, maintenance information, and troubleshooting information
5 Display of air conditioner operation history, Daily management automation through yearly schedule function with possibility of various schedules
6 System should be capable of providing power consumption by each indoor unit in KWH along use time & use ratio
7 The output available should be in Microsoft Excel format, Data storage capacity of power distribution shall be at least 75 Days.

NOTE:
Bidders are requested to submit power consumption details separately for Indoor & outdoor units. Power distribution and central controller operational logic is required in soft copies

HANDING OVER OF VARIABLE REFRIGERANTSYSTEM

Following reading / data shall be generated as a part of handing over of the Central Variable Refrigerant air conditioning system, apart from the handing over data for air side & indoor design conditions.

Outdoor Units

1. Suction pipe temperature
2. Oil pressure
3. Condensing Pressure
4. Inlet Temperature

5. Discharge Pipe Temperature
6. Evaporating Pressure
7. Power supply voltage
8. Inverter compressor frequency
9. Inverter current
10. Fan operating current
11. Total ODU current

INDOOR UNITS

1. Indoor unit operation – On / off from remote
2. Indoor unit operation – On / off from thermostat
3. Remote control presser temperature
4. Suction temperature
5. Indoor liquid pipe temperature
6. Indoor gas pipe temperature
7. Electronic expansion valve opening
8. Fan operating current

Class O Glass cloth tubing – Ref. Piping Insulation:

Insulation material shall be Closed Cell Elastomeric Nitrile Rubber with treated woven glass cloth laminated on one side. Thermal conductivity of insulation material shall not exceed 0.035 W/ (m.K) at mean temperature of 0□C as per EN ISO 8497.Moisture Diffusion Resistance Factor or 'μ' value of insulation material shall be minimum 7,000 without any external barrier as per EN 13469.

The insulation material shall have fire performance such that it passes Class 1 as per BS476 Part 7 for surface spread of flame and also passes Fire Propagation requirement as per BS476 Part 6 to meet the Class 'O' Fire category as per 1991 Building Regulations (England & Wales) and the Building Standards (Scotland) Regulations 1990.

The insulation material shall have fire performance of V0, HB as per UL 94, 1996. The insulation material shall be FM (Factory Mutual), USA Approved. Density of insulation material shall be between 40 to 55Kg/m3. The insulation material shall be dust and fiber free. The insulation material shall withstand maximum surface temperature of +105Deg.C and minimum surface temperature of 0Deg.C as per EN 14707.

Glass Cloth Treatment: Shall be treated water based acrylic binder to give crisp and non-piling property to the fabric, to help in easy installation, minimize fiber erosion, good aesthetics and resistance to abrasion. Fiber spillage / Thread raveling shall be minimum.

Glass Cloth: Weight shall be 205 +/- 10 grams per square meter, Tensile Strength shall be 275 +/- 25 Kg / 50 mm (minimum) and Thickness shall be 0.18 mm / 7 mil. Glass Cloth shall be UV resistant for artificial weathering as per EN ISO 4892-2 Method– A. The material shall have ODP (Ozone Depletion Potential) and GWP (Global Warming Potential) of Zero

Thickness of the insulation shall be as specified for the individual application.

The insulation material shall be installed as per manufacturer's recommendation.
The insulation material - tubes with pre-covered GC shall be fully factory (machine) slit along each length with two strips of double-sided self-adhesive tape pre-applied to each open slit surface. The self-tape adhesive shall be solvent free acrylic with high initial tack and high peel strength. (Pre-Slit GC tubing with self-adhesive tape are available for pipe sizes >=15 NB DIA Pipes) Below 15NB Día pipes, Factory laminated GC tubing's are required to be without Pre- slit & self-adhesive tape.

Recommended Summary of Pipe Thermal Insulation Thickness Chart & Application:

Inner Pipe dia. (NB)	**Required Thickness**	**1st Layer thick (mm)**	**Insulation Material**
06	19	19	Closed cell Class O Nitrile rubber with factory laminated GC tubing (without Pre-slit & self-adhesive tape) **Color Code:** For Supply Line: Blue colored GC Tubing For Return Line: Red colored GC Tubing
10	19	19	Closed cell Class O Nitrile rubber with factory laminated GC tubing (without Pre-slit & self-adhesive tape) **Color Code:** For Supply Line: Blue colored GC Tubing For Return Line: Red colored GC Tubing
15	25	25	Closed cell Class O Nitrile rubber with factory laminated pre-covered GC tubing with pre-slit and self-adhesive tape **Color Code:** For Supply Line: Blue colored GC

			Tubing For Return Line: Red colored GC Tubing
20	25	25	Closed cell Class O Nitrile rubber with factory laminated pre-covered GC tubing with pre-slit and self-adhesive tape **Color Code:** For Supply Line: Blue colored GC Tubing For Return Line: Red colored GC Tubing
25	25	25	Closed cell Class O Nitrile rubber with factory laminated pre-covered GC tubing with pre-slit and self-adhesive tape **Color Code:** For Supply Line: Blue colored GC Tubing For Return Line: Red colored GC Tubing
32	25	25	Closed cell Class O Nitrile rubber with factory laminated pre-covered GC tubing with pre-slit and self-adhesive tape **Color Code:** For Supply Line: Blue colored GC Tubing For Return Line: Red colored GC Tubing

40	25	25	Closed cell Class O Nitrile rubber with factory laminated pre-covered GC tubing with pre-slit and self-adhesive tape **Color Code:** For Supply Line: Blue colored GC Tubing For Return Line: Red colored GC Tubing

INSPECTION AND TESTING

Inspection (pre-dispatch & site), testing &acceptance

Pre-dispatch inspection shall be carried out for certain items. All the system equipment's, parts shall be checked for physical damage, before commencing the installation work. Complete fabrication, installation and commissioning work shall be jointly supervised and shall be carriedoutasperthespecificationsandinstructionsofsiteEngineerIn-charge. All the rotating equipment shall be checked for static and dynamic balancing, minimum operating vibration and noise.

All the system / equipment's shall be checked before / after satisfactory commissioning, at manufacturer's works / site as may be required for the approved technical specifications, performance data provided by supplier / manufacturer. Actual capacity of each equipment shall be calculated based on the test readings, recorded jointly for design conditions / operating conditions. Performance acceptance is subject to comparison of test results with supplier / manufacturer's performance data and contract specification. Acceptance is subject to satisfactory installation, commissioning and performance testing with respect to technical specifications. Rejected items must be replaced or rectified for the defects. In case of system modification / rectification complete performance tests are to be repeated. Site test readings shall be jointly recorded.

Methodology

In general, following Inspection / tests are involved. Type of test, duration of test, testing procedure / parameters, will be as per the applicable BIS codes. However, the detail Inspection and test procedure shall be worked out jointly by the purchaser and the contractor along with the approval of drawings, within 30 days from the date of contact agreement.

a) Pre-dispatch Inspection (as per client/consultant's format)

b) Pre-dispatch testing at manufacturers shop / factory. (Material, performance, pressure, joints, etc.)

c) Physical Inspection – Pre-installation at site.

d) Brazing / welding joint inspection and testing at site.

e) Pressure and / or leak testing at site.

f) Performance testing at site (capacity, power consumption, pressure drop, vibration, etc.)

g) Calibration at site if required

SR. NO.	ITEM / EQUIPMENT	INSPECTION / TEST INVOLVED.
1.	AC Units	a, b, c, e, f.
2.	Refrigerant Piping	c, d, e
3.	Inline / Propeller Fans	a, b, c, e, f
4.	Ducting	c, e
5.	Insulation	C
6.	Diffusers / Dampers and Grilles	C

Test certificates and documents

Contractor shall furnish following Test certificates for Approval / Information of Client / Consultant Material Test Certificates for items 1, 2,3,4,5 under table mentioned above. Welder's / Brazer's qualification certificate. Performance test certificates and Calibration Certificates - carried out by manufacturer before Pre- dispatch inspection & testing. All equipment operation and maintenance manual.

TESTING THE EQUIPMENTS ATSITE

The following aspects shall be considered for performance testing.

- Prevailing conditions shall be as close as to design conditions at the time of performance testing procedure.
- Type, quantity, location, frequency, duration of test parameters shall be decided and recorded accordingly during the test.
- Rated capacity, power consumption and other operating parameters shall be checked.
- Functional test for all Instruments, controls (safety and capacity) shall be carried out to check for the expected operation / action / accuracy / response time / repeatability parameters.

Control & Instruments:

All Instruments shall be factory calibrated and provided with necessary instructions for site calibration and testing. Various items of the same type shall be completely interchangeable and the manufacturer shall guarantee their accuracy. All automatic

controls and instruments used in the DX unit (Thermostat / Pressure Cut-outs) shall be tested at site for accuracy and reliability before commissioning the installation.

Piping:

- Refrigerant Piping Test Procedure shall be submitted for approval by the short-listed bidder for approval of Client /Consultant
- All piping shall be tested to hydrostatic test pressure of at least one and half times the Maximum operating pressure, but not less than 10 kg/cm2 gauge for a period of not less than 24 hours. All leaks and defects in joints revealed during the testing shall be rectified and gotten approved at site.
- Piping repaired subsequent to the above pressure test shall be re-tested in the same manner.
- System may be tested in sections and such sections shall be securely capped, then re-tested for entire system if called for.
- The Contractor shall give sufficient notice to all other agencies at site of his intentiontotestasectionorsectionsofpipingandalltestingshallbewitnessed and recorded by Owner's site representative.
- The Contractor shall make sure that proper noiseless circulation of fluid is achieved through all coils and other heat exchange equipment in the system concerned. If proper circulation is not achieved due to air bound connection, the Contractor shall rectify the defective connections. He shall bear all expenses for carrying out the above rectifications including the tearing up and re- finishing of floors and walls as required.
- The Contractor shall provide all materials, tools, equipment, instruments, and services and labour required to perform the test and to remove water resulting from cleaning and after testing.

Inspection Check List

SR. INSPECTION ITEM NO.	SYSTEM COMPONENTS	
	DUCTABLE / HI WALL / HIDE AWAY UNITS	AIR DISTRIBUTION
1.Physical	- Body	- Sheet metal Work / Ducting

2. Fabrication, Installation &commissioning Vibration and noise. Insulation and painting.	- Compressor - Condenser - Cooling Coil - Fan-Blower - TSE valve. -Refrigerant piping - Accessories	- Dampers - Diffusers / Registers / Grilles --- - Supports etc.

Testing:

All the system / equipment's shall be checked after satisfactory commissioning, for the tender specifications, performance/technical data provided by supplier/ manufacturer. Actual capacity all equipment's shall be calculated based on the test readings, recorded jointly, for design conditions / operating conditions. Performance acceptance is subject to comparison of test results with supplier/ manufacturer's performance data and contract specification. In case of system modification / rectification complete performance tests are to be repeated. Following test readings shall be jointly recorded.

(A) Test Reading sheet:

Ductable / Hi Wall Split / Hide Away / Cassette type Air conditioning Units.

Unit:

- Main volts / Amps.

Compressor:

- Refrigerant suction pressure (LP, Bar) / Temp. Degree C.
- Refrigerant Discharge pressure (HP, Bar) / Temp. Degree C
- Discharge cutout pressure (Bar)
- Discharge cut in pressure (Bar)
- Suction cutout pressure (Bar)
- Suction cut in pressure (Bar)
- Compressor motor Amp.

Cooling Coil:

- Surface (Face) area - Sq. Mt.
- Return (entering coil) air Temp. DBT / WBT Degree C
- Supply (leaving coil) air Temp. DBT / WBT Degree C
- Air velocity across the cooling coil – Mt. / Min.
- Air volume -CMH capacity

DETAILED SPECIFICATIONS AND SPECIAL CONDITIONS FOR SCHEDULE "F"

Note :- Guarantee/Warranty certificate if applicable shall be handover to DFCCIL after completion and testing of work/item.

(Item no. 1)

LIFT WORK

(a) General Features & Special Features of the all lift items shall be taken as below: (b) for Handicap Lifts, Minimum 10 Passengers Lift Capacity shall be considered. Same is to be informed to architect /civil authority to keep necessary size of lift well. (A) GENERAL DESCRIPTION OF LIFTS.

[1] GEAR LESS LIFT DRIVE comprising of High Starting torque Lift 3 phase 440 V A. C. Permanent Magnet Synchronous motor of proper rating with high efficiency shall be used.

[2] Microprocessor based / PLC, ACVVVF, vector control drive with encoder feedback closed loop system shall be used for lift car and door operation which shall be full collective selective operation hall call demand response, UP/DOWN hall stops, Main, Up/ Down Contactor with overload and phase reversal relay and safety controls.

[3] Car with M S platform with bracings of adequate size and to sustain the impact load cabin + passenger with safety factor of fire for steel and side panels of Stainless steel of sheet of grade 304 duty. Car ceiling will be S.S. finishes with aesthetic appearance with LED ceiling lights. Car flooring shall be of anti-skid PVC with choice of colour of engineer in charge. Car doors shall be of stainless steel grade 304, hairline finish with center opening / telescopic automatic doors. Car panel will also be S.S. 304 finished with emergency stop device, mechanical door safety device, facility of auto/ attended mode. All car panel buttons and all floor switches must be with brail language as per lift act.

[4] All landing doors must be fire rated for 2 hour shall be fully automatic center opening/telescopic opening made of hairline finish steel grade of 304 with key holes and infrared curtains with Unlocking facility from outside

[5] Appropriate battery operated emergency light in the car along with alarm switch shall be provided. Also, Emergency Light & Fan should start immediately without any Time Delay as soon as power fails.

[6] Digital scrolling indicator system for up-down arrow along with floor position indicator shall be provided inside the car and at all floors.

[7] Full height infra-red curtain with multiple cross / crossing light beams shall be provided.

[8] Automatic Rescue Device (ARD) shall be provided accordingly of passenger capacity with Manual Rescue Operation (Manual Cranking Facility).

[9] Audio visual indication in the lift car showing over loading shall be provided such that doors kept open till excess load is removed.

[10] Spring buffers/PU Buffers shall be provided.

[11] Car fan as per passenger capacity with automatic sleep timer shall be provided.

[12] Voice annunciator with suitable music shall be provided in lift car.

[13] Self diagnostics system for operational and safety parameters shall be provided in control panel.

[14] Mechanical over speed governor with governor calibration as per actual site parameters and submission of calibration certificate submission, door key holes in the floor doors, fireman switch shall be provided.

[15] Lift machine hoisting arrangement in the lift machine room and monkey ladder for lift pit should be provided by the lift agency, along with the other steel structure works, foundations for the machine etc…

[16] In the hoist way fascia plate shall be provided without any extra cost, where ever required as / if directed by engineer in charge.

[17] Permanent wiring with necessary safety devices like RCCB in all circuit, Over Voltage under Voltage protection and THD eliminator in circuit for lift machine room and lift well with proper numbers of light points, with fixtures, exhaust fan and plug points shall be provided by the agency. Only 3 phase Power Supply shall be made available by department in lift machine room. Necessary Earthing as per Lift Act/Rules shall be arranged by Lift Agency.

[18] Any civil/ electrical works for additional and alteration in lift shaft and machine room related to erection of lift shall be made by lift agency without any extra cost. (Granite/marble fixing around all landing door openings are not in lift agency's scope.)

[19] Agency has to provide all working drawings and documents and liaison services for obtaining all necessary permission from lift inspector and other authorities.

[20] Acrylic transparent licence/display A4 size holder in lift car

[20A] As per statutory requirement of Govt. Of Gujarat lift & escalator act 2000, lift agency has to provide

1. Car top safety barricade
2. Push & talk communication system.
3. Fireman's switch operation at Ground Floor.
4. carrying out third party lift inspection during/after lift erection and provide report by third party authorized by concern licensing authority.
4. Agency has to provide third party insurance upto completion of free maintenance period and submit the document for the same.

[21] Car Panel Operating Buttons with floor position indicator/buttons must be of Auto Glow type clearly visible when view from inside cabin.

[22] For Physically Handicapped person Full Length Handrails of hairline finish steel grade of 304 should be provided at appropriate height on the Rear & Side Wall Panels in

Lift Car.

(B) SPECIAL FEATURES DESCRIPTION OF LIFTS for PREMIUM category.

1. Advanced control system dual 64 bit embedded microprocessor with CANBUS Serial Communication mode including Regenerative power efficient operation, on site programming facility,

Anti-nuisance, Pte-opening, BMS/RMS with necessary online real time monitoring system having

Necessary connectivity for remote monitoring & other suitable supporting hardware & software

Devices to fulfil the purpose.

2. Floor Indication LCD Display with call registration & brail mark with arrival gong and hall lantern &

TFT Screen in the car with MP3 Voice Announcer.

3. CAR Panel should be scratch resistive SS Moon-rock finish / Hair Line / Honeycomb for car and all

Doors, All landing doors must have fire rating up to 2 hours and car door must have multi-level

Crisscross beam door protection. 4. To & fro communication system & wiring (i.e. car, control room & guard room) and each elevator are equipped with remote monitoring system. Agency has to provide mobile app and user id and password for monitoring

Supplying, Erecting, Testing & Commissioning the passenger / stretcher lift having following main features: 4/5/6 Passengers, Ground plus 3 upper floors with Rated Speed of 1.0 m/sec., (C) With General PLUS ADDITIONAL SPECIAL FEATURES attached herewith. Prem. Cat. - MAKE - SCHINDLER / OTIS / OMEGA / TRIO

And

Supplying, Erecting, Testing & Commissioning the passenger / stretcher lift having following main features: 15/16 Passengers, Ground plus 3 upper floor with Rated Speed of 1.0 m/sec., (C) With General PLUS ADDITIONAL SPECIAL FEATURES attached herewith. Prem. Cat. - MAKE - SCHINDLER / OTIS / OMEGA / TRIO

The scope of work is to cover design, manufacture, supply at site, installation, erection, testing, commissioning, and handing over in satisfactory condition passenger lifts as per norms of state Lift Licensing Authority and maintenance of Lifts during the warranty period as per the tender conditions.

Contractor shall have to obtain the approval / license from the state govt. for operating the lift at his own cost.

The Contractor shall be fully responsible for obtaining relevant safety certificate or license or any other authorization required from statutory authorities as a prerequisite for taking up the work of commissioning and regular operation of Machine-room less and Gear-less Elevators. The firm shall also obtain the relevant safety certificate from statutory authority in respect of individual elevators. Fee, if any, for obtaining such license/ certificate shall be borne by the contractor. The aforesaid provision shall be applicable to contractual warranty period and (if applicable) AMC period also.

The Contractor shall submit to the railway, relevant safety and clearance certificates for each equipment, as obtained from the statutory authorities.

The Contractor shall be responsible to supply and install any signage/ graphics required for fulfillment of relevant statutory authority's norms, whether or not specifically mentioned in the specification.

Design, Manufacture, supply at site, installation, testing and commissioning of Machine Room less and gear less passenger lift of 8/10 person capacity, minimum speed 1.00 MPS, G+3 complete in all respect with complete accessories comprising of CAR, CAR door, Landing Door, Machine, Motor, Control Equipment Panel, Safety device, Suspension rope, counter weights, guide rails, buffers, all electrical wirings/arrangements beyond the main switch near the Lifts, necessary earthing arrangements and other equipments and accessories complete for satisfactory and safe operation of lift generally confirming to the CPWD General Specifications for Electrical Works (Part-III Lifts and Escalators) - 2003 with all latest amendments and as per norms of state government Lift Licensing Authority duly processing for obtaining the approval/license from the State Government Lift Licensing Authority for operating the lifts

and maintenance of Lifts in warranty/Guarantee period at DFCCIL rest house area. The salient points pertaining to safety shall also be complied by the Supplier/Contractor.

However, if any deviations are necessary due to site conditions, it should be with the approval of Dy.CPM/ELECT Ahmedabad. If prospective bidder wants a copy of this specification, same can be obtained from this office or CPWD.

Work shall be carried out in co-operation/consultation with the firm who execute the civil portion of work.

The scope of work shall also include the followings:

- Lift housing / structural work will be carried out by Civil Engineering Department of DFCCI, or Civil contractor appointed by DFCCI. Minor civil / structural work during installation of Elevator shall be carried out by the successful contractor.
- Contractor shall carry out the work in co-ordination with Civil Engineering Department of DFCCI.
- All necessary, Mechanical and electrical works connected with the Design, manufacture, supply at site, painting, testing and commissioning of the elevator inclusive of statutory approvals.
- It will be Contractors responsibility to display adequate sign boards at respective places during erection process.
- Contractor shall also take adequate steps to block the entrances to the lift shaft at various levels/ floors to prevent possible accidents.
- Dismantled materials if any, shall be removed from site of work at regular intervals after notifying the ENGINEER in charge so as to preserve sufficient working space for erection of new elevators.

General:

The Machine Room less type Lift shall be governed by relevant International Standards and International Codes of Practice such as European code of safety EN 81, American National Standard Safety Code for Elevators(ANSI) A117.1, IS:14665 or latest and IEC 60364 for Electrical Installations of buildings. The traction machine, over speed governor, ropes, brake gear controls and other safety equipment even though corresponding to specification EN 81 and ANSI A117.1 should under all conditions of operations at least match with IS code of specification for passenger lifts viz. IS: 14665

or latest. This has to be ensured by Lift manufacturers primarily and the manufacturer should have appropriate Quality Assurance accreditation ISO 9000 / ISO 14001. The installations shall be to the highest standard as expected of a fully experienced contractor. The manufacturer shall also comply with the provision of Indian electricity act and rules in vogue and shall be taken over only if and when they fully comply with all their requirements. The lift installation shall also be designed to produce a safe working environment for Engineers and auxiliary works to work on or around.

Sr No.	Description	Particulars
	Particulars of Details for 4/5/6 Passengers or 15/16 Passengers, Ground plus 3 upper floors with Rated Speed of 1.0 m/sec.	
A	General	
1	Capacities	4/5/6 Passengers or 15/16 Passengers
2	Speed of Travel	1 MPS
3	Height of Travel	As per site conditions
4	No. of floors	Ground + 3 floors
5	No. of opening	4 – as per site conditions
6	Position of counterweight	Design as per site criteria
7	Type of levelling method	Automatic +/- 5 mm
B	Machine	
1	Position of Machine	Top of lift shaft in hoist way/Machine room less
2	Motor	Permanent Magnet Synchronous Motor, Gear less machine
3	Electric supply particulars for which it is suitable for	Three phase, 415 Volts, 50 Hz, 4 wire system

	operation	
4	Type of Control	Microprocessor based, Variable voltage – Variable frequency drive
	Firm to confirm suitability of shaft	
C	Brake	
1	Type	Drum
D	Car and Doors	Horizontal sliding, centre/side opening with full screen dense infra-red curtain. Electrically operated proximity detector/ infrared curtain devices(s) shall be installed on the leading edge of the car doors. The device(s) shall create two dimensional zone of protection. Two dimensional detection shall be for a height of at least 1800 mm of the door. The zone of detection shall move forward as the doors close and the presence of a person, if within this zone, shall activate the detector to stop the closing movement of the doors and re-open them before hitting the person. The device shall have provision to switch off two dimensional detection. a) Colored red/green indicators highlight door movement. b) Dense infra-red 234 beam light curtain using pluggable connectors
1	Outside Dimensions of Car	AS PER SITE CRITERIA
2	Lift Car Inside Size	As per IS 14665 parts and their latest amendments

3	Construction of car	Stainless steel scratch proof (HAIR LINE FINISH) on 2 sides, made of 1.5 mm thick panel, with cladding SS - 304 grade
4	Design/type of enclosure of car	Rectangular /as per site condition, stainless steel scratch proof (moon rock/honey comb/ HAIR LINE FINISH) on 2 sides, made of 1.5 mm thick panel without cladding, SS-304 grade
5	Details of flooring	6 mm ±1 mm thick Aluminum/ 5 mm SS Chequered plate
6	Attachment and fitting inside the car	Cross flow fan and LED light fittings with anti-theft Arrangement as per standard of the manufacturers.
7	Car Doors	HORIZONTAL SLIDING, CENTRE OPENING/ SIDE OPENING OR AS PER SITE CONDITION. Car Doors SS Scratch Resistant Stainless steel 304, 1.5 mm in Hairline finish with cladding SS - 304 grade with Vision panel of 125mm x225mm. a) The car door shall be hung from the top fabricated track and means shall be provided to prevent the door from jumping off the track. The doors shall be provided with two-point suspension sheave type hangers suitable for the type of door operation specified. The hangers shall be provided for vertical and lateral adjustment of car door. The rollers shall move on a fabricated track so shaped as to permit free movement of sheaves with regard to

		vertical adjustment of sheave bracket or hosting. b) Steel Sills shall be Slot-less type and be provided with a suitable nosing for roller movement on underside of the sill of approximately 25 mm depth on the landing side. c) Dual Coupler of doors
	Operations	Power operated automatic doors
	Construction, Design and Finish	Stainless steel scratch proof (HAIR LINE FINISH) on 2 sides, made of 1.5 mm thick panel, with cladding SS - 304 grade.
8	Landing Doors	AS PER SITE CONDITION. Each landing door shall be complete with locks, header, sills, frames, rims, hanger supports with cover plates, facia plates etc. The finished work shall be strong, rigid, and neat in appearance. Plain surfaces shall be smooth and free from warp or buckle. Moulded surfaces shall be clean, straight and true. Fastenings shall be concealed from the face side of the material. Steel Sills shall be Slots-less type provided with a suitable nosing for roller movement on underside of the sill of approximately 25 mm depth on the shaft side.
	Operations	Power operated automatic doors
	Construction, Design and Finish	Landing Doors SS Scratch Resistant Stainless steel 304, 1.5 mm thick in

		Hairline finish with Vision panel of 125mm x225mm.
E	Safety Devices:	
1	Car Safety Type	Progressive/instantaneous type
2	Door inter locks in car-type	Electromechanical type
3	Door locks in landing type	Electrical type
F	Potential Free Contacts:	
	Whether provided or not? Give Details	YES, for each floor position and up and down movement of the lift; and in the controller which can be used for building automation system later
G	Automatic Rescue Device (Give details)	With UPS and SMF (sealed maintenance free battery) of suitable capacity. The Lift shall be such that in case of failure of the ARD the lift shall become inoperable for passengers use i.e. it shall become out of service for passenger use.
H	For physically challenged	
a)	Voice Response System	Required in Hindi, English and Gujarati
b)	Luminous Push Buttons with Brail Script	Required.
c)	Hand Rails	Stainless steel hair line finish, SS-304
I	SMS Alert system (inbuilt system) (pl refer clause HHH)	Provision for sending SMS message to minimum 10 pre-specified phone numbers for identified unusual occurrences should be available in the controller. Provision of SIM and payment of data charges should be

		borne by Elevator manufacturer/supplier till Elevator is under warranty/Guarantee.
J	Signage plates	The contractor shall provide the following SS plates inside the lift car:- a)Dos/Don"ts instructions plate of suitable size (as per attachment as Annexure "A" .(tamper proof) b) lift capacity no of Passenger & weight(tamper proof) c) Platform No. (tamper proof) The contractor shall provide the following SS plates outside the lift car:- a) lift capacity no of Passenger & weight (tamper proof)

NOTE: All the lifts above shall have all mandatory provisions, without any extra charge to the owners, to make these lifts fully compatible for use by physically challenged persons.

1) All the expenses (cost) for inspection will be borne by the contractor at his on cost.
2) Contractor's scope of work –

Contractor's scope shall include but not be limited to the following –

I. Design, supply, installation, testing and commissioning of Machine-room less and Gear-less Elevators in stations/ buildings for vertical transportation of passengers (including the differently abled and elderly);
ii. Supply and fixing of guide rails and related items;
iii. The elevator shall be supplied in accordance with specific requirements of the site
iv. Minor civil works (limited to minor items such as chipping, repair or touch up in the shaft for carrying out the elevator installation);

v. Transportation of material and equipments to site, & storage in proper way in their custody for installation; Loading / Unloading and Transportation of the lift material along with its safety and security in station premises will be the responsibility of the contractor till final handing over of the lift;

vi. Scaffolding works and barrier fencing at the landings (only to the extent required for installation of Elevators);

vii. Enclosures and supporting brackets for housing and fixing of equipment;

viii. Shaft lighting and electrical sockets;

ix. All equipment, fixtures and materials reasonably required for interface with other Contractors.

NOTE: The following items shall also form a part of contractor's scope if specifically asked for in the tender-

a) Special tools (Open ended spanner set, 3 sets of lift key etc.), testing and diagnostic equipment and measuring instruments.

b) Maintenance for specified period.

2.1 Feasibility study –Site feasibility study prior to proposing the work.

In respect of Elevators to be provided for transferring passengers from ground floor to second floor level, the feasibility study for lift shall be carried out by contractor.

3) INTERFACES –

a) The Contractor is required to interface with railway or civil contractor appointed by railway in respect of the Elevator shaft requirement. The Contractor shall coordinate with the railway or civil contractor appointed by DFCCI, to finalize all the details.

b) The Contractor shall co-ordinate with the DFCCIs and/ or DFCCI appointed civil contractor with regard to the following specific issues: -

i. Space requirements, including tolerances to be complied by civil engineering works.

ii. Fixing requirements

iii. Loads induced on the building, by the elevator

iv. Interface with architectural finishes

v. Location for power supply termination point
vi. Information on embedded parts, box-outs, etc. so as to enable DFCCI"s civil contractors to provide the necessary works
vii. Hanging pits (if any), including the shaft dimensions
viii. Equipment access route
ix. Scaffolding, lifting, etc. to be carried out by the elevator contractor (only to the extent required for elevator installation)
x. Ventilation requirement
xi. Integration with DFCCI"s fire protection system (if any)
xii. Rain shed and pit water proofing must be ensured and if required must be carried out at design/installation stage in co-ordination with railways" civil contractor.

4) Fire Emergency return –

Contractor must provide a fireman switch at the ground floor. When the building's fire or smoke detectors are activated, all calls should be cancelled automatically and the lift shall travel to the main lobby or a pre-designated floor and park there with the door fully opened. However the Electrical signal that indicates the actuation of the fire sensors must be supplied to the lift controller by others or the fire alarm switch provided on the ground floor is activated. The display to be given in the car with pre-recorded audio message so that passengers do no panic.

5) Car lights and Fan automatically shut off –

The lift shall be installed with an energy saving feature that automatically switches off the car internal lighting and ventilation fans when there are no calls registered after a predetermined (Programmable) period of time.

6) Handicap:

It is special for those people who are handicapped, which include Voice annunciator with hand rails, back mirror and horizontal push button station with Braille buttons.

7) Alarm Bell and Emergency Light:

The alarm bell is to be provided and fitted in an approved position close to the Lift at Ground floors complete with push button inside the car and with necessary SMF

rechargeable Battery. Battery operated emergency lamp should also be fitted in the car which shall work automatically in the event of a power failure, providing illumination within the car. The batteries shall be maintenance free and shall be supplied on board with a battery charging system.

8) Batteries and chargers:

The batteries shall be of sealed, high rate maintenance free nickel-metal hydride type, or a type of better functions and performance and approved by the Supervising Officer and shall have a guaranteed life expectancy of at least four(4) years. They shall not have any memory effect as to affect their usable life or performance. The nickel-metal hydride battery shall comply with EN 61436 and EN 61951-2 where appropriate. The battery charger shall be compatible with the batteries used. The charger shall comply with EN 60335-2-29 and be capable of fully re-charge the batteries in not more than 12 hours.

9) Stainless steel –

All stainless steel materials specified for car finishes shall be of grade SS 304.

10) Wiring and Earthing –

All necessary wiring i heavy gauge conduits from the MCB to the driving motor, controller, call push buttons, door locks, limit switches, alarm bell, halfway junction box and wiring inside the car shall be done by the Suppliers/Contractor in accordance to IEC 60364 for Electrical Installations of buildings. Necessary traveling cables from the car to the halfway junction box in the shaft shall be provided by the Supplier/Contractor. Equipment earthing required for the machine and in the Lift well should be carried out by the Supplier/Contactor. All electrical equipment in the Lift including car body shall be provided with two distinct earthing arrangement as per IS standards and connected to the earth pit provided in stations.

11) Spare parts and tools:

Spares that are considered necessary for continuous satisfactory operation of the equipment for at least two years shall be advised separately, inclusive of rates for reference. Any specials tools required for the maintenance of the equipment shall be submitted along with the tender.

12) General requirements:

All dangerous parts shall be effectively guarded. Where applicable, Components shall be

designed to be inherently safe, obviating the need for external or removable guards. Every lift car body shall be carried in a steel car frame sufficiently rigid to withstand the operation of the safety – gear without permanent deformation of the car frame.

The deflection of the members carrying the platform shall not exceed 1/1000 of their span under static conditions with the rated load evenly distributed over the platform. At least four renewable guide shoes, or guide shoes with renewable linings, or sets of guide rollers shall be provided, two at the top and two at the bottom of the car frame.

13) ACCESS TO WORK SITE –

a) Access to the site for the purpose of this contract shall be accorded to the contractor by the purchaser at all times. In the execution of the work no person other than the contractor or his duly appointed representative or approved sub-contractor and bonafide workmen shall have access to the site. Access to the site of work at all times shall be allowed by the contractor to Officials or approved representatives of the purchaser or to Railway staff for purpose of maintenance.

b) The Purchaser or his authorized representative shall have the right to refuse admission to the work site of any person employed by the contractor whom the purchaser or his engineer may consider undesirable.

c) The purchaser or his Engineer shall be at liberty to object to the employment of any person as Contractor's Agent/Representative, approved sub-contractor's supervisors, workmen or labourer for execution of this contract on the ground of misconduct, incompetence or negligence. The contractor on receipt of notice of such objection in writing from the purchaser or his engineer shall forthwith remove the person so objected to and provide in his place any other competent person and shall not allow the persons so objected to, to enter the site of work subsequently or remain in the execution of the contract. The purchaser will not be liable to pay any cost or damage on this account.

14) ACCIDENTS –

a) The Contractor shall, in respect of all staff engaged by him or by his sub-contractor, indemnify and keep the purchaser at all times indemnified and protected against all claims made and liabilities incurred under Workmen"s Compensations Act, the Factories

Act and the Payment of Wages Act and rules made there under from time to time or under any other labour and Industrial legislation made from time to time.

b) The Contractor shall indemnify and keep the Purchaser indemnified and harmless against all actions, suits, claims, demands, costs, charges or expenses arising in connection with any death or injury sustained by any person or persons within the Railway premises and any loss or damage to Railway property sustained due to the acts or omission of the Contractor, his sub-contractors, his agents or his staff during the execution of this contract irrespective of whether such liability arises under the Workmen‟s Compensation Act, or Fatal Accident Act or any other statute in force for the time being.

15) SAFETY MEASURES –

The contractor shall take all precautionary measures in order to ensure the protection of his own personnel moving or working on the Railway premises, but shall then confirm to the rules and regulations of the Railway. The contractor shall be responsible for safe custody of all equipments till provisional acceptance. Moreover, if any time the works to be carried out directly concern the safety of trains, the contractor‟s staff must comply fully with Railway regulations given to him by the authorized Railway staff. The contractor‟s employees and workers may for no reason operate an installation concerning train safety or train movement. They shall notify the authorized representative of the purchaser who will take all necessary steps in this regard.

16) DEFECTIVE EQUIPMENTS TO BE CHANGED –

Notwithstanding completion of work in partial or full use of any equipment, if the completed equipment or any portion thereof before it finally taken over at the end of the guarantee period be found to be or to have become defective in course of usage by the Railway due to faulty material, design or workmanship, or otherwise fails to fulfil the requirement of the contract and/or its purpose, the purchaser shall normally give the contractor prompt notice setting forth the particulars of each defects or failure and the contractor shall forthwith make the defects good or modify or replace the equipment, as may be directed by the purchaser’s Engineer, at his own cost in all respects to make comply satisfactorily with the said requirements. Should the contractor fail to do within a reasonable time the service of the said notice upon him or should time not permit of

service of such notice, the purchaser may repair or reject and replace the whole or part of such defective equipment as the case may be, at the cost of the contractor. The contractor's full liability under this clause shall be satisfied by the payment to the purchaser of the extra total cost, if any, of such replacement delivered and erected as provided for in the original contract, such extra cost being the ascertained difference between the price paid by the purchaser under the provisions above mentioned for such replacement and the contractors price for the plant so replaced, plus the sum, if any, paid by the purchaser to the contractor in respect of such defective equipment. Should the purchaser not so replace the rejected equipment within a reasonable time, the contractors liability under this clause shall be satisfied by the repayment by the contractor of all money paid by the purchaser to him in respect of such rejected equipment. Rejected/defective materials shall be returned to the contractor to the extent possible.

17) PILFERPROOF DESIGN –

The Elevator equipment (i.e. Indicators, landing call plate, MCB, etc.), if any at Ground level, should be pilfer proof.

18) Civil Engineering:

The contractor should inspect site conditions before quoting the tender. The design of the Lift includes the design of the support system and guidance which includes the support of the traction machine and all its accessories. The lift shaft is either 230 mm brick/concrete. The design of the Lift should be compatible with the Lift well and Lift shaft/machine room. The contractor should ensure adequate design so as the individual load and their distribution of car, counter weight for both normal and abnormal working (Accident), or within the structural design limits of lift well. The anchorage and guidance of car and counter weight will be designed to suit the lift shaft under all conditions. This is considered as primary responsibility of the contractor.

19) WATER PROOFING OF LIFT MACHINARY AND PIT –

The Contractor shall liaise with the railway to ensure for proper drainage and pumping of water/rain water with water sensing device if demanded from the Elevator pit. For elevator pits on railway platforms, this may call for provision of pump, it may ensure for proper water proofing of machine housing, equipment, electronics, panel, machine at the

time of structural /shaft erection with respect to machine room less design. It shall also ensure that proper platform for machine maintenance, installation & overhauling, staircase & excess window shall be done as per requirement. Further during MAINTENANCE/WARRANTY, THIS TYPE OF PROTECTION PROVISIONS FROM WATER /MONSOON MUST BE ARRANGED BY LIFT CONTRACTOR ONLY.

20) FOLLOWING ADDITIONAL DOCUMENTS SHALL BE SUBMITED FOR ALL LIFTS –

a) LICENSE FOR ERECTION FOR LIFTS –

Tenderer should have License for erection and maintenance of lift from Lift Inspector, Government of Gujarat.

b) Test by lift inspectors, Government of Gujarat –

It will obligatory on the part of successful tenderer, on completion of installation of the lift to arrange for the inspection of the lift installations by the lift inspector of Govt. of Gujarat, at his cost. Any defects/deficiencies pointed out by the lift inspector, during such examination, should be promptly attended by the tenderer and the lift will not be taken over by the DFCCI until the lift Inspectors clearance certificate for commissioning the lift is submitted to the Railway.

c) Submittals

d) Drawings etc.:- The successful tenderer shall supply 3 sets of the layout diagram of the lift.

e) Wiring diagram and literature

f) Operating and maintenance instructions

21) After successful installation of lifts, the contractor should remove the debris and make the location clean, before handing over the lift to DFCCI for operation.

22) CONFORMITY WITH STATUTORY ACTS, RULES, REGULATIONS, STANDARDS AND SAFETY CODES –

The installation shall be carried out in conformity with the local Lifts" Acts and Rules. For example the Bombay Lifts Act for Bombay, The West Bengal Lifts and Escalators Act for lifts and escalators for West Bengal, the Bombay Lifts Act as extended to Delhi for Delhi etc. At other places where no local lifts" act is in force, the Bombay Lifts Act shall be

followed. The installation shall also conform to requirements of local Municipal bye-laws. It shall be obligatory on the part of the successful tenderer to arrange for inspection of the lift installations on completion of installation of the lift by lift inspector of Govt. of Gujarat, at his own cost. Any defects/deficiencies pointed out by the lift inspector, during such examination, shall be promptly attended by the tenderer and the lift will be taken over only when the lift Inspectors clearance certificate for commissioning the lift is submitted to the Railway.

23) FIRE REGULATIONS –

The installation shall be carried out in conformity with the local fire regulations and rules there under wherever they are in force.

24) INDIAN ELECTRICITY ACT AND RULES –

All electrical works in connection with installation of electric lifts shall be carried out in accordance with the provisions of Indian Electricity Act, 1910 and the Indian Electricity Rules, 1956 amended up to date. The electrical works shall also conform to CPWD General Specifications for Electrical works Part-I (Internal), 1994 and Part-II (External), 1994 as amended up to date wherever relevant.

25) Penalty:

The defective part shall be put into operation after necessary repairs and put right lift in operation within 24 hours from receipt of intimation of failure. If contractor fails to do so penalty at the rate of 200 rupees per day beyond stipulated time shall be charged.

The penalty shall be deducted from Security Deposit. In case of no response from the contractor within the stipulated period, the lift will be got repaired departmentally/through other agencies and amount will be deducted from Security Deposit. (Departmental cost shall include cost of Supervisor, technician and khalasi, cost of material used). If security deposit forfeit, penalty will be deducted from contractor"s other running contract.

26) Preventive Maintenance and Schedules during Guarantee Period:

The contractor shall service the lifts thoroughly once in a month and attend the breakdown complaints free of charge during the guarantee of 12 months.

(a) However copy of schedule of maintenance during the guarantee period is enclosed herewith.

(b) Maintenance schedule for Electric lifts.

The following maintenance schedule should be carried out during the maintenance of lifts and a record should be maintained in the office of the concern engineer In charge. Any abnormality noticed during the schedule should be attended immediately (within 2 hours) and proper operation ensured. Preferably Lifts should be taken up for Schedule of Maintenance on Saturday/Sunday/Holidays or between 07.00 AM to 8.30 AM or after 06.30 PM.

- The lift will be serviced in once in a month and will include oiling cleaning of the controller, motor and gear machine, oiling and greasing of the guides and bearing and performing of necessary adjustment. The contractor will be responsible for repairing and replacement of work out parts such as the contactors, relays, break liners, guide shoes, guide shoes lines, gate locks and safety devices. Contractor shall have to submit maintenance report duly signed by DFCCI representative.
- The contractor will attend to worn about damaged bushings and bearings of gear and motor also he will be responsible for getting repaired the lift motor whenever the same get burnt or damaged. The gear box is to be serviced and oil replaced at in Guarantee period. The contractor will support the condition of the gear every six months.
- The contractor will be responsible to maintain the lift to the standard of Gujarat lift & elevators Act 2001, the contractor will answer queries of all lift inspectors and be responsible to carry out necessary minor modifications free of cost any major modification will be reported to us. And DFCCI will decide by whom and when to get it done.
- The contractor has to furnish Regular Comprehensive Maintenance for passenger lifts at rest house
- Contractor shall have to use trained men directly employed and supervised by them. They will be qualified to keep equipment properly adjusted and will use all reasonable care to maintain the elevator's equipment in proper and safe operating condition.
- Contractor shall have to follow the schedule maintenance of electric lifts as per this Para during Guarantee period.

- Contractor will regularly and systematically examine, adjust, lubricate as required, and if in judgement conditions warrant repair and replace all elevator parts.
- To examine periodically safety devices and governor and make annual safety tests.
- In case of rope failure during the Guarantee period of Passenger lift at site / rest house, same to be replaced by the contractor at his own cost including material.

I. Monthly Schedule of Maintenance:

S. No	Nature of Work	Periodicity
1	Check and attend fitting of Lift (light, fan, emergency light, failure alarm etc.)	Monthly
2	Check Level of the lubricating oil in the gearbox, any unusual sound in the gearbox.	Monthly
3	Check the operation of all the doors, door locks.	Monthly
4	Check the brakes and adjust it.	Monthly
5	Check the operations of the limit switches.	Monthly
6	Clean machine and associated equipment's.	Monthly
7	Check the main switch contacts and earth connections/continuity.	Monthly
8	Check the main switch, fuses etc. (for loose connection, oscillation and ratings etc.)	Monthly
9	Check the general condition of the motor.	Monthly
10	Control Panel:	Monthly
a) Check overhead relays operation		Monthly
b) Check the interlocks for its proper function.		Monthly
c) Check the relay contacts their operation and chattering.		Monthly
11	Check the electrical connections.	Monthly
12	Check the foundation bolts of the motor any unusual noise, vibration etc.	Monthly
13	Check the input voltage & current of the motor and record it.	Monthly
14	Check the leveling switches, arm pivots and limit switch rollers	Monthly

	and lubricate.	
15	Check the performance of the over speed governors and adjust if necessary.	Monthly
16	Check the working of the floor selection switch.	Monthly
17	Check floor indicators.	Monthly
18	Check all ropes, hinges, shackles etc.	Monthly
19	Check the microprocessor control for its proper functioning.	Monthly

II. Quarterly Schedule of Maintenance:

S.No	Nature of Work	Periodicity
1	Lubricate the rope pulley bearings	Quarterly
2	Check tightness of the counter weight, fixing clamps, bolts etc.	Quarterly
3	Check the trailing cables for broken/damaged insulation and loose binding.	Quarterly
4	Check the condition of the pit clean the car top and clean the gate.	Quarterly
5	The wire ropes should be cleaned by a stiff brush to remove old lubricant and lubricate it again by using oil machinery medium or equivalent.	Quarterly
6	Clean the ropes for broken strands and general condition.	Quarterly
7	Check the dia. of the rope and record it.	Quarterly
8	Rope winding drum to be checked for its proper winding in the sheave grooves.	Quarterly
9	Measure the voltage and current at the various test points in the control system including microprocessor control and record it.	Quarterly
10	Check the fixing bolts of the motor for any vibration.	Quarterly

III. Yearly Schedule of Maintenance

S.No	Nature of Work	Periodicity
1	Overhaul the motor for bearings and alignment.	Yearly
2	Check car body supports and steel channels.	Yearly
3	Check the condition and wear in the bearings.	Yearly

4	Clean and check guide rails.	Yearly
5	All break gear to be reconditioned.	Yearly
6	Solenoid coils to be tested.	Yearly
7	Limit switches to be overhauled and adjusted.	Yearly
8	All the interlocking arrangements to be overhauled and checked for proper functioning.	Yearly
9	Gearbox to be overhauled completely.	Yearly
10	Check the microprocessor units for the proper functioning.	Yearly

IV In addition to the above periodical maintenance the firm has to attend the following:

a)	The firm has to attend the breakdown failure at any time during the working hours without any delay.
b)	They have to supply the required consumables, spares, to keep the lift in good condition.
c)	While attending the quarterly schedules the firm has to carry out the monthly schedules also.
d)	While attending the yearly schedules the firm has to carry out the monthly and quarterly schedules also.
e)	Maintenance schedules should be carried out in consultation with concerned site incharge mostly on Saturday/Sunday/Holiday or between 07.00 AM to 8.30 AM or after 06.00 PM.

DETAILED SPECIFICATIONS AND SPECIAL CONDITIONS FOR SCHEDULE "G"

(SCHEDULE-G: ITEM NO. 11 to 14, 18 to 23)

Items which are taken from DSR-2022, the work shall be carried out as per DSR-2022 item descriptions and specifications of CPWD DSR and latest instructions/guideline issued.

(Item No. 1 & 2)

1.0 SCOPE OF WORK

This specification covers the design, manufacture, testing & supply of H.V indoor switchboards The enclosed drawings and/ or data sheet, single line diagram form a apart of the specification.

Item No. 1 of single VCB shall be provide to inter connect with existing HT Panel so necessary civil / electrical alteration will be in scope of contractor.

HT and LT panels designed and installed as per attached SLD or instruction given by engineer in charge.

The drawing and specifications complement each other and what is shown or called for one shall be interpreted as being called for on both. Material, if any, which may have been omitted but which fairly implied as being required to make a complete assembly of switchgear as shown on the drawing and specifications shall be constructed as being required and no extra charges shall be paid for this material

2.0 DESIGN BASIS & SITE CONDITIONS

All the equipment and components provided in the switch gear and accessories shall be suitably designed for installation and satisfactory operation as specified below.

Minimum 05 ^{0} C	Minimum 40 %

Design 45 ^{0} C		Deign 98 % at 45 ^{0} C		
Seismic factor Zone III as per IS:1893		**Rainfall** 1000 mm/year		
Environmental Tropical		**Location of Equipment** INDOOR		
Wind speed 80 kmph maximum				
Electrical system data:				
Power supply for Equipment				
Voltage	11 kV ± 15 %		**Frequency** 50 Hz ± 3 %	
Permissible combined voltage & frequency variation		± 6 %	**System design faults level (Symmetrical)**	18.7 kA for 1sec.max.
System earthing LV side neutral solidly earthed		**Wiring** 3 phase, 3 wire on 11kVsystem 3 phase, 4 wire on 415Vsystem		
Auxiliary power supply :				
Power supply		240V AC, 1-Ph, 50Hz		
Control Supply		-----		
Space heater power supply		240V AC, 1-Ph, 50Hz		
Illumination power supply		240V AC, 1-Ph, 50Hz		
Plug-socket power supply		240V AC, 1-Ph, 50Hz		

3.0 GENERAL REQUIREMENTS

The scope generally describes to design, manufacture, assemble, connect, wire, supply, test and commission 11KV vacuum circuit breaker panel.

The unit shall consist off tee off spring assisted three position, three pole vacuum circuit breaker.

All equipment and materials shall be designed, manufactured and tested in

accordance with the latest applicable Indian Standards (IS) except where modified and/or supplemented by this specification

The equipment shall meet the requirements of Indian Electricity Rules as amended up to date and relevant IS Codes of Practice. In addition, other rules and regulations as applicable to the work shall be followed. In case of any discrepancy, the more restrictive rule shall be binding

4.0 TECHNICAL REQUIREMENTS

GENERAL CONSTRUCTIONAL FEATURES

The switchgear enclosure shall conform to the degree of protection IP-4X. The minimum thickness of sheet steel used shall be 2mm CRCA steel.

The switch gear assembly shall comprise a continuous, dead-front, line-up of free standing, vertical cubicles. Each cubicle shall have a front hinged door with latches and a removable back cover. All covers and doors shall be provided with recessed neoprene gaskets. All doors shall have pad locking arrangement. Switchgear shall be fire retardant type

Circuit breakers, instrument transformers, bus-bars, cable compartment etc., shall be housed in totally isolated air tight separate compartments within the cubicle. The design shall be such that failure of one equipment shall not affect the adjacent units. Suitable venting arrangement shall be provided to release the gas pressure developed due to the operation of the breaker or due to live arc of fault

Each cubicle shall be separated from adjacent one by grounded sheet steel barrier and bus sealing

Arrangement

5.0 BUS AND BUS TAPS

The switchgear panel shall be of arc proof version. Test report as per DIN VDE 0670 part 601, IEC- 694/IEC-298 shall be furnished

All relays, meters, switches and lamps shall be flush mounted on the respective cubicle door or on control cabinet built on the front of the cubicle

Each switchgear cubicle shall be provided with a thermostat controlled space heater and single phase plug point operated at 230 V AC. 50 Hz, Also all HT Panels should have Temperature Sensor TH110 + ZBN Concentrator with Ethernet convertor for temperature monitoring on EMS.

Each breaker cubicle shall be provided with 'service' and 'test' position limit switches, each having at least 4 NO & 4 NC contacts. All fixing bolts, screws, etc. appearing on the panel shall be so arranged as to present a neat appearance. The swing of the door shall be more than 90 deg C.

The main buses and connections shall be of high conductivity copper, sized for specified continuous and fault current ratings with maximum temperature limited to

85 deg C (i.e.35 deg C rise over 50 deg C ambient)

Adequate contact pressure shall be ensured by means of two bolts connection with plain and spring washers and locknuts

Bimetallic connectors shall be furnished for connections between dissimilar metals

All Busbars, Jumpers and connection shall be fully insulated for working voltage with adequate phase/ground clearances. Epoxy cast-resin shrouds for joints shall be provided. All jointing hardware shall have nylon caps. All busbars, links, jumpers etc. shall be sleeved with sleeves of Raychem/DSG make and non-in flammable heat shrinkable type. Busbars, links, live parts etc. shall have non- flammable shrouds.

No paper/cotton based insulation shall be used anywhere in the switch gear.

Minimum amount of combustible and low smoke generation type insulating material shall be used.

Safety shutter, phase barrier, busbar seal-off bushing plate, support insulators etc. shall be non- inflammable high tracking fiber glass/epoxy insulation system of grade

94V-O as per UL

All buses and connections shall be supported and braced to withstand dynamic electro-magnetic stresses due to maximum short circuit current and also to take care of any thermal expansion

Bus bars shall be colour coded for easy identification and so located that the sequence R-Y-B shall be from left to right, top to bottom or front to rear, when viewed from front of the switchgear assembly

The successful tenderer shall submit the calculation in support of selection of busbar conductor size, spacing and short time withstand capability

6.0 CIRCUIT BREAKERS (VCB)

Circuit breaker shall be triple pole, single throw, Vacuum type

Circuit breaker shall be draw out type, having SERVICE, TEST and DISCONNECTED positions with positive indication for each position

Circuit breakers of identical rating shall be physically and electrically interchangeable

Circuit breaker shall have motor wound spring charging facility with Mechanical & Electrical anti-Pumping features and shunt trip. In addition facility for manual charging of spring shall be provided. The motor shall be suitable for operation with voltage variation from 85% to 110% of rated voltage. Spring charging motor shall be in a standard enclosure

For motor wound mechanism, spring charging shall take place automatically after each breaker closing operation. One open-close-open operation of the circuit breaker shall be possible after failure of power supply to the motor

Mechanical safety interlock shall be provided to prevent

The circuit breaker from being racked in or out of the service position when the breaker is closed Racking in the circuit breaker unless the control plug is fully engaged

Closing & opening of the breaker in an intermediate position between ‘service’ & ‘test’ and between ‘Test’ and ‘Disconnected’ position

Automatic safety shutters shall be provided to fully cover the female primary contacts when the breakeris withdrawn from service position

Each breaker shall be provided with an emergency manual trip, mechanical ON-OFF

indication, an operation counter and mechanism charge/discharge indicator. The manual trip device shall be located on the front door. Indicators with shrouds will be visible from front door even when breaker is closed.

Suitable padlocking arrangement shall be provided as stated below: Circuit Breaker operating handle in the OFF position

Each feeder panel operating handle in CLOSED, OPEN, EARTH position

Each breaker shall be provided with following:

Auxiliary switch, with 6 NO + 6 NC contacts, mounted on the draw out portion of the switchgear Position/cell switch with minimum 3 NO + 1 NC contacts, one each for TEST and

SERVICE position

Auxiliary switch, with 4 NO + 4 NC contacts, mounted on the stationary portion of the switchgear and operated mechanically by a sliding lever from the breaker in SERVICE position

Limit/auxiliary switches shall be convertible type that is facility for changing N.O. contact to N.C. and vice-versa. Switch contact shall be rated 10A A.C. and 2A D.C. at operating voltage

Circuit breaker shall be draw out type, complete with transfer trunks, self-aligning primary and secondary disconnects, positive guides to ensure proper alignment

Each breaker shall be provided with suitable encased rollers

The trip coils shall be operated satisfactorily at voltage between 70 % and 110 % of rated control supply voltage

Each circuit breaker cubicle shall be provided with an earthing facility to earth the incoming or outgoing feeders by the arrangement specified below. Earthing facilities shall be fully interlocked to prevent faulty operation e.g. earthing of live parts

Separate earthing trunk, which can be inserted in place of circuit breakers, one trunk suitable for incoming and the other for outgoing circuits shall be provided

Positive earthing of circuit breaker frame shall be maintained when it is in the connected position and in all other positions in which the safety shutters are in open position

Insulation used for auxiliary switches shall be anti-tracking type.

INDICATION & MONITORING

Each breaker cubicle shall be equipped with following:

One (1) number heavy duty spring return type TRIP-NORMAL-CLOSE control switch with pistol grip handle

Three (3) indicating lights front of compartments:

GREEN : Breaker Open

RED : Breaker Closed

AMBER : Trip

Blue : Spring charged/Low vacuum

Lamp shall be LED type with series resistor, Lamp and lens shall be replaceable from the front

CURRENT TRANSFORMER

Current transformers shall be bar primary, cast resin type. All secondary connections shall be brought out to terminal blocks where Y or D connection will be made.

1. Class PS for differential & restricted earth fault relaying.
2. Class 5P20 for other relaying.
3. CT Accuracy as per meter accuracy, /meter and CT's should have same Accuracy Class

The current transformer shall be capable of safely withstanding the short circuit, stresses corresponding to the fault level as indicated & shall be able to meet the short-time requirement specified

All CT secondary shall be earthed through separate switch link on terminal block.

The secondary terminals of the CTS shall have the provision of shorting and disconnecting facilities by links

CT terminals & their polarities shall be clearly marked

VOLTAGE TRANSFORMER

Voltage Transformer shall be cast-resin, draw out type and shall have an accuracy class of 2.0, 3P. Voltage Transformer mounted on breaker carriage is not acceptable

High voltage windings of voltage transformer shall be protected by current limiting fuses. The voltage transformer and fuses shall be completely disconnected and visibly grounded in fully draw- out position

Low voltage fuses, sized to prevent overload, shall be installed in all ungrounded secondary leads. Fuses shall be suitably located to permit easy replacement while the switchgear is energized.

RELAYS

Protective relay shall be microprocessor based Relays shall be of draw out design with built-in site testing facilities. Small auxiliary relays may be in non-draw out execution and mounted within the cubicle Relays shall be rated for operation on 110 V secondary voltages and 5 A secondary current as shown on drawings. Number and rating of relay contacts shall suit the job requirements.

METERS

All meters should be digital meters only:
Kindly refer SLD for details.

SECONDARY WIRING The switchgear shall be fully wired at the factory to ensure proper functioning of control, protection, transfer and interlocking schemes Fuse and links shall be provided to permit individual circuit isolation from bus wires without disturbing other circuits. All spare contacts of relays, switches and other devices shall be wired up to terminal blocks Wiring shall be done with flexible, 650V grade, FRLS PVC insulated switchboard wires with stranded copper conductors of 2.5 mm2 for control and current circuits and 2.5 mm2 for voltage circuits. All power wiring like

space heater supply etc. shall be carried out with min. 4 mm2 Cu, conductor, Wiring of trip circuit shall be with fluro- plastic wires each wire shall be identified, at both ends, with dependent & cross addressing permanent markers bearing wire numbers as per Contractor's Wiring Diagrams. Trip circuit shall have red color ferrule Wire termination shall be made with crimping type ring connectors with insulating sleeves. Wires shall not be spliced between terminals

The wires shall run preferably through metallic through adequately supported along its run to prevent sagging due to flexibility or vibration. The control & Inter-panel wiring trough shall be furnished for wiring

Between switchgear cubicles.

All wiring required for interlocking between the cubicles of any switchgear shall be furnished and installed. Wherever wires are passing through cutouts or openings

They shall be protected by providing suitable grommet or gasket around the Openings. Inter panel wiring at

shipping sections shall be through terminal blocks placed suitably at intersection points

The colour of wire shall be taken as follows:

1. AC System Black
2. DC System Grey
3. Earthing System GREEN

CT & PT Wiring System Red, Yellow, Blue colour

TERMINAL BLOCKS

Terminal blocks shall be 660 V grade box-clamp type with marking strips ELMEX 10 mm2 or equal. Terminal for C.T. Secondary leads shall be disconnecting link type and shall have provision for shorting. Terminal for P.T. Secondary lead shall also be disconnecting link type

Not more than two wires shall be connected to any terminal. Spare terminals equal in number to 20% active terminals shall be furnished. Multi connection terminal strip to be used if required

Terminal blocks shall be located to allow easy access. Wiring shall be so arranged that individual wires of an external cable can be connected to consecutive terminals

Terminal blocks for inter panel/external/Space Heater wiring shall be separate from inter panel wiring

All control wire shall be terminated with ring type insulated lug only

The terminal block shall be grouped according to circuit functions and individual terminals in each block shall be serially numbered in accordance with the drawings. Such numbering shall be legible, permanent and indelible

The terminal blocks of different voltage classes shall be segregated

Similar type of terminal block shall be used for inter panel wiring at shipping sections

power wires shall be routed through separate troughs

CABLE TERMINATION

Switchgear shall be designed for cable entry from the top. Sufficient space shall be provided for ease of termination and connection

Power cables shall be XLPE insulated, armored, overall PVC sheathed with stranded Aluminum/capper conductor

Control cables shall be PVC/XLPE insulated, armored, overall PVC sheathed with 2.5mm2 stranded copper conductor

All provisions and accessories shall be furnished for termination and connection of cables, including removable aluminium gland plates, cables supports etc.

The gland plates shall be minimum 4mm thick aluminium sheet. The gland plate and supporting arrangement for 1/C power cables shall be such as to minimise flow of eddy current Sufficient

Space shall be provided between the power cable termination (end- boxes) and gland plate.

Core balance C.T.s, wherever specified, shall be accommodated within this space.

GROUND BUS

A ground bus, rated to carry maximum fault current, shall extend full length of the Switchgear The ground bus shall be provided with two-bolt drilling with G.I. bolts and nuts

At each end to receive 50 x 6 mm G.I. flat

Each stationary unit shall be connected directly to the ground bus. The frame of each circuit breaker and draw out P.T. unit shall be grounded through heavy multiple contacts at all times except when the primary disconnecting devices are separated by a safe distance Wherever the schematic diagrams indicate a definite ground at the switchgear, a single wire for each circuit thus grounded shall be run independently to the ground bus and connected thereto C.T. and P.T. secondary neutrals shall be earthed through removable links so that earth of one circuit may be removed without disturbing other Suitable ground terminal, directly connected with the ground bus shall be provided in the cable chamber for grounding connection of cable screen/ armour All hinged doors shall be grounded using sliver plated and braided copper flexible of adequate size

NAME PLATE

Nameplates of approved design shall be furnished at front & back side of each cubicle and at each instruments & device mounted on or inside the cubicle

The material shall be 3ply lami cold or approved equal, 3 mm thick with white letter on black background. The letters of the nameplates shall be engraved

The nameplate shall be held by self-tapping screws. Nameplate size shall be minimum 20 x75mm for instrument/device and 40 x 150mm for panels.

Caution notice on suitable metal plate shall be affixed at the back of each vertical panel

Following plate size & letter size shall be considered for nameplate

SR.	NAMEPLATE NO.	PLATE SIZE (mm × mm)	LETTERSIZE (mm × mm)
1.0	Main nameplate	40 × 150	25 × 25
2.0	Equipment & device (Front)	20 × 75	5 × 5
3.0	Equipment & device (Internal)	6 × 20	3 × 3

SPACE HEATER AND PLUG SOCKET

Each cubicle shall be provided with thermostat controlled space heaters and 10A, 3 pin plug socket

Cubicle heater, Plug/socket circuits shall have Individual MCBs

A.C. POWER SUPPLY

The following power supplies will be made available to the switchgear: A. C. supply: Double Feeder with manual change over switch

Isolating MCB will be provided at the switchgear for the incoming supplies

Bus-wires of adequate (minimum 4 sq.mm copper) capacity shall be provided to distribute the incoming supplies to different cubicles. Isolating MCB shall be provided at each cubicle for A.C. supplies

A.C. load shall be so distributed as to present a balance loading on three-phase supply system

TROPICAL PROTECTION

All equipment, accessories and wiring shall have fungus protection involving special treatment of insulation and metal against fungus, insects & corrosion

Screens of stainless steel shall be furnished on all ventilating louvers to prevent the entrance of insects

PAINTING

All surfaces shall be sanding blasted, pickled and grounded as required to produce a smooth, clean surface free of scale, grease rust and foreign adhering matter

After cleaning, the surfaces shall be given a phosphate coating followed by 2 coats of high quality primer and staved after each coat

The switchgear shall be finished in powder coat, shade RAL-7032 MATT finish

Sufficient quantity of touch-up paint (approx. 5 ltrs.) shall be furnished for application at site

ACCESSORIES

Earthing equipment suitable for earthing the bus or outgoing cable Breaker carrier trolley if C.B. is of that design cubicle door opening key (1 for each panel) Withdrawal handles for breaker

Commissioning spares (Provide list of spares along with offer.

7.0 DESIGN CRITERIA

The Switchgear shall be capable of continuous operation at specified rating under the following condition sec.

Voltage variation : +/- 1

Frequency variation : + 3%

Combined voltage & frequency variation: 10 %

The de rating of the equipments shall be done taking 50 deg C as an ambient temperature if it is designed at lower temperature. The maximum temp. in any part of the equipment at specified rating shall not exceed 85 deg C considering reference ambient temperature as 50 deg C.

The breakers of the respective system shall have the breaking capacity corresponding to fault levels as specified

The breaker shall be Vacuum type. The circuit breaker shall be fitted with microprocessor based self-powered relay inside the front cover

The breaker ratings shall be as per drawing and bill of quantity

The cable termination shall be done by heat shrinkable termination method. The Compartment should have sufficient height space for proper Termination /Bonding of cable leads

8.0 DRAWINGS & INFORMATION

Drawings, Data & Manuals shall submitted in triplicate with the bid and in quantities and procedures as specified in General Conditions of contract and/or elsewhere in the specification for approval & subsequent distribution after the issue of Letter of intent.

9.0 DRAWING AND INFORMATION

Breaker sizing calculation along with relevant Test Reports.

Outline dimensional drawing of the switchgear showing general arrangement, space requirements and cable entry points, location of breaker, CT, Pt busbar chamber, grounding arrangement etc. c. Bill of Materials.

Typical foundation plan.

Typical breaker control schematic.

Test reports on circuit breaker/CT/PT.

Technical leaflets on & complete specifications & OEM address for bought out items.

Bus bar & circuit

Instruction manuals of switchgear & individual equipment. The manual shall clearly indicate that the installation method, check-up and tests to be carried out before commissioning of the equipment as well as monitoring tests, their interval & maintenance.

10.0 TESTING

Vendor shall test each cubicle as per relevant standards with all components assembled and fully wired.

Routine tests shall be carried out on all components as per relevant standards.

Four (4) copies of test certificate shall be submitted for Owner's approval before dispatch of switchgear.

Vendor shall also submit 4 – sets of Test certificates of all bought out items supplied along with panel, viz. relay,

CT, VT, Meters etc.

Owner reserves the right to witness the following routine test on switchgear/components mounted in switchgear:-

Operational test (Electrical & mechanical) of Circuit Breaker.

Primary/secondary current injection test to check the operation of circuit breakers, indicating lamp, interlocks etc.

Pick-up & drop-off voltage test for shunt trip and closing coil.

Current Transformers Polarity Test. Voltage Ratio Test for Voltage Transformers.

Insulation resistance Test of Power & Control Circuit, before and after High Voltage Test .

High Voltage test on Power and Control Circuit

Earth continuity test, with low voltage tester. Physical dimensional check as per the approved drawing and visual inspection of the switchgear.

Circuit breakers contact opening & closing time at rated voltage, at 70% to 110% of rated voltage and also synchronous operation test.

Milli volt drop test of circuit breaker.

11.0 INSPECTION

Owner or his authorized representatives will carry out inspection including witnessing tests.

Vendor shall notify Owner or his authorized representatives in writing at least fifteen (15) days prior to scheduled date of inspection. All apparatus, instruments etc. required for test shall be provided by the vendor's and shall have been checked and tested for accuracy during the twelve month, prior to the test, bearing tag No. of competent authority.

12.0 TRANSPORT, DELIVERY AND STORAGE

The prices shall be F.O.R. site basis including packing & forwarding charges. The quoted price must include all the costs for necessary mode of transportation up to the final location of HT switch gear on site store. The switch gear should be supplied with required storage arrangements suitable for placing in open storage yard. All incidental expenses during transportation shall be part of quoted prices including transit insurance. The charges for loading and unloading of equipments at site should form part of offer.

The transportation for any auxiliary item or detachable part of equipment should be simultaneous and carry necessary instructions for assembling and storage requirements.

13.0 COMPLETENESS OF SUPPLY

It is not the intent to specify completely herein all details of the equipment. Nevertheless, the equipment shall be complete and operative in all aspects and shall conform to highest standard of engineering, design and workmanship any material or accessories which may not have been specifically mentioned but which is necessary or usual for satisfactory and trouble free operation and maintenance of the equipment shall be furnished without any extra charge

14.0 GAURANTEE

The Bidder shall stand guarantee for the performance of entire equipment and components for twelve (12) months from the date of commissioning or eighteen (18) months from the date of dispatch, whichever is earlier, as agreed up on and as reproduced in the purchase order within the tolerance specified or as permitted by the relevant standards for the equipment in his scope of supply. The Purchaser also reserves the right to use the rejected equipment or part thereof until the new equipment meeting the guaranteed performance is supplied by the Bidder.

15.0 MAKE LIST

Make of switchgear component shall be as specified in data sheet or customer standard

or as per specified in BOQ and Make list

16.0 QUALITY ASSURANCE

Vendor shall submit their internal quality assurance plan followed for manufacturing of the Equipment, for approval of Owner/Consultant. This shall be adhered to and shall be monitored by owner/consultant during manufacture.

17.0 DIVIATION

Deviation from specification must be stated in writing at the quotation stage. In the absence of such a statement, it will be assumed that the requirements of specification are met without any deviation

(Schedule – G: Item No. 3)

TECHNICAL SPECIFICATIONS FOR DISTRIBUTION TRANSFORMER (OIL TYPE)

1.0 SCOPE OF WORK

1.1This specification are intended to cover engineering, design, manufacture, assembly, testing at manufacturer's works, packing and forwarding, delivery and transportation F.O.R. site of Low loss Transformer complete in all respect with all equipment, fittings and accessories for efficient and trouble-free operation as per the technical specified below

2.0 CODES & STANDARDS

2.1 The design, material, construction, manufacture, inspection, testing and performance of the low loss power transformers shall comply with all currently applicable statutes, regulations and safety codes in the locality where the equipment will be installed. The equipment shall also conform to the latest applicable standards and codes of practice.

2.2 Transformers shall conform to the current applicable standards and codes of practice as specified as under. In case of conflict between the applicable reference standards and this specification, this specification shall govern.

Sr.	Item	Relevant IS	Relevant IEC
1	Distribution Transformer up to 500KVA	**IS 1180**	
2	Power transformer	IS 2026	IEC 76

3	Fittings & Accessories	IS 3639	
4	Climate Proofing	IS 3202	IEC 354
5	Loading of Transformer	IS 6600	IEC 296
6	Oil	IS 335	IEC 137
7	Bushings	IS 3347/IS 2099	IEC 144
8	Degree of Protection	IS 2147	IEC 76
9	Testing, Tolerances on guaranteed Particulars	IS 2026	IEC 76
10	Buchholz Relay	IS 3637	
	Electrical Insulation	IS 1271	IEC 85

3.0 DESIGN BASIS & SITE CONDITIONS

3.1 All the equipment and components provided in the transformer and accessories shall be suitably designed for installation and satisfactory operation as specified below.

Site conditions			
Location : PALANPUR		**Site altitude** : 36 M above meansea level	
Ambient temperature		**Relative humidity**	
Maximum : 50 ^{0} C		Maximum : 98 %	
Minimum : 5^0 C		Minimum : 40 %	
Design : 50 ^{0} C		Design 98 % at 50 ^{0} C	
Seismic factor : Zone III as per IS:1893		**Rainfall** : 1000 mm/year	
Environmental : Tropical		**Location of Equipment : Outdoor**	
Electrical system data:			
Power supply for Equipment			
Voltage 415 kV ± 5 %		**Frequency** 50 Hz ± 3 %	
Permissible combined voltage & frequency variation	± 6 %	**System design faults level (Symmetrical)**	26.3 Max.
System earthing LV side neutral solidly earthed		**Wiring** 3 phase, 4 wire on 415V system	
Auxiliary power supply :			
Power supply		240V AC, 1-Ph, 50Hz	
Control Supply		-----	
Space heater power supply		240V AC, 1-Ph, 50Hz	
Illumination power supply		240V AC, 1-Ph, 50Hz	
Plug-socket power supply		240V AC, 1-Ph, 50Hz	

4.0 TECHNICAL REQUIREMENTS
4.1 GENERAL CONSTRUCTIONAL FEATURES

4.1.1 The transformer shall be able to withstand a short circuit between phases and between phase to ground at one side for 5 sec. without damage maintaining rated voltage on the other non-affected side. It shall be capable of withstanding without permanent damage the thermal and dynamic stresses resulting from short-circuit symmetrical R.M.S. and asymmetrical peak currents. Thermal capability shall be sufficient to allow short-circuit current to flow for the specified time without any damage to the equipment. The Bidder shall provide necessary proof to prove the dynamic stability of the transformer proposed to be supplied to withstand the short-circuit either by testing or by submitting the Test Certificates for testing conducted on similar transformer at Government recognized Testing Laboratory (CPRI, ERDA, etc.). The Certificate shall be applicable to the configuration of transformer proposed to be supplied and tested at not less than the circuit Fpqains specified on the Data Sheets.

4.1.2 Similar parts, particularly removable ones, shall be interchangeable

4.1.3 Pipes and pipe fittings, screws, studs, nuts and bolts used for external connections shall be as per the relevant standards. Bolts and nuts exposed to atmosphere shall be galvanized.

4.1.4 Nuts, bolts and pins used inside the transformers and tap changer compartments shall be provided with lock washers or locknuts.

4.1.5 Exposed parts shall not leave pockets where water can collect.

4.1.6 Internal design of transformer shall ensure that air is not trapped in any location.

4.1.7 Materials in contact with oil shall be such as not to contribute to the formation of acid in oil. Surface in contact with oil shall not be galvanized or cadmium plated.

4.1.8 Labels shall be provided for all identifiable accessories like relays, switches, fans, current transformers etc. All label plates shall be of non-corrosive material.

4.1.9 All internal connections and fastenings shall be capable of operating under overloads and over-excitation allowed as per specified standards without injury.

4.2 PAINTING

4.2.1 The interior of all transformer tanks and other oil filled chambers and internal structural steel work shall be cleaned of all scale and dust by shot blasting unless otherwise approved. These surfaces shall be painted with not less than two coats of heat resistant, oil insoluble and insulating varnish. Steel surfaces exposed to the weather shall be thoroughly cleaned and have a priming coat of zinc chromate applied. The second coat shall be of an oil and weather resistant nature, preferably of distinct colour from the prime and finish coats. The final coat shall be of a glossy oil and weather resisting non fading paint of specified shade.

4.2.2 Metal parts not accessible for painting shall be made of corrosion-resistant material.

4.2.3 Interior surfaces of mechanism chambers and marshalling kiosks shall receive three coats of paint after proper cleaning. The final coat shall be of a light colour anti- condensation paint.

4.2.4 As per OEM standard practice painting procedure shall be sent for approval.

4.3 ELECTRICAL AND PERFORMANCE REQUIREMENTS

4.3.1 Transformers shall operate without injurious heating at the rated kVA at any voltage within +10% to –10 % of the rated voltage of that particular tap.

4.3.2 Transformers shall be capable of delivering the rated current at a voltage equal to 105 percent of the rated voltage without exceeding the limiting temperature rise.

4.3.3 Unless otherwise specified, transformers shall be designed for operation at a frequency of 50 Hz.

4.3.4 The maximum flux density in any part of the core and yokes, at normal voltage and frequency shall be such that the flux density under over voltage conditions shall not exceed the maximum permissible values for the type of core and yoke material used. The type of material and values of flux density in the core/ yoke for the 100%, 125% and 140% and the hysteric characteristic curves shall be included in the Bid, and shall be subject to approval. In case of transformers with variable flux density the voltage variation which affects the flux density at every tap shall be kept in view while designing transformers.

4.3.5 Unless otherwise specified, transformers shall be designed for the following over fluxing withstand

Capability:

- 110% - Continuous for all transformers.

- T

ransformers shall operate below the knee of the saturation curve at 110 percent voltage to reduce ferro resonance and non-linear oscillations.

4.3.6 Unless otherwise stated, transformers shall be capable of operation continuously, in accordance with the applicable standard loading guide at their rated kVA and at any of the specified voltage ratios.

4.3.7 Overloads shall be allowed within the conditions defined in the loading guide of the applicable standard. Under these conditions, no limitations by terminal bushings, on- Load tap changers or other auxiliary equipment shall apply.

1. T

ransformer core shall be built up of low loss non-ageing, cold rolled grain oriented silicon steel insulated laminations. Adequate cooling ducts shall be provided. Transformer tanks shall be of robust construction fabricated out of M.S. plate. All welded joints and valves shall be tested after fabrication of the tank to withstand up pressure of 1.0 kg/sq.cm. In excess of the static head of oil. Bolted joints shall carry non-deteriorating -gaskets.

2. T

ransformer cooling shall be as specified under equipment schedule with fixed or removable radiator tubes of seamless construction and adequately braced to the tank.

3. A

ll normal fittings required under section 14 of IS: 2026 - Part I shall be provided. Additional fittings shall also be provided as stipulated in the Datasheet.

4. T

he transformer shall be supplied with oil conforming to IS: 335. The transformer shall be delivered after drying out and ready to put into commissioning without further drying out at site.

5. The t

6. T

he dynamic ability to withstand short circuit shall be demonstrated by reference to tests on similar transformers.

7. Every

8. T

he transformers shall be designed with particular attention to the suppression of harmonic voltage, especially the third and fifth, so as to eliminate wave form distortion and from any possibility of high frequency disturbances reaching such a magnitude as to cause interference with communication circuits.

9. A

ll rated quantities subject to the guarantees shall be within the tolerances given in applicable standards.

10. T

he finally assembled core with all the clamping structures shall be free from deformation and shall not vibrate during operation.

11. A

ll internal metal parts of the transformer, with the exception of individual laminations, core bolts and their individual laminations, core bolts and their individual clamping plates shall be earthen.

12. W

indings shall be subjected to a shrinking and seasoning process, so that no further shrinkage occurs during service. Adjustable devices shall be provided for taking up possible shrinkage in service.

13. M

aterials used in the insulation and assembly of the windings shall be insoluble, non-catalytic and chemically inactive in the hot transformer oil, and shall not soften or be otherwise affected under the operating conditions.

14. T

he completed core and coil assembly shall be dried in vacuum at not more than0.5

mm of mercury absolute pressure and shall be immediately impregnated with oil after the drying process to ensure the elimination of air and moisture within the insulation. Vacuum may be applied in either vacuum oven tank or in the transformer tank.

4.4 VALVES

4.4.1 Valves shall be of forged carbon steel upto 50 mm size and of gun-metal or of cast iron bodies with gun-metal fittings for sizes above 50 mm. They shall be of full-way type with screwed ends and shall be opened by turning counter clockwise when facing the hand wheel. There shall be no oil leakage when the valves are in closed position.

4.4.2 Every valve shall be provided with an indicator to show the open and closed positions and shall be provided with facility for padlocking in either open or closed position. All screwed valves shall be furnished with pipe plugs for protection.

4.4.3 All valves shall be provided with flanges having machined faces drilled to suit the applicable requirements. Oil- tight blank flanges shall be provided for each connection for use when any radiator is detached and for all valves opening to atmosphere. If any special radiator valve tools are required, the same shall be provided.

4.5 TRANSFORMER COOLING EQUIPMENT

4.5.1 Radiators and coolers shall be designed to withstand the vacuum and pressure conditions specified for the tank. They shall be so designed as to avoid pockets in which moisture may collect, to completely drain oil into the tank and to prevent formation of gas pockets when the tank is being filled.

4.5.2 The clearance between all pipe work and live parts shall be more than the clearance for live parts to earth.

4.5.3 Unless otherwise approved, for transformers rated 1000 kVA and above, tank mounted radiators/coolers shall be of the detachable type with bolted and gasketed flanged connections.

4.6 TAPS AND TAP CHANGE GEAR:

4.6.1 Tapings shall be On Load/Off Load (where ever applicable as mentioned in data sheets) and brought out from HV winding and terminated in an external motor operated tap switch with position indicator. Transformer output shall remain

unaffected for any tap position.

4.7 LOSSES

4.7.1 The iron losses and copper losses shall be as mentioned in data sheet shall be as per IS 1180

4.7.2 Bids will be evaluated based on the CBIP formula.

4.7.3 For the purpose of evaluation of Bids, the quoted load losses and iron losses shall be increased to take into consideration tolerance as permitted by applicable standards and as quoted.

4.8 REJECTION

4.8.1 The client may reject any transformer if during tests or service any of the following conditions arise:

4.8.2 The client reserves the right to retain the rejected transformer and take it into service until the BIDDER replace, at no extra cost, the defective transformer by a new transformer. Alternatively, the BIDDER shall repair or the replace the transformer within a reasonable period to the client satisfaction at no extra cost.

5.0 DRAWINGS & INFORMATION

5.1 ALONGWITH OFFER

5.1.1 The bidder shall submit completely filled data sheet as per the given format along with GA drawing indicating list of accessories.

Submit list of spare parts required for safe operation of equipment for Two years

5.2 HANDING OVER DOCUMENTS

5.2.1 The supplier shall submit following:
GA drawing
HV/LV Cable Box
Foundation layout
Rating and Diagram Plate
Data sheet indicating results of tests
Test reports O & M manuals

6.0 INSPECTION AND TESTING

6.1 Following tests should be performed as acceptance test at manufacturing place

1. Measurement of winding resistance at all taps
2. Measurement of voltage ratio and check' of voltage vector relationship
3. Measurement of impedance volt age/short-circuit impedance (principal tapping) and load loss
4. Measurement of no-load loss and current
5. Measurement of insulation resistance
6. BDV of insulating oil
7. Magnetic balance test
8. Functioning of equipments at marshalling box
9. Submission of test reports and certificates for all the bought out components from the sub-suppliers for the tests carried out at the respective manufacturer's works
10. Calibration reports of meters used during testing
11. Any other special test, if asked for in data sheet

One day free supervision shall be provided by OEM during commissioning of transformer.

All Routine tests as per IS: 1180 shall be carried out with no extra costs.

7.0 METHOD OF MEASUREMENT

7.1 Supply of the transformer including transport to site, loading and unloading etc. as specified will be treated as one unit for measurement and payment.

(GUJ R & B ELE SOR-10.2.1 to 10.2.6) - (Schedule- G: Item No. 4 to 9)

Item No-4:

Specification

Printed instruction chart both in English and Gujarati and duly framed with front glasses, for treatment of person suffering from Electric shock with minimum 50" diagonally size.

Item Measured in no basis.

Item No-5:
Specification
Rubber hand gloves suitable for working on 11 KV/22 KV
Measured in no basis.

Item No-6:
Specification
Rubber matting of following thickness as per IS: 15652/IEC 61111 (c) 12mm
Item Measured in Sq.m basis.

Item No-7:
Specification
Stand first AID box with antiseptic cream, medicine for use on wounds due burn, crepe bandage, gauge bandage, medicated ready to use bandage (Band-Aid) adhesive tape for medicinal user, Scissors, anti-septic solution (Savlon or similar) etc. (All above contents shall be of standard makes)
Item Measured in no basis.

Item No-8:
Specification
FIRE bucket round bottom of 9 liters capacity made out of 24 gauge G.I. sheet with extra handle at bottom duly painted white inside and Red outside with FIRE mark, filled with dry-sand and kept on existing stand provided or hung on wall hook.
Item Measured in no basis.

Item No-9:
Specification
Floor mounting stand for keeping four nos. of FIRE buckets comprising 1500 mm in length, 900 mm height frame made out of 30mm X30 mm X 4 mm angle iron with cross supports for legs, welded with 4 hooks and duly painted with one coat of red lead and two coats of approved enameled silver paint.
Item Measured in no basis.

(Schedule – G: Item No. 10, 15)

TECHNICAL SPECIFICATIONS FOR HT XLPE CABLE (GUJ R & B ELE SOR-10-2-14.)

1.0SCOPE OF WORK

The scope shall cover supplying, laying, testing and commissioning of 3 or 1 core cables of circular stranded aluminum conductors, XLPE extruded dielectric, screened, copper shielded and PVC outer sheathed. The cables will be armoured with galvanized steel armour.

Cables shall be capable of operating at a sustained conductor temperature of 90° c. and suitable for a maximum conductor short-circuits temperature of 250° c.

This specification gives the general requirement of cables. However, it is the responsibility of the vendor to obtain client's approval before the placement of orders to the main supplier/manufacturer.

2.0CODES & STANDARDS

The following standards and rules shall be applicable:

Sr.	Item	Relevant IS	Relevant IEC
1	Conductors of Insulated	IS: 8130 - 1984	IEC: 228
2	Impulse tests on cables and their accessories		IEC: 230
3	Extruded solid dielectric- insulated power cables for rated voltage from 1 KV up to		IEC: 502
4	Test methods for insulations and sheaths of electric cables and chords.		IEC: 540
5	Test on cable over a sheath which has special protective functions and are applied by extrusion.		IEC: 229
6	Calculations of continuous current rating of cables (100%)	IS: 7098 (Part II)	IEC: 287
7	Cross-linked polyethylene insulated PVC sheathed cable for voltage from 3.3KV up to 33 KV.		
8	PVC insulation & sheath of electrical cables.		
9	Mild steel wires, formed wires and tapes for armouring of		
		IS: 7098 (Part II) IS: 5831 - 1984	
10	Electrical test methods	IS: 3975	

3.0 DESIGN BASIS & SITE CONDITIONS

All equipment and materials will be selected and rated for use at the following site conditions.

Site conditions			
Location		PALANPUR	
Ambient temperature		**Relative humidity**	
Maximum 47 0 C		**Maximum** 98 %	
Minimum 5 0 C		**Minimum** 40 %	
Design 45 0 C		**Design** 98 % at 45 0 C	
Seismic factor As per IS:1893		**RAINFALL** 1000 mm/Year	
Environmental Non corrosive, Humid and Dusty		**Location of Equipment** Ground/Air	
Wind speed 80 kmph maximum			
Electrical system data :			
Power supply for Equipment			
Voltage 11KV ± 5 %		**Frequency** 50 Hz ± 3 %	
Permissible combined voltage & frequency variation	± 6 %	**System design faults level (Symmetrical)**	18.37KA for 1 sec.
System earthing LV side neutral solidly earthed		**Wiring** 3 phase, 3 Wire system on 11Kv system. And 3 phase 4 wire system on 415V	
Auxiliary power supply			
Power supply	240V AC, 1-Ph, 50Hz or as per specified in SLD		
Control Supply	-----		
Space heater power supply	240V AC, 1-Ph, 50Hz or as per specified in SLD		
Illumination power supply	240V AC, 1-Ph, 50Hz or as per specified in SLD		
Plug-socket power supply	240V AC, 1-Ph, 50Hz or as per specified in SLD		

4.0TECHNICAL REQUIREMENTS

GENERAL CONSTRUCTIONAL FEATURES

Conductors:

The conductor shall be of circular stranded Aluminium confirming to IS: 8130 & IEC:

It shall be clean, reasonably uniform in size & shape smooth & free from harmful defects. Any other form of conductor may also be accepted if in line with modern trends

Semi-Conductor Barrier Tape/Tapes:

The semi-conducting barrier tape/tapes shall be provided over the conductors.

Conductor Screen:

The conductor screen shall consist of an extruded layer of thermosetting semi-conducting compound which shall be extruded simultaneously with the core insulation.

Insulation:

The insulation shall be super clean XLPE compound applied by extrusion and vulcanized to form a compact homogenous body.

Insulation Screen:

Each insulation have an insulation screen in two parts consisting of:

A water barrier tape/Non-metallic semi-conducting swell able tape part and a metallic screen part.

The non-metallic part shall be directly applied upon the insulation of each core and may consist of an impregnated but nylon/PVC tape or a similar approved material or, an extruded semi-conducting material extruded simultaneously with the conductor screen and insulation (triple extrusion).

The semi-conductor shall be readily strippable and must not be bonded in such a manner that it has to be shaved or scraped to remove.

The metallic part shall consist of a copper tape helical applied with a 30% overlap over the water barrier tape/blocking tape. A binder tape of copper shall be applied over the copper wire metallic screen.

Laying Up:

The cores shall be identified on the non-metallic part of the insulation screen by legible printing on the length of each conductor or, by the inclusion of a marker tape.

The cores shall be laid up with a right hand direction of

lay. Binder tape/Moisture barrier:

During lay-up, a suitable open spiral binder may be applied, at the manufacturer's discretion, before the application of an extruded inner covering.

Fillers

Fillers shall be polypropylene.

Inner Covering/Sheath

The inner covering shall be extruded over the laid up cores to form compact and circular bedding for the metallic layer.

Metallic Layer:

The metallic layer shall be galvanised steel wire.

Outer Sheath:

The tough outer sheath, black coloured best resisting PVC polyethylene compound type ST-2 as per IS: 5831 for the operating temperature of the cable shall be provided over the armour as specified in relevant standards by extrusion process.

5.0 Cable Marking:

Embossing on outer sheath:

The PVC outer sheath shall be legibly embossed with the legend: “ELECTRIC CABLE 11000 VOLT” ETC.

The letter and figures shall be raised and shall consist of upright block characters. The maximum size of the characters shall be 13 mm. And the minimum size 15% of the cable circumference or 3 mm. whichever be the greater. The gap between the end of one set of embossed characters as above and the beginning of the next shall not exceed 150 mm.

Identification of Manufacturer and year of manufacture:

An identification of the manufacturer, year of manufacture, Cable size shall be embossed at regular intervals on the PVC outer sheath. This shall not affect the spacing between repetitions of the legend as given above.

6.0 SEALING AND DRUMMING:

After tests at the manufacturers’ works, both ends of the cable shall be sealed to prevent the ingress of moisture during transportation and storage.

Cable shall be supplied in lengths of 500 meters non-returnable drums of sufficiently

sturdy construction.

The spindle hole shall be 110 mm. minimum diameter.

Each drum shall bear on the outside flange, legibly and indelibly in the English language, a distinguishing number, the manufacturer's name and particulars of the cable, viz. voltage, length, conductor size, cable type, insulation type and Gross weight shall also be clearly visible. The direction for rolling shall be indicated by an arrow.

7.0 DRAWINGS & INFORMATION

Contractor shall submit the as built drawing of cable laying. Complete technical data sheet and QAP should be submitted after award of contract.

8.0 INSPECTION AND TESTING

Routine tests shall be carried out in accordance with the relevant IEC standards/IS.

The copies of routine test results shall be submitted along with each drum length or part thereof.

9.0 Method of Measurement

All the items will be measured as mentioned in Bill of quantity.

10.0 DATA SHEET

Sr. No.	Particulars	Description
1.0	**ENVIRONMENT DETAILS**	
1.1	Ambient Temp In Degree Celsius	50 Degree Celsius
1.2	Ground Temp In Degree Celsius	35 Degree Celsius
1.3	Relative Humidity	90 % At 35 Degree Celsius
1.4	Altitude	< 1000 Meter Above MSL
1.5	Atmosphere	Non Corrosive, Humid and Dusty
2.0	SYSTEM DETAILS	
2.1	System Voltage	11KV , + / - 10%
2.2	System Frequency	50 Hz., +3% / -6%
2.3	Grounding	Solidly Earthed
2.4	Fault Level	For 11 KV System 18.37 KA for 1 Sec
3.0	CABLE	

3.1	No. of Cores	3 (Three)
3.2	CABLE CONDUCTOR	
3.2.1	Size Of Conductor	As per BOM
3.2.2	Material	High Purity Aluminium
3.2.3	Construction	Stranded
3.2.4	Shape	Compacted Circular
3.2.5	Confirming To	Is-8130
3.3	Conductor Screen	Extruded Semi-conducting Material
3.4	CONDUCTOR INSULATION	
3.4.1	Material	High Purity Void And Moisture Free Cross Linked
3.4.2	Thickness	> = 5.5mm

(Schedule – G: Item No. 16)

HNICAL SPECIFICATIONS FOR CAPACITOR & APFCR PANEL (GUJ R & B ELE SOR-10-4-11.)

1.0 SCOPE OF WORK

1.1 This specification covers design, manufacture, supply, installation, testing and commissioning of automatic power factor correction panel with capacitor banks suitable for continuous duty.

2.0 CODES & STANDARDS

The design, manufacture and performance of the power factor correction panel with capacitor banks shall comply with all currently applicable statutes, regulations and safety codes in the locality where the equipment will be installed. The equipment will also conform to the latest applicable Indian/British/IEC standards. In particular the equipment shall conform to the latest revisions of the following:

Sr.	Item	Relevant IS	Relevant IEC
1	Shunt capacitors for power system.	IS 2834	

2	Low voltage fuses.	IS 9224	

When the above standards are in conflict with the stipulation of this specification, this specification supersedes them.

3.0 DESIGN BASIS & SITE CONDITIONS

All the equipment and components provided in the transformer and accessories shall be suitably designed for installation and satisfactory operation as specified below.

Site conditions			
Location		PALANPUR	
Ambient temperature		**Relative humidity**	
Maximum 47 ^{0} C		Maximum 98 %	
Minimum 05 ^{0} C		Minimum 40 %	
Design 45 ^{0} C		Design 98 % at 45 ^{0} C	
Seismic factor As per IS:1893		**Rainfall**	
Environmental Tropical/humid/corrosive conditions		**Location of Equipment Indoor**	
Wind speed 80 kmph maximum			
Electrical system data:			
Power supply for Equipment			
Voltage 415 kV ± 5 %		**Frequency** 50 Hz ± 3 %	
Permissible combined voltage & frequency variation	± 6 %	**System design faults level (Symmetrical)**	35 kA – 50 KA for 1 sec. max.
System earthing LV side neutral solidly earthed		**Wiring** 3 phase, 4 wire on 415V system	
Auxiliary power supply :			
Power supply		240V AC, 1-Ph, 50Hz	

Control Supply	-----
Space heater power supply	240V AC, 1-Ph, 50Hz
Illumination power supply	240V AC, 1-Ph, 50Hz
Plug-socket power supply	240V AC, 1-Ph, 50Hz

4.0 TECHNICAL REQUIREMENTS

GENERAL CONSTRUCTIONAL FEATURES

CAPACITOR PANEL (APFC Panels): 50KVAr – OEM Panel

Supply, fixing, connecting and commissioning and testing of OEM Manufactured / Company make APFC Panel 50 KVAr with steps 2x12.5kVAr + 1x25kVAr. The APFC Panel shall be fully type tested at an Independent Laboratory and shall comply to IEC 61439-1&2 and IEC 61921 & as per IS16636. The APFC Panel shall be (Indoor) type, weather, and dust and vermin proof suitable for humidity up to 95%.

Average daily temperature: +35°C max, Ambient temperature: -5°C to 45°C, Maximum altitude: 2000

m. The enclosure system shall be of certified design as per IEC 62208. The enclosure system should have a minimum of IK 10 certification (external mechanical impacts) in accordance with IEC 62262. The degree of protection of enclosures system of the APFC Panel shall be IP31 in accordance with IEC 60529.

As equipment shall be manufactured as directed by the Eng.-in-Charge and shall comprising of the

Following: -

(A) Insulated bus bar pan assembly made from Al and rated of 250 Amps capacity. The short circuit withstand capacity shall be 35 KA / 1 Sec (Icw) for the main bus bar and the rated impulse withstand voltage shall be 12 KV.

(B) The incomer of the APFC Panel shall be a 250Amp MCCB, The MCCB Shall have short circuit and overload protection & shall be of certified design confirming to IEC 60947- 1,2 & 3.

(C) Capacitor Units: The capacitor unit shall be metalized polypropylene film with Zn / Al alloy. The capacitors shall be encapsulated in an aluminium can. The capacitor

unit shall have a rated voltage of 440V and shall have a maximum over current capacity of: 1.8 In. The capacitor unit shall have a built in 3 phase over pressure protection and shall have discharge resistors (50V in 1min) factory fitted and shall be tamper proof. Capacitance Tolerance -5%, +10%. Maximum permissible over voltage 1.1 x Un, 8 h every 24 h. The capacitor unit shall be of certified design confirming to IS-13340-1993, 13341-1992 & IEC - 60831-1&2.

(D) Reactors: The de-tuning reactors shall be connected in series with each capacitor stage and shall be of iron cored type. The reactors shall have relative impedance of 7%, with a de- tuning frequency of 135 Hz. The reactors shall prevent amplification of 3rd and higher order harmonics. The reactors shall have built in thermostats to protect from overheating. The reactor insulation shall be Class “H” rated at 180oC. The reactors shall be of certified design confirming to IEC-60076 - 6.

(E) Short-circuit and Overload Protection: Each stage of the APFC Panel shall have a suitably rated MCCB with an over-current relay for short-circuit and overload protection. The over- current relay shall be adjusted to trip if the RMS current of the stage exceeds the overload setting. The MCCB shall be of certified design confirming to IEC 60947-1, 2 & 3.

(F) PF Regulator: Advanced Range PF Regulator shall have 6 steps with a LCD Display, Voltage Range: 90V - 550V, 50 / 60Hz, CT Input: 1A/5A with a built in RS 485 communication port. The PF Regulator shall be of certified design confirming to IEC 61326.

(G) Stage Contactor: The electromagnetic contactors shall be rated for 660 Volts and shall be 3- pole type and shall be employed for switching 'on' and switching 'off' operations in capacitor banks. The rated voltage of control coil shall be 415V (phase-to-phase). This voltage is subject to a variation of (+) 10% and (-) 15%. The contactor shall be AC3b type. The contactor shall be of certified design confirming to IEC 60947-1 & 4-1.

(H) Ventilating fans of required size shall be sued to dissipate the heat produced by the capacitor bank components like the capacitor units, reactors, contactors, breakers etc. The capacitor banks should be of type tested design and

temperature rise test report of the capacitor bank performed at an independent laboratory should be submitted along with the offer.

(I) The APFC Panel shall be manufactured by an Original Equipment Manufacturer (OEM) only

i.e. The OEM's specified cannot authorize any other partners / sub vendors to manufacture APFC Panels on their behalf. The APFC Panel manufactured by OEM's only will be accepted & factory acceptance test (FAT) will be Carried out at OEM's plant only.

EARTHING

The enclosure of individual capacitor unit shall be provided with 2 nos. 10 mm earth terminals each

Complete with two plain and one spring washer, nuts etc. These terminals shall be effectively

Bonded to the common sheet steel frame work. Each bank will have two external earth terminals in the bus bar chambers complete with hardware.

PAINTING

The painting shall be as per "PAINTING" specification only.

5.0 DRAWINGS & INFORMATION

The following drawings shall be submitted along with the bid:

General arrangement drawing showing overall dimensions, weight, internal arrangement and mounting details.

Terminal chamber, showing bus-bar arrangement with all dimensions.

Power wiring diagram of capacitor panel.

Control wiring diagram of capacitor panel.

C.T. connection.

Manual for Automatic Power Factor Correction Relay.

6.0 INSPECTION & TESTING

ROUTINE TESTS

Capacitor control panel shall be automatic as specified in the data sheet and bill of

quantity.

The panel for capacitor shall be fabricated from 2.0 mm thick sheet steel and shall be finished as per clause no. 5.0. Earthing terminals shall be provided as per clause no. 4.0. The panel shall be provided with suitably rated TPN AL bus bar supported on FRP insulator and with heat shrinkable type sleeves. Each capacitor unit shall be connected to main bus bar through contactors of suitable rating (double the rating of capacitor current) with safety margin. Each unit shall be of suitable KVAR rating as specified. Protective HRC switch fuses of suitable rating shall be provided with base/holders as mentioned in the drawing.

Connections shall be made with FRLS insulated flexible copper cables having crimped Cu. lugs. Continuous earthing conductor/strip shall run through and all capacitor units shall be earthed. Sufficient ventilation shall be provided in the capacitor compartment to limit the temperature rise to 85° C. Cooling fans shall be provided with ON-OFF switches as per requirements. Drawing pocket shall be provided for each panel at the door. Also, a 15 A switched socket and a lamp holder shall be provided for panel illumination at suitable location.

The main bus bar shall be terminated on suitably rated SFU with fuse links or MCCB as per Drawing. Vertical compartment with detachable gland plate shall be kept for incoming cable connections from bottom or top as specified. The gland plate shall be provided with required size and nos. of knockouts. Capacitor units shall be mounted on angle frame of strong construction.

The panel shall be mounted on M.S. channel section at bottom for easy installation.

The panel shall be provided with lifting hooks/Eye bolts for handling.

Automatic power factor correction sensing relays (APFCR) shall be provided with all related circuits and contactors for controlling the power factor to max. 0.98 By energizing the contactor and related capacitor bank “ON” or “OFF” as per load conditions.

The controller shall be set for time lag of 40-60 seconds so that on sensing the low or high power Factor it energizes or de energize the contactor after 40-60 seconds.

The Dust and Vermin proof switching compartment shall be isolated from capacitor mounting compartment.

The panel shall be provided as per the respective drawing.

The following drawings shall be submitted before procurement for approval from the client/consultant 1 General arrangement and Fabrication details.

2 Power wiring diagram of capacitor panel.

3 Control wiring diagram of capacitor panel.

4 C.T. connection.

5 Manual for Automatic Power Factor Correction Relay.

TEST & TEST CERTIFICATES

Vendor shall carry out all routine tests as specified in IS: 2834 and shall furnish the test certificates.

The vendor shall also carry out the thermal stability test on the units in the presence of purchaser's representatives.

The capacitor units shall be tested from electric supply authorities like state/local electricity board and the test certificates in duplicate shall be furnished to client and also the copy shall be submitted to the electric supply authority while getting the power supply released from them.

7.0 METHOD OF MEASUREMENT

Supply of the LT Capacitor & APFCR Panel including transport to site, loading and unloading etc. as specified will be treated as one unit for measurement and payment.

Item No-17:

Specification

M.S. structure as per requirement on site incorporating proper size of M.S. angles, square, round, flats, bars, channels, sections complete with cutting, welding, grinding & finishing duly painted with one coat of red oxide with erection on site as per direction of engineer in charge with necessary grouting, cementing, plastering & finishing complete.
M.S Structure should be anti-corrosive.
Item Measured in KG basis.

(Schedule – G: Item No. 24 & 25)

Specification for DG SET

The work shall be executed as per CPWD's general specification for Electrical Works, Part-I-2013, Part-11- 1994 (External) & Part-IV-2013 for Sub-Station, The CPWD General Specifications for Electrical Works Part 7 - DG Sets - Final - 2013, Indian

Standards amended up to date and as per direction of Engineer-in- Charge. The additional specifications as given below are to be read with above and in case of any variations, specifications given along with the tender shall apply.

Contractor shall submit foundation drawings for DG sets, Chimney Structure drawings etc., which should have been prepared by OEM or a specialist, and the same shall be got approved from Department. Wind load of 200KM/Hr. shall be considered for design of Chimney. Ventilation Requirement calculations for DG set shall be submitted Energy efficient sets only shall be accepted. The sets supplied shall meet CPCB norms in respect of Noise, Fuel consumption, Emission levels. Necessary certificates shall be submitted in this regard at the time of approval of drawings of DG sets.

GENERAL:

SCOPE:

This general specification together with the equipment sheets and attachments defines the minimum requirements the design, performance, inspection, supply and testing diesel engines & alternators for general purposes. The construction, design and rating of the diesel engine shall meet fully, the requirements of the specified driven machine and the Vendor shall select and provide the requisite ancillaries and controls with the diesel engine for its safe and satisfactory operation. No deviations or exceptions from this specification shall be permitted without the written approval of the purchaser. Intended deviations supported by reasons there of shall be separately listed by the vendor and submitted with the bid for the consideration of the Purchaser. Compliance with this specification shall not relieve the vendor of the responsibility of furnishing equipment and accessories of proper design, materials and workmanship to meet the specified operating conditions. This general specification supplements the specific requirements contained in the attached equipment data sheets. In the event of any contradiction between the two, the information contained in the latter shall govern. Other attachments of the Material Requisition from a part of this specification.

TERMS AND DEFINITIONS:

The Net Calorific value of fuel is defined as the heat resulting from the complete combustion of a unit quantity of fuel oil and air, without condensation of the water vapor. A net calorific value shall be considered as per relevant standard while declaring

the fuel consumption and for testing purposes. The unit of horsepower as defined in this specification is the metric horsepower equivalent to 4,500 n Kg/Min. The horse power in F.P.S. system is equal to 1.014 metric horsepower. Other terms used in this specification or in the equipment data sheets are as defined in the latest edition of British Standard 5514.

1.0 STANDARD OPERATING CONDITIONS:

The standard operating conditions shall be defined in the latest edition of B.S. 5514 unless otherwise mentioned specifically in the equipment data sheet.

2.0 RATED POWER OUTPUT AND SPEED:

The diesel engine rating shall be the net output in brake horse power, which the engine is capable of delivering continuously at the stated crank shaft speed under the conditions specified under Clause 2.0 above, provided the engine is maintained in good operating condition and is serviced / overhauled regularly as per the schedules laid down by the Manufacturer. No negative tolerance shall be allowed on the diesel

Engine rating specified by the Vendor in the equipment data sheets. The engine shall be capable of satisfactorily providing an output 10 percent in excess of the prime rating defined as per IS 8582. The normal power requirement of the engine driven radiator fan or the coolant pump and the battery charging dynamo shall be clearly stated for the engine which is so equipped. Unless otherwise specified in the equipment data sheets, the site rating of the engine shall be worked out considering the duration's specified under the latest edition of B.S. 5514 and the power absorb by all the engine driven ancillaries shall also be deducted.

3.0 DESIGN & CONSTRUCTION:

GENERAL:

The Diesel engine offered shall be of the regular production models of the manufacturer for industrial applications and already type tested either at the manufacturer's works or outside. The type test report shall be furnished to the purchaser for his review if so desired. The diesel engine with less number of cylinders viz 12/16 cylinder arrangement or as per OEM will be preferred. The diesel engine should be latest design

, without any PT pump, and it should be digital governing system to manage the fuel .

The fuel system should be equip with unit injectors for better fuel atomization. Unless otherwise specified in the equipment data sheets, the diesel engine shall be provided with relevant class as per the latest edition of B.S. 5514. The "Cyclic irregularity" of the diesel engine for direct coupling to an electric generator, "angular deviation of p73 A.C. generators " driven by diesel engine for parallel operation, and the "engine governor speed droop characteristics", shall be restricted to the values specified under the latest edition of B.S. 5514.

In case diesel engines are required to drive generators in parallel, the governor fuel injection pumps provided should have identical characteristics and the speed load curves shall be made available to the purchaser's inspector for his scrutiny and approval prior to load testing. The vendor shall maintain proper record for such curves to ensure additional diesel engines if required in future with identical characteristics, could be made available to the purchaser. A set of the said curves shall also be furnished to the purchaser. The vendor shall be responsible for carrying out torsion analysis of the dynamic system as specified in the latest edition of British Standard 5514. The results in the form of a report shall be submitted to the purchaser for scrutiny and reference, if desired. Vendor shall provide the flexible exhaust connection /s to connect the engine exhaust to the exhaust piping. The required size of the exhaust piping should be clearly specified by the Vendor.

If specified, the common base plate for mounting the diesel engine and the driven equipment through single bearing alternator shall be supplied by the vendor. Vendor shall indicate in the bid, the ISO Noise Level rating of the diesel engine with the offered exhaust silencer/s.

ENGINE STARTING:

Diesel engines shall be capable of starting without the use of cold starting aids so long the ambient temperature at the site is not below 4 oC. The vendor shall provide suitable cold starting aids with diesel engine for quick starting below 4oC of ambient and such aids shall be clearly detailed out along with the offer. Where the diesel engine is specified / offered with battery starting arrangement, the starter motor shall be capable of starting the engine without having to disengage the driven machine with the help of a clutch. In case of diesel engines driving fire water

pumps, besides the engine mounted dynamo and voltage regulator, the Vendor shall also provide automatic battery charging equipment suitable for taking power from an alternating current power source and mounted on a free standing type of a panel. The battery charger if specified in the equipment data sheet, shall be SMPS type. Where the diesel engine is specified / offered with 24V Electric Start system.

If as specified in the data sheets, the diesel engine is required to start / stop automatically, the vendor shall provide the necessary controls (automatic cum manual) in the engine panel and the interconnecting wiring and piping from the panel to the engine and starting equipment. A pilot lampshell be provided in the line side of the starting equipment circuit to indicate that the controller is in the automatic position. In the event the engine does not start after three attempts have been made, the controller shall stop all further cranking and operate the audio-visual alarm.

ENGINE COOLING:

Radiator cooled engines are offered, the diesel engine shall be provided with a radiator for mounting on the common base plate, complete with the suction / blower fan, temperature control valve and a radiator guard.

ENGINE FUEL SYSTEM:

The daily service fuel tank shall be equipped with as air breather, shielded level gauge, strainer and a hand hole, besides the required fuel connections and a drain plug. The capacity of tank shall be as specified in the equipment data sheets. The inside surfaces of the fuel tank and the float tank shall be coated with Enamel Red or Black of LC.I. or its equivalent and the outside surface to be given two coats of the oil resistant primer paint. Both the fuel tank and the float tank, shall be hydrostatic tested at a pressure not less than 0.35 kg /Cm2.

4.0 INSPECTION & TESTING:

The inspector representing Purchaser shall have entry to the plant while and wherever work for the equipment is being performed. The vendor shall have the responsibility of providing purchaser's inspector with all requisite facilities / equipment for carrying out satisfactory testing. The diesel engines shall be tested in the

presence of purchaser's inspector in accordance with the latest edition of B.S. 5514 or any other equivalent standard or as per CPWD specification as agreed to with the purchaser before the finalization of order. Unless otherwise specified, 10% overload provision shall be kept while setting the fuel stop for the site running. The hydrostatic test certificates for the heat exchanger / intercooler, fuel tanks and other pressure vessels shall be furnished to the purchaser's inspector for his review and approval at the time of load testing of the diesel engine. The engine control panel/s after assembly and wiring, shall be functionally tested in the presence of the purchaser's inspector.

Following tests has to be perform

PERFORMANCE TESTS

Performance Tests at works and site test shall be as per CPWD specification.

Upon the delivery to the site and if the generator set is required to re-assemble on site, similar tests shall be carried out by the Contractor to ensure that the performance is not degraded.

The tests, but not limited to be:

Diesel engine-Generator coupling and shafts alignment. On load 'mains failure' simulation test Safety devices test Remote monitoring Auxiliary contacts etc. Load tests. Load tests shall be carried out through building load (minimum 50%). Additional Load test at any load other than building load or 100% load at site shall be optional. However if load is not available not site than, to arrange load bank at site is optional and not included in current tender scope.

5.0 PROPOSAL :

Proposals shall be accompanied with completely filled in Data Sheets. The vendor shall not use his own data sheets. The proposals must include either a specified statement that all equipment is in accordance with the purchaser's specifications or exceptions, if any, to this general specification including attachments shall be clearly brought out by the vendor on separate sheets, supported with suitable reasons thereof for the consideration of the purchaser. Additions or exclusions from the scope of supply shall be clearly brought out on separate sheets giving reasons for such deviations for the purchaser's approval. The drawings and data as listed under "prints

with Quote" on the vendor data requirement sheet attached with this specification, shall be provided. The vendor shall also submit a separate proposal for carrying out supervision of the installation and commissioning of diesel engine/s offered indicating per item rates, no. of specialists proposed to be deputed, completion time and a list indicating nature and quantity of consumable/ tools required and any other terms. And DG set rating as per specified in BOQ.

6.0 SCOPE:

This specification define the requirements of manufacture, testing and supply of self-excited emergency generator complete with automatic voltage regulator, control panel, generator breaker and other accessories as specified in the material requisition. Unless otherwise specified the emergency generator shall be supplied complete with Brushless excitation system complete with AVR. Air inlet and outlet for generator cooling (inlet shall be oriented to suit local plant layout). Lifting arrangement for the machine. Foundation frame complete with foundation bolts and base frame. Lube oil system integral with the prime mover lube oil system. Spares for commissioning - recommendation List of Spares for 4 years / 1000 hours of operation and maintenance. These spares are also to be provided under comprehensive maintenance. Any other part / accessories not specifically mentioned above but considered necessary for safe and reliable operation.

7.0 PERFORMANCE REQUIREMENTS:

Operative Conditions:

Generators shall be suitable for operating satisfactorily in humid and corrosive atmosphere found in pump house. Service conditions shall be as specified in the data sheet. The generator shall operate satisfactorily under sudden load application. Generator rating indicated in the data sheet shall be the net output of the set after accounting for all auxiliaries for the prime mover and generator.

Transient Voltage performance

The dip or rise in system voltage load variations is dependent on the leakage voltage drop of the machine, which shall be kept to the minimum. In case of sudden application of minimum 60% Block load at rated power factor the voltage drop shall not exceed 20% of the rated voltage. The rated voltage shall be restored within 25 to 30 second depending on the size of the machine.

Voltage Regulation

The voltage regulation of the machine shall be within +/- 1 % of the nominal voltage under following conditions

a). Between no load and nominal load with p.f. of 0.8 lag to unity.

b). With the machine cold or warm.

c). At a speed drop of approximately 3% of

the nominal speed. Voltage setting range :

The generator terminal voltage shall be adjustable with a continuously variable potentiometer. The adjustment range shall be +/- 5%.

Harmonic Content

The maximum permissible deviation from the sine wave shall be 5%. The harmonic content of the voltage shall be less than 3% measured between phases off load and up to nominal rating for a power factor of 0.8 lag to unity and with symmetrical distortion free consumers in circuit.

Frequency limits

The Generator shall be suitable for continuous operation at rated load for frequency variation of +/ 3% of rated value in addition the vendor shall furnish the short time under frequency operating limits.

Overloads:

The generator shall be capable of withstanding without injury the effect of a 10% overload for one hour.

Short Circuit Conditions:

The generator shall be capable of withstanding without damage, a three phase, a line to line, line to earth or two line to earth short circuit for a period of 3 seconds when operating at rated speed and with an excitation corresponding to 5% over voltage at no load.

Excitation support system

Excitation system shall be provided with short circuit support equipment (Series compounding) to maintain three times the rated current for three seconds in case of short circuit to ensure proper fault clearance in outgoing feeders.

8.0 DESIGN AND CONSTRUCTION:

The generator design shall meet the requirement specified in data sheet and shall be suitable for the site conditions specified therein. The generator shall be mounted on a common base frame together with the prime mover unless otherwise agreed. The

generator shall be provided with necessary lifting hooks and two earth terminals for connection to main earth grid. The generator winding shall be class "H" insulation with temperature limitation for class **"H"** the windings and overhangs shall be braced to withstand the short circuit forces. The stators windings shall be brought out to suitable terminals in terminal boxes. The terminal box for control cables shall contain properly marked terminals for all internal equipment e.g. embedded temperature detectors etc. All terminals shall be stud type. The terminal boxes shall be complete with lugs and double compression cable glands. Current transformers shall be as specified in data sheet. All parts and accessories shall be suitable to withstand stresses due to over speed / overload / short circuit conditions specified. Bearings shall be single shielded and re lubricated. Grease in the bearing enclosure shall provide additional lubrication to bearing as well as provide sealing against dust and moisture.

The generator shall be air cooled unless otherwise agreed generator enclosure shall be as specified in data sheet. The direction of rotation of the rotor of the machine shall be compatible with that of the prime mover. A clear indication of the direction of rotation shall be given on either end of the machine. Space heaters shall be installed within the enclosure, location and max. Surface temperature of the heaters shall be such that no damage can be caused to any insulation. Heaters shall suitable for operation on a single-phase 240V AC supply unless otherwise specified. A suitable double pole switch shall be mounted on or adjacent to the stators frame or enclosure for the manual switching off of the heaters.

Field winding shall have class "H" insulation with excellent electrical and mechanical properties. The field winding shall be capable of operating at a field voltage of 125% of rated load field voltage for at least one minute starting from stabilized temperatures at rated conditions. All cabling on the generator set skid shall be in GI cable trays/ conduits. All cables shall be identified close to their termination point. Double compression type cable glands shall be used for cable termination.

A rating plate of corrosion resistant Material shall be fixed on the generator frame and shall give the following information: (as per Manufacturer standards is acceptable), however it is preferred to have minimum following parameters.)

Manufacturer's name. Serial Number, Type and frame reference. Rated output in KVA & KW.

Rated power factor, frequency and voltage. Rated stators current and speed in Rev. / Min. Class of insulation. Phase rotation (CW or CCW).

9.0 EXCITATION SYSTEM:

The generator shall be provided with brushless type solid state excitation system with automatic voltage regulator. The excitation system shall include the automatic voltage regulator, AC exciter and rotary rectifier. The field of the exciter shall be fed from the stators winding through a suitable transformer and AVR. AC Voltage generated in the AC exciter shall be rectified by the rotary rectifier assembly and fed to the main field circuits. The rotor windings of the AC exciter, the rectifier assemble, main field winding of the generator and other accessories on rotor part shall be rigidly fastened to the shaft and the connection with different items shall be anti-loosening type.

The exciter capacity shall be at least 20% more than the maximum requirement at any time. The exciter winding shall be insulated with class "H" insulation.

Automatic solid state voltage shall be provided with the following features as a minimum.

- Under frequency protection.
- Short circuit protection.
- Cross current compensation for parallel operation.
- Voltage build up circuitry.
- Stators current limited.
- Field current limited.

The Current and potential transformers required to feed the AVR from the generator terminal shall be adequately rated.

10.0 SYSTEM OPERATION

The emergency generator set shall normally be in an unattended area. The Control system shall operate in fail safe mode and shall include all controls and protection necessary for the safe operation of the package. The generator set shall function as per one of the following schemes: Auto main failure scheme (AMF). Manual start in service mode.

11.0 GENERATOR CONTROL PANEL:

DG Controller Based Synchronizing and Automatic Mains Failure/

Aux. Panels Scope

The scope of this section comprised of fabrication, supply, earthing, testing &

commissioning of Synchronizing, and AMF/Aux. panels. These panels shall be suitable for operation on 3 Phase 415 volts, 50 cycles. The degree of protection for enclosure shall be IP-52. All panels shall be CPRI approved.

Synchronizing panels and AMF/Aux. panels shall comply with the latest Relevant Indian Standards and Electricity Rules and Regulations and shall be as per IS-13947-1993.

Microprocessor based Engine generator Control package with built in AMF with Protection like Over Current, Reverse Power, Under/Over Voltage, under/ Over Frequency, etc. With inbuilt key features as under:

- 8 Relay Outputs, 8 Static Outputs & 3 Programmable Digital Inputs
- 3 Programmable Static Outputs, configurable to one of over 10 function types
- 13 Digital Inputs, 1 Pick Up Input for RPM monitoring
- D+/W.L. control & 3 Channel Analogue Sender Interface
- 3-phase Generator & Mains Voltage Monitoring upto 500 V ac
- External Adaptor to monitor upto 1010 V ac-3-phase
- 3-phase Generator Current monitoring upto 9900 A
- Digital Metering for Amp. Voltage, Frequency, Power Factor, KW, KVA, KVAR, KWH, Engine Run Hour
- Battery Voltage etc...
- Annunciation for Various Faults.
- Serial Interface RS 232 or RS 485 for Grid Parrareling, Import/ Export Facility, remote control & monitoring
- Aac, Vac, Hz, Vdc, kVA, kW, kVAr & PF monitoring
- Oil pressure, Engine Temperature & Fuel Level measurements
- Manual, Automatic, Remote & Off operating modes
- Event & Data Logging Memory & Hour Counter
- Automatic Scheduled Testing & Service/Maintenance
- 6 Point Relationship for analogue senders up to 1010 Ohm
- Cycle Lube Interval, Automatic Transfer Fuel Pump Control
- Extended Temperature Range/Humidity -30°C to +70°C/95% HR

Incomer: As per Rated in BOQ / SLD

1. 1 no. digital type Ampere meter with inbuilt selector switch

2. 1 no. digital type Voltmeter with inbuilt selector switch
3. 1 no. digital type KW/PF meter
4. 1 no. digital type Frequency meter
5. 1 no. 3 phase, 4 wire, Panel mounted Digital Type KWH meter
6. Necessary set of instrument fuses, HRC type
7. CT Ratio & Burden as specified in BOQ / SLD or sufficient rated as per breaker value
8. 3 nos. CT for each feeders
9. 1 no. F-Thyristor (Primary) Controlled Constant Voltage Constant Current Automatic Charger
10. 1 no. 96 sq.mm Analogue type DC Ampere meter
11. 1 no. 96 sq.mm Analogue type DC Voltmeter
12. 2 set (12 nos.) of indicating

lamps, LED type Load on Gen set R,

Y, B Gen set Load on Mains R, Y, B

13. 1 no. 4-point annunciator with inbuilt hooter, Test, Accept & Reset push buttons for the following, Low lubricating oil pressure High water temperature Engine over speed Relay operated
14. Auto/Manual Selector Switch for MCCB ON/OFF
15. 1 no. TNC type Breaker Control Switch for Genset MCCB / DG

Outgoing: As per Rated in BOQ / SLD

1. 1 no. digital type Ampere meter with inbuilt selector switch
2. 1 no. digital type Voltmeter with inbuilt selector switch
3. 1 no. digital type KW/PF meter
4. 1 no. digital type Frequency meter
5. 1 no. 3 phase, 4 wire, Panel mounted Digital Type KWH meter
6. Necessary set of instrument fuses, HRC type
7. CT Ratio & Burden as specified in BOQ / SLD or sufficient rated as per breaker value
8. 3 nos. CT for each feeders

Construction Features

Synchronizing and AMF panel shall be made as per provided MV Switchgear specs

where MV Switchgear is in scope with DG set & Synchronizing panel tender document.
If Synchronizing and AMF panel is individual scope then consider as per below specified specification Synchronizing and AMF panels shall be 2 mm thick sheet steel cabinet for indoor installation, dead front, floor / wall mounting type and shall be min. form 3b construction. The Synchronizing/ AMF panels shall be totally enclosed, completely dust and vermin proof and shall be with hinged doors, Neoprene gasket and padlocking arrangement. Panels shall be suitable for the climatic conditions as specified in Special Conditions. Steel sheets used in the construction of Synchronizing / AMF panels shall be 2 mm thick and shall be folded and braced as necessary to provide a rigid support for all components. Joints of any kind in sheet metal shall be seam welded, all welding, slag shall be rounded off and welding pits wiped smooth with plumber metal. The general construction shall confirm to IS-8623-1993 (Part-1) for factory built assembled Switchgear & control gear for voltage upto and including 1100 V AC. The panel shall be painted with paint shade Siemens Grey. The sheet steel shall be treated for degreasing, rinsing, degreasing, pickling, phosphating & passivation through-tank process

All panels and covers shall be properly fitted and square with the frame, and holes in the panel correctly positioned. Fixing screws shall enter into holes tapped into an adequate thickness of metal or provided with wing nuts. Self-threading screws shall not be used in the construction of Synchronizing / AMF panels. A base channel of 75 mm x 40 mm x 5 mm thick shall be provided at the bottom for floor mounted panels. Minimum clearance of 275 mm shall be provided between the floor of AMF panels and the lowest unit.

Synchronizing / AMF panels shall be of adequate size with a provision of spare switchgear

As indicated on the Single Line Diagram. Switches shall be arranged in multi-tier.

Knockout holes of appropriate size and number shall be provided in the AMF panels in

Conformity with the location of cable/conduit connections.

Synchronizing/ AMF panels shall be suitable for top cable duct connection for incoming from alternator and bus duct connection for outgoing to LT panel. Every

cabinet shall be provided with Trifoliate or engraved metal name plates. All panels shall be provided with circuit diagram engraved on PVC sheet. All live accessible connections shall be shrouded and minimum clearance between phase and earth shall be 20 mm and phase to phase shall be 25 mm.
All panels shall have provision of pad locking of breaker handles
in OFF position. Panel must be future expandable type.

Base Frame:
Suitable and recommended base frame of sturdy design made out of M. S. channel with necessary reinforcement & pri-drilled holes. The base frame shall be made out of reputed steel company. The diesel engine and alternator will be coupled on this base frame. Skid mounted type providing common bed for engine and alternator. Provision is made in Base Frame for lifting arrangement of DG set.

Bus bar Connections
Bus bar and interconnections shall be of high conductivity electrolytic copper and of rectangular cross section suitable for carrying the rated full load current and short circuit current without overheating of phase and neutral bus bars and shall be extendable on either side. Bus bars and interconnections shall be insulated with heat shrinkable sleeve and shall be color coded. Bus bars shall be supported on glass fiber reinforced thermosetting plastic insulated supports at regular intervals to withstand the force arising from in case of short circuit in the system. All bus bars shall be provided in a separate chamber and all connections shall be done by bolting. Additional cross sectional area to be added to the bus bar to compensate for the holes. All connections between bus bars and breakers shall be through solid strips of proper size to carry full rated current and insulated with insulating sleeves.

Temperature - Rise Limit

Unless otherwise specified, in the case of external surface of enclosures of bus bar chamber and trunking system which shall be accessible but do not need to be touched during normal operation, an increase in the temperature rise limits of 25° C above ambient temperature shall be permissible for metal surface and of 15° C above

ambient temperature for insulating surfaces as per IS 8623(Part-2) 1993.

AMF/ Synchronizing panels shall be provided with ACB's / MCCB's of appropriate capacity as per Single Line Diagram. AMF / Synchronizing Panels shall be completely factory wired, ready for connection. All the terminals shall be of proper current rating and sized to suit individual feeder requirements. Each circuit shall be clearly numbered from left to right to correspond with wiring diagram. All the switches and circuits shall be distinctly marked with a small description of the service installed.

Cable Compartments

Cable compartment of adequate size shall be provided in the AMF / Synchronizing panels for easy clamping of all incoming and outgoing cables entering from the top/bottom. Adequate supports shall be provided in cable compartment to support cables.

Air Circuit Breakers (ACB)

ACB shall comply with standards IS/IEC 60947-1 & 2. ACB shall have a rated operational voltage of 690V AC, rated insulation voltage of 1000 volts AC, and rated impulse voltage of 12kV. ACB front facia shall be IP 54 with or without cover rating/ details of all fitted accessories, vis. Shunt, UN, Mechanical operation counter, details, closing coil details, etc. shall be visible thru. Front facia. ACB shall be of 3pole or 4pole (as per BOQ), air break, molded case design for longer life along with less maintenance requirement. All ACBs shall be of same model to optimize requirement for spares management. ACB shall have a Ready to close mechanism preferably having a ready to close mechanical indication on front of ACB. All EDO ACBs ready to close indication contact which shall be used to give a single indication via indicating lamps on panel door if ACB is ready to be closed, after checking all the given conditions (UV release energized, Shunt release de-energized, spring charged, Breaker is not "ON", Breaker has not tripped on fault, Breaker is not mechanically interlocked with other breaker and ACB is not racked in completely in service position) ensuring safety for user and electrical distribution. ACB shall comply with the environmental directives like

RoHS Performance:

ACB shall have the breaking performance Ics = Icu = Icw (1sec) = 100%. The Breaking

Capacity value shall be as per SLD. ACBs, upto 2500 A shall have minimum Mechanical life of 20000 operations. For higher

Rated ACBs, minimum mechanical life shall be 10000 Operations. For the purpose, mechanical operation counter shall be provided for each ACB the operating mechanism of ACB shall be of the Open/Closed/Open stored-energy spring type. The closing time shall be less than or equal to Ohms, and of fast opening type with break time of breaker should be <30ms (including breaker opening & arc extinguishment time) to ensure higher life of distribution cables.

Accessories & Auxiliaries: Shunt trip and closing coil (having common AC/DC supply up-to 250V) shall be rated. For Incomer ACBs. Incomer ACB delayed type under voltage release shall be used to avoid nuisance tripping during voltage surges. ACBs shall have minimum 4 change-over auxiliary contacts, available to be used for indication and interlocking, rated at minimum 10A 240/380V 50 Hz and shall be wired on chassis/cradle. There should be facility to add one more set of 4 contacts if required. ACB shall be provided with two programmable contacts for fault/Alarm indications on panel door via LED lamps. It shall be possible to program the contacts for pre overload alarm and pre earth alarm. Panel builder shall wire these contacts to LED lamps on panel's front door. Pre wired Fault trip contact should be provided with Release as standard. Indication lamps On, Off. Trip, Ready to close, Electrical fault to be provided on front door of ACB. Spring charge indication required for EDO ACB only.

Safety : Draw-out ACBs shall preferably be provided with a mechanical latch on chassis/ or through smart racking shutter, which latches the ACB at Connected-Test-Disconnected positions while racking in and racking out the circuit breaker. This feature will help the operator in placing the circuit breaker at right position inside the chassis and can help in avoiding the accident.

Interlocks. : The racking handle shall be stored on the air circuit breaker in such a manner as to be accessible without defeating the door interlocking.

Terminations: All air circuit breaker shall be fully tropicalized as standard & suitable for terminating copper or aluminum bus bars. Silver plated copper/ copper alloy adapters shall be provided on both sides for 2000 - 6300 A ACBs. For lower ratings of ACBs, minimum 1 side adapters/ as required, shall be provided.

Protections: Air circuit breaker shall be provided with microprocessor release, which

should be self-powered type without the need of any auxiliary power supply during normal operation of the breaker. The circuit breaker control unit shall measure the true RMS value of the current. Circuit breaker trip unit shall have LED display for measurement of current, voltage, energy. It shall be possible to view last 10 trip cause and 10 event history on trip unit. All trip units provided shall have thermal memory as standard. All trip units shall be EMC/EMI tested. The protection release shall have following protections as standard, Adjustable phase overload current (Ir) settings from 40% to 100% of rating of ACB (In). Over load time setting (TR) from 0.5s, 1s, 2s, 4s 24s, 30s as field selectable curves. There shall be total selectivity between all the Switchgear from

ACB to MCCB to final distribution, OEM shall provide total selectivity chart during drawing approval, if rating of Switchgear need to increase to achieve the total selectivity, OEM shall do. It shall be possible to change the protection settings online and the circuit breaker need not be switched off while adjusting the settings. Release of all incomer ACB shall display ACB terminal temperature with required alarm/ trip feature.

It shall be possible to view the absolute percentage loading of three phases at once on trip unit LED/LCD display to help the user in identifying the current load balancing of the network. This will help in preventing the deterioration of loads affected by load balancing by identification of the balancing related issue. All 4 Pole ACBs shall have fully rated neutral equal to rating of the breaker.

Communication: The advanced communication system is required to connect all the ACB release, Energy meter, MV relays, and temperature sensors to a SCADA/Energy management software for continuous monitoring all the parameter of electrical facility. Software shall be cyber secured & compliance to IEC 62443 with third party certificate. Energy management system shall capable to provide energy data on hourly, daily, weekly & monthly basis. Software shall be capable to do the analytics like, contact wear of ACB, energy benchmarking, harmonic level compliance as per IEEE519, Energy management software shall capable to record all the electrical events with date & time stamping.

Specifications for communication (Shall be applicable wherever mentioned in SQQ)

All ACBs shall be provided with individual Modbus communication port for data transfer. Panel shall be Ethernet ready. TCP/IP Ethernet port for better speed of data transfer

(with at least 10mbps speed on Ethernet network). Ethernet port provided shall be with two Ethernet ports to minimize the number of Ethernet switches required in the system. Panel builder shall provide circuit break communication test report having the data like.. Circuit breaker settings at the time of communication test. Settings on the circuit breaker, at the time of communication test, shall be same as recommended by the client. Circuit breaker number of operation measurement through physical operation counter. Circuit breaker control (ON/OFF). Circuit breaker ready to close and spring charge status, Circuit breaker settings, Circuit breaker last 10 trip history etc.

All ACB's should have communication module and it should communicate on Modus bus/ Ethernet, vendor to consider all Accessories like gateway/ converters. All MCCB should communicate ON/OFF Trip status and it should communicate on Ethernet vendor to consider all communication Accessories. Vendor to submit detailed communication Architecture at the time of quoting the tender. Following communication Architecture should be considered at the time of quoting.

Energy Management system: Energy management system shall have two years of analytics services for provide report about health of electrical system. This will help to maintain the compliance & prescheduling the maintenance plan & actioned required to reduce the energy cost. This EMS & Services shall be the part of LT panel.

DG Controller Function

General

The auto synchronizing cum LT panel shall have DG controller with following general requirements for AMF start, Auto synchronizing and Auto Load sharing functions.

AMF function

In the case of failure of normal power supply of individual substations

1. Generator to start after min 10 to 15 second on any of the following conditions: Total absence of voltage. Failure of one or two phases. Under voltage below 375 volts. Overvoltage of more than 6%.

2. After a lapse of 10-12 seconds normal power supply breaker to open and Generator supply breaker to close.

In the case of Resumption of Normal Power supply:

Generator breaker to open and normal power supply breaker to close after three

seconds on resumption of normal power on the following conditions.

a. All the three phases available at the normal supply breaker.
b. 380-415 volts available at the normal supply breaker.
2. Generator to over run for the three minutes and stop automatically.
3. All auxiliaries to stop automatically.

4. Generator to be ready for the next operation automatically. Auto Synchronizing & Auto Load sharing function

A. Sequence of Operation in Auto Mode.

In auto mode Master GENERATOR set (Selected by DG controller) shall start through cranking relay & close its ACB / NIC after verifying frequency and voltage. However, the transfer of load shall take place only when the generator output reaches 90% of its rated voltage and frequency.

As load increases beyond 90% (settable from 80 to 100%) of ratings of DG set which is running, other generator will start and synchronize on the same bus. Required no of DG sets as per demand shall run, synchronized automatically and shall feed the loads accordingly

As the load increases or decreases, accordingly switching ON and OFF of the generator on the synchronizing bus shall continue with the help of DG controller. If any time only one Generator coming and the load is increased suddenly more than the available capacity then non critical load shall drop out from the bus automatically through DG controller and same shall come on automatically if other Generator shall start and synchronize on the same bus.

Auto Synchronizing system shall verify the phase angle of all the sets and also compensate for ACB closing time by initiating closing of the breaker ahead of the actual predictable synchronism hereby ensuring a phase difference of zero degree. The breaker closing command shall not be given at a phase angle difference of+ 4% in any circumstances.

The synchronizing system shall operate the generator ISOCHRONOUS mode by setting Droop to Zero. The system shall have a direct analogue interface with the AVR & Governor for direct bias control. No motorized potentiometers shall be acceptable.

Failure of any synchronizing module shall not disturb the synchronizing of other generator. Failure of any one DG controller shall not affect the synchronizing system which shall be independent of each other.

System shall also monitor the slip frequency and the Beat Voltage of the machine or system.

NIC of First generator shall remain in Ckt. In the event of shutting OFF of First Set, NIC of any other generator shall close first before tripping NIC of first set. It shall be possible to alter sequence of generator starting through, manual selection or through, Man Machine interface.

Active and reactive power shall be made equal on all the machines automatically with the help of ACTIVE LOAD BALANCING System through Governor Control.

In event of set failing to Synchronize, Alarm from annunciator shall invite attention of OPERATOR For manual intervention. LOAD MANAGEMENT SYSTEM shall have 64 output contacts for tripping various loads by field wiring and also trip the ACB of different generator and give ALARM for shutting OFF generator in accordance with predefined parameters to avoid under loading, overloading, cascading effect of tripping and unnecessary FUEL WASTAGE. On the removal of load, generator ACB's & Bus Coupler ACB's shall be switched OFF in Preset sequence with time delays to cover DIPS. Generator shall continue to run for Minutes at reduced speed after generator ACB has been switched OFF.

DG controller System shall have compatibility for interface with PC (for Graphic Displays/ Report Generation). All auxiliaries (Cooling tower fan, pumps supply air fans etc.) to come on automatically.

Engine start stop control system shall be mounted on the generator panel.

B. Sequence of Operation in Manual Mode (Through DG controller)

In the manual mode master generator set shall be started by pressing 'Engine Start' Push Button (PB) When Engine starting push button is pressed cranking relay shall be energized and give starting signal to the engine.

After full voltage is build up, breaker of the Master generator shall close manually with the help of breaker control switch.

When breaker Control switch is turned to 'CLOSE' position, breaker as per following sequence:

a. DG controller /Main Selector Switch shall be in Manual Mode.

b. Solo/Parallel Selector Switch being in 'Solo' mode.

c. With the conditions mentioned above fulfilled and breaker control switch in 'Close' position, Neutral contactor shall be energized.

d. Closing command to the generator breaker shall be given.

IN manual mode care shall be taken, to synchronize the follower generator sets with the 'Master' before closing its breaker.

For synchronizing the generator in manual mode, voltage/frequency raise/low commands shall be given to Alternator/Engine with the help of 'Joy sticks' provided in the Relay/Synchronizing Panel.

While synchronizing the generator, manually, all the parameters viz. voltage, frequency and phase rotation shall be monitored with the help of Double voltmeter, Double Frequency Meter and Synchrono scope provided in the Relay/Synchronizing Panel and breaker shall be closed only when all the three parameters are matched properly.

Active/Reactive load sharing between all the running sets in manual mode shall be managed by raising/lowering voltage/frequency with the help of joy sticks.

During the parallel operation of Power Generating sets in 'Manual Mode', Neutral contact of only master generator shall close. This shall be assured by inter locking the neutral contactors of all the generator.

Summary of Functions

The following functions shall be performed by the controller for synchronizing the generating sets.

Automatic starting of generating sets.

Automatic Synchronization of all available generating sets.

Automatic load sharing between generators, active as well as reactive load sharing. Starting & stopping of generators as per load requirement.

Monitoring of engine & alternator condition and protections. Complete load management as per requirement.

The control functions shall be as follows:

Engine Control

Speed monitoring

Over-speed protection

Oil pressure monitoring

Water temperature monitoring

Battery voltage monitoring.

Engine Protective Features

High / Low coolant temperature

High / Low oil pressure

Over-speed Start Failure Generator Protective Features

Over / Under voltage.

Over / under Frequency Reverse Power (Inverse time delay) Loss of Excitation

Over Current (Inverse time delay) Current Unbalance Voltage Unbalance Reactive (KVAR) Control

VAR sharing on isolated busses using %age base reactive load sharing.

Power factor or VAR control when base loaded externally adjustable VAR of PF set point levels.

Control System

All the electrical parameters are monitored centrally through DG controller. All the electrical data is brought to the DG controller & then DG controller controls the complete Synchronizing, Load Control & Management system.

No motorized potentioners are used. AVR & Governor are given direct bias control (Analog / Plum Commands).

Synchronizing Logic

The system shall be capable of a dynamic synchronization as described above, where the generator frequency is controlled to be slightly higher than the bus bar frequency, when the breaker closes. This shall ensure that the generator will start to take load the moment the generator breaker is closed. The frequency difference between generator & bus bar at the moment of synchronization shall be programmed. Breaker time shall be adjusted to ensure breaker closure at the exact point of synchronization. System shall control the voltage under synchronization if necessary.

During synchronization system shall supervising the frequency of the generator voltage to make sure that the genset is not unstable due to a cold fuel / genset or an uneven fuel supply. The two frequencies must be within the accepted slip-frequency in 200 mili sec before

synchronization.

The system shall synchronize the generator to the bus, when all below conditions are fulfilled:

A control order is given by setting the input "start synchronizing / Regulating" Feedback signal from breaker "GCB open" is present.

Bus bar voltage is present Generator voltage is present

The voltage regulator in the system shall start when the frequency is within 90% of nominal Frequency.

System shall close the breaker without synchronization, when all the following conditions Are fulfilled:

Display setting "Black bus bar operation is ON.A control order is given by setting the input "Start synchronizing / regulating" Feedback signal from breaker "GCB open" is present. Bus Bar voltage is not present (Black bus bar) Generator voltage is present.

Monitoring

Following electrical parameters shall be monitored by DG controller based system, which shall be connected through set of CT/ PT's & shall indicate the following:

i. Voltage - all phases (Line & Phase both)
ii. Current - all phases.
iii. Frequency
iv. Power factor
v. KVAR
vi. KVARH
vii. KW
viii. KWH

All these parameters shall be displayed & shall be used for Load Management & Safety functions. Limits can be assigned to each parameter in the PLC for alarm & recording / logging purposes.

System shall include the following features:

The system shall work on isochronous principle thus avoiding the problem of Droop

adjustment. The frequency shall remain constant at all loads. Automatic dead bus closing. Active & reactive load sharing. Modular system & each module shall be independent of the other. The breakdown of one section shall not affect the other.

The synchronizing module shall directly communicates with the electronic governors and shall connect to the load control lines of governor directly.

Solid State Annunciator For Auto Synchronizing Panel (Typical For each DG With Bus Coupler)

Channel No.Inscription

01 Fails to Synchronize

02 Fails to Start

03Neutra Discrepancy

04 ACB Fails to Close

05 Bus Coupler ACB-1 Fails to close

Repeat similar inscription for each nos. of DG set & applicable Bus couplers INDICATION

: 1 No. Spring charged Indicating Light.

: 1 No. Neutral ON Indicating Light.

: 1 No. Neutral OFF Indicating Light

: 1 No. Trip Indicating Light

: 3 Nos. Ph. Indicating Light

: 1 No. ACB ON Indicating Light

: 1 No. ACB OFF Indicating Light

: 1 Set Control MCB.

: 1 set push buttons for generator start/ stop, master changing, speed decrease/ speed

Increase, voltage decrease / voltage increase.

PROTECTION THROUGH RELAYS

(Applicable for both synchronizing and AMF panel)

Following protection shall be provided through relay both for the stator side and the rotor side:

Restricted Earth fault Relay: Relay shall have REF protection element (64R), which shall monitor the generator for internal earth faults, i.e. Phase to Phase &Phase to Earth. It has a built-in O/C protection, as a backup. Over voltage and under voltage protection. Stator & Field winding Fault Abnormal operation conditions / Faults interterm Fault Temperature-Thermal protection Over Current protection Over load protection Over Speed protection Over & under frequency protecting Reverse power protection In advertent Energization Loss of Synchronization out of step Single phasing Negative sequence against unbalance load Rotor

Earth fault protection Loss of excitation Rotor temp. Alarm Rotor over heating due to over excitation Lockout Protection against vibration External fault backup protection bearing overheating protection In addition to above, following relays to be provided Master Trip Relay Trip Circuit Supervision Relay Engine Cranking Relay

ANNUNCIATION

Annunciation with Hooter, Test, Accept and Reset P.B. and Annunciator. 14 Window Solid State Annunciator for each DG sets.

Channel No .Inscription

01 Set fails to start (only alarm)

02 Over current (breaker trip)

03 Earth Fault (Breaker trip)

04 Excitation Failure (Engine should be stop with breaker trip)

05 Reverse Power (Breaker trip)

06 Emergency Shutdown (Breaker will trip with engine stop command)

07 Over speed (Breaker will trip with engine stop Command)

08 Low Lube Oil pressure (Breaker will trip with engine stop Command)

09High Water Temperature (Breaker will trip with engine Stop Command

10 Under Voltage (Breaker trip)

11.Over Voltage (Breaker trip)

12 Bearing Temperature high (breaker will trip with engine stop command)

13 Under Frequency (Breaker trip) Over Frequency (Breaker trip)

14 Winding Temperature High Breaker with trip with engine stop command)

15. Low fuel oil level (only alarm at preset level.

The Local generator control panel for the generator set shall comprise of the following unless otherwise specified in the attached data sheet & Technical specification in17.

(a) Protection and metering equipment's.

(b) Indicating instruments.

(c) Control gear for generator set auxiliaries.

Any other accessory require to make the generator set operational as a package shall be included in scope of supply .If required, the generator control panel shall be split into various functional sections vi. Protection, metering and control, regulation etc. All motor

starters for generator set auxiliaries shall be DOL type. Programmable Logic Controller (PLC) and Human Machine Interface (HMI) Scope:

Programmable Logic Controller (PLC) based control along with HMI (Human Machine Interface) touch-screen LCD/LED display board (min. 8" size) along with all required accessories for complete automatic/ manual controls & indication. The complete PLC system control matrix, wiring diagram, SLD's and technical details shall be submitted by the vendor along with shop drawings for approval prior to procurement.

The Programmable Logic Controller system shall be configured with redundancy. The system shall provide for sequencing of automatic start and stop bringing process safety and equipment safety into operation. It is not the intent to specify here the complete details of the control system, rather only basic type of control required has been specified. The supplier has to submit with the proposal the complete details of the system offered by them like the extent of automation offered, operation of the complete system, logic/flow diagrams, type and details of the presentation of information, the type of mimic, hardware details etc.

The operation and control of the complete System is through a Programmable Logic Controller (PLC) based control system. The operation is based on automatic and remote manual mode. The PLC manufacturer shall have authorized service facilities able to provide service support. System features

a. Programmable according to IEC 61131 standard.
b. Consistent data storage of user program on the CPU.
c. Automatic reporting of system events and presenting the month display, in the web server, in the engineering and on the HMI system.
d. Integrated web server with standard and user defined pages.
e. Integrated communication protocols (MODBUSTCP).
f. Integrated security functions like access protection
g. Support Counters, Timers, Analog input /Outputs.
h. With analog dedicated register (U) and monitor in dedicated function, convenient use for 1/0 is maximized.
i. Integrated programming environment intensified program convenience, diverse monitoring, diagnosis and editing function.
j. Built-in high-speed counter function.
k. Built in PID function
l. Data Logging Function through SD card, FT Plink

m. Monitor/Control data in PLC through commercial web-browser, Min two web client scan access the web server at once & Also User defined web pages

n. SMTPE- mail service & SNTP time sync Email service through commercial mail

o. Dual port Ethernet which support daisy chain topology.

p. Supports SD card interface(Min.16GB

Commissioning: The PLC supplier OR channel partner of PLC supplier shall undertake to assist the customer in commissioning the PLC. The PLC supplier shall provide suitably qualified staff to ensure successful commissioning. Documentation: The PLC shall be provided with a complete set of user and support, documentation, including; Technical manual, recommended list of spare parts and Schematic drawings Training: The PLC supplier shall be capable of providing a complete training schedule with the PLC. The PLC supplier shall undertake to deliver the complete training program if required by the customer. The training program, shall be delivered at the customer's premises or at the supplier's premises, as required by the customer. The training program shall deliver to the customer the skills to: Appropriately program the PLC to meet customer requirements, safely operate the PLC, Identify and rectify operating problems caused by incorrect programming and Identify and diagnose operating problems caused by faulty PLC

12.0 PAINTING, PACKINGANDTRANSPORT:

All metal surfaces shall be thoroughly cleaned of scale, rust and grease etc. Prior to painting. Cleaned surfaces shall be given two coats of primer and prepared for final painting. Final finish shall be free from all sorts of blemishes. The equipment shall be shipped to site suitably packed to prevent any damage. Each package shall have labels to show purchaser's name, purchase order and equipment no. suitable lifting lugs etc. shall be provided and lifting points shall be clearly marked on the package. Packing shall be suitable for storage at site for a minimum period of 6 months.

13.0 TESTSANDINSPECTION:

The owner or his authorized representative may visit the works during manufacture of equipment to assess the progress of work swell as to ascertain that only quality raw materials are used for the same. He shall be given all assistance to carry out the inspection. Detailed test procedure along with the facilities available at vendors works shall be furnished along with the bid Owner's representative shall be given minimum four weeks advance notice for witnessing the final testing. Test certificates including test records and performances curves etc. shall be furnished by the vendor. Tests Equipment shall be tested to confirm to the appropriate standards and the following tests shall be conducted in the presence of purchasers: Functional tests, continuity tests and high voltage test on control panel to establish the performance called for in the specification. Power frequency voltage

test on switchgear and mechanical / electrical operational check. Routine tests for alternator as per IS: 4722. Over speed test (to be provided by way of engine test certificate) Transient response tests for sudden application and rejection offloads of O to 60% Wave form test (type test results are acceptable) Phase sequence test. Vibration test Noise level test. Dimensional and alignment test. Test certificate of engine alternator breaker manufacturer is acceptable

14.0 Technical Specifications of Diesel Engine Generator Sets rating Diesel Engine

The diesel engine shall be of the 4 stroke cycle, prime rated continuous, multi-cylinder direct injection, compression ignition as per OEM operating at a speed of 1500 rpm and shall be silent, vibration free while in operation and comply Center/ State Pollution Control Board and shall conform to BS:5514.

The engine shall be complete with radiator cooled type engine, fan, lubricating oil pump, lubrication oil pressure gauge (or micro process built-in display), tachometer, digital integrated hours-run recorder, over-speed trip and all other necessary auxiliaries.

The brake horse power of the engine with all attached accessories as specified shall not be less than that which is required by the full load rating of the alternator at site operating conditions taking into consideration losses, plus a reserve factor of at least 10%. Standard Equipment: Radiator with blower fan & Fan Guard.

Corrosion in hibitor coolant (if applicable) Papere lement filters-fuel, lubricating oil and by-pass (if required) Fly wheel to suit single/double bearing alternator & Flexible Coupling with starter ring. Flywheel housing Dry type air cleaner with vacuum indicator Residential Silencer Stainless steel exhaust flexible bellow Electric Starter 24V Electric starting system Battery charging alternator Safety Controls (trip): High water temperature (HWT) Low lubricating oil pressure (LLOP) Engine over speed Exhaust Gas Turbocharger with after cooler Bypass thermostat

1. Coolant capacity (engine only) Specific fuel consumption at rated load (As per ISO: 3046/BS 5514)

Rated Output (prime Rating) The above fuel consumption datas are based on engine operating with diesel fuel corresponding to Grade no.2D as per ASTM D975/IS 1460:1995 This engine should be meets latest CPCB emission norms Exhaust System Adequate sized piping and fittings shall be installed to carry the engine exhaust discharge into the atmosphere at a height as indicated in the drawings & as per the requirement of Center / State Pollution Control Board

or Pollution Control Committees the case may be.M.S. epoxy painted structural support and vibration arrestors for D.G. set chimney to specify along with drawing for statutory clearance. Mufflers shall be installed to reduce the engine exhaust noise at the outlet of muffler to noise level as permitted at site as per CPCB requirements. Flexible connection shall be provided between the engine and the fixed piping. Engine instrument panel An instrument panel mounted on the engine shall be provided and shall comprise the following flush- mounted instruments and gauges: Lubricating oil pressure gauge Tachometer, positive driven Hour counter with hour totalizer Protection Devices Warning indication and automatic shut-down shall be provided for the following: Low oil pressure shutdown and alarm high coolant temperature alarm High coolant temperature shutdown Fail to crank shutdown Over cran king shutdown Over speed shutdown Low & high DC voltage alarm Low battery alarm Low fuel-day tank alarm High and Low AC voltage shutdown Under frequency shutdown Over current and alarm and shutdown Short circuit shutdown Earth fault alarm Overload alarm Emergency stop Failure indication lights and alarm for all fault conditions shall be provided on control panel for restoring the operation to normal. The starting circuit shall be disconnected in the even to fany of the above shutdowns.

15.0 VIBRATIONCONTROL

The complete generator assembly shall be isolated on static deflection unhoused spring-neoprene in series isolator with non-skid neoprene pads. Start-up and shut down rocking restraint snuffers shall be provided at four corners of base frame. All fuelling pipes shall be cushioned with a layer of harness sand neoprene pad at attached points. All pipe work and engine silencers shall be suspended on static deflection spring- neoprene in-series hangers. Detail calculation and proposal for justifying the size and provision shall be provided for Project Manager Review prior to the installation. LIMITS OF NOISE FOR POWERGENERATING SETS MANUFACTURED as per Latest Codes & Standards Applicability These rules apply to all Generator sets Requirement of Certification Every manufacturer or importer of Power Generating set must have valid certificates of Type Approval and also valid certificates of conformity of production for each year, for all the product models being manufactured or imported after 1stJuly, 2003 with the specified noise limit. All Power Generators shall have a valid Type Approval certificate and conformity of production certificate. All Power Generator shall have conformance label meeting the requirements.

The conformance label shall contain the following information:

Name and address of the supplier (if the address is described in the Owner's manual, it may not be included in the label). Statement "This product conforms to the Environment (Protection) Rules, 1986" Noise limit viz. 75 dB (A) at 1 meter under free field condition Type approval certificate number. Date of manufacturer of the product.

Alternator:

The above diesel engine will be coupled with the brushless type Alternator. The make of Alternator shall be as specified. The alternator shall be with salient features like self-excited, self-regulated through AVR, three phase, 415 Volts, 50 Hz, 1500 RPM, screen protected, drip proof. The alternator shall generally confirm to IS: 4722/BS: 2613 standards. The alternators shall be with class H insulation & temperature rise limited to class "H". The alternator shall be suitable for 40°C Ambient Temperature. The alternator shall be single bearing type.

The alternator shall be generally confirming to IEC 60034-1 & shall be suitable for 10% overload for 1 hours in continuous 12 hours duration. Automatic Voltage Regulator An automatic high speed, voltage regulator shall be provided, complete withal accessories. The regulation system shall be provided with equipment for automatic and manual control. The regulator shall regulate the output voltage from generator current and potential signals. Series compounding transformer shall be provided to enable maintaining adequate terminal voltage in the event of terminal faults. Alternatively, excitation system shall be provided with arrangement for field forcing. Contractor shall coordinate suitability of protection relays for generator with the operational characteristics of automatic voltage regulator, especially under short circuit conditions. Voltage regulation and steady state modulation shall be within + 1% of the line voltage. The response time of exciter and the generator shall be properly matched to avoid hunting. AVR system shall be provided with equipment for operation / control. Necessary equipment shall be furnished for the following. To prevent automatic rise of field voltage in case of failure of potential supply. To initiate transfer from automatic to manual control of excitation on fuse failure on the generator potential signal.

Acoustic Enclosure:

The Generating sets should be housed inside a high quality acoustic enclosure having salient features & constructional features such as: Below is general guidelines, OEM shall consider standard enclosure as per industry practice): Compact, modular construction &

sleek design with low noise level 75dBA @ 1 mtr distance in free field condition. Or as per CPCB latest norms. Soundproof, weatherproof& environment-friendly silent set with top lifting facility, preferred 6 sided enclosure. Ready-to-use silent set, eliminates need for foundation or grouting. The acoustic enclosure is manufactured& powder coated & lined with Fireproof Acoustic Material light resin rock wool as per IS: 8518.Thematerialshall be of48-kg/m3density& the layer shall be 75-mmthick.Itis made of compact sleek design confirming to international standards to provide insertion loss of 25 dBA meeting CPCB norms. (1.6 / 2 mm thick CRCA sheet) Steel outer construction with heavy-duty fabricated base frame & inbuilt fuel tank. Attenuators are placed in the hot air outlet & cooling air inlet. Exhaust silencer -Residential type mounted on the enclosure, exhausting to atmosphere. All joints are sealed with fire proof neoprene gaskets, which withstand high temperature & pressure. All high temperature exposed surfaces are insulated by glass wool with aluminium cladding. Painted with weatherproof, acid proof, heat-resistant, powder-coated afterpretreatment for degreasing, derusting, pickling, phosphating & passivation for durability & better look. Fuel Tank: Silent Genets having a inbuilt/ standalone fuel tank outside the DG set should be provided along with all required interconnectivity, piping, control panel etc. complete in all respect. The daily fuel tank should be suitably designed so as to provide long hours of uninterrupted and continuous power. For ease of monitoring the fuel level in the fuel tank, a sophisticated fuel level gauge should be provided in the control panel. For ease of operation, there is a provision for fuel inlet, which has accessibility from outside the acoustic enclosure, and designed so that the re fuelling is possible even when the generating set is in operation. The tank should be fabricated from M.S. Sheet, duly painted and fitted with inlet-outlet connections, air-vent, drain valve & level indicators suitable for 8 Hrs. running. Scope also include to get approval from explosive department.

Earthing:

Four Numbers earth set are required. 2 for Body and 2 for neutral. Earthing job shall be carried out as per general specification of electricalworkpart-1internal2013. The generating set and all associated equipments control and switch gear and switchgear panel must be earthed before the set is put into operation.

Batteries:

2nos. of Batteries will be required with each Gen set. Each battery shall be of 12 Volts and of EXIDE/ EQUIVALENT make with leads & Battery Cable. Vendor to submit battery

calculation.

BATTERY CHARGER

General

The battery charger shall be SMPS type. The charger shall have selector switch for Auto Float -Boost / Manual Float / Manual Boost Mode of operation. During Auto Float -Boost Mode, Automatic Changeover shall take place from Float Mode to boost mode and Vice-Versa. This means that when the Batteries are fully charged the charging shall automatically change from Boost charge to trickle charge.

Construction Feature

The battery charger shall be housed in sheet steel cubicle of Angle Iron frame work with sheet steel panels of 1.6 mm thickness. Louvers shall be provided in the cabinet for the ventilation. The cubicle shall be painted in Siemens Grey shade RAL7032 of IS-5.Four wheels shall be provided at the base.

Performance

The D.C output voltage of F load/Boost charger shall be stabilized within +2% for AC input variation of 230 V + 10%, frequency variation of 50 Hz + 5% and DC load variation of 0-100%.The voltage regulation shall be achieved by a constant voltage regulator having fast response SCR control. The ripple content will be within 3% of DC output nominal voltage. There shall be provision to select Auto Float/ Manual Float/ Manual Boost modes. During Auto

Float Mode the battery charging shall automatically change over from Boost Mode to

Float Mode and Vice Versa. During Manual Float / Boost modes it shall be possible to set

The output Volts by separate potentiometers. The battery charger shall have automatic output Current

Limiting feature. Rating AC Input: 230V+10%AC 50Hz single phase.

DC Output: To float / boost charge 180AH batteries and also supply a continuous Lad

Current Rating 30.0Amps

Float e

Mod 27.0 V nominal (Adjustable) between 24-28.0V.

Boost Mode Voltage Regulation

	29.0 V nominal (Adjustable) between 24-32.0	
	+2% for AC input variation of 230 V+10%. Frequency Variation of 50 Hz+5% and DC load Variation 0-100%	

(Schedule- G: Item No. 26)
TECHNICAL SPECIFICATIONS FOR ELECTRICAL SOLAR POWER GENERATION (GUJ R & B ELE SOR-14.1.1)
SCOPE OF WORK

(A) Technical specification for item No. 01 of SCHEDULE 'A' of rates and quantities: [Grid connect Solar generating system]

The proposed project shall be commissioned as per the technical specification RDSO/PE/SPEC/PS/0092-2008 (Rev. '0'), Amdt. 5. Any shortcoming will lead to cancelation of subsidy in full or part as decided by DFCCIL & competent authorities

Decision will be final and binding on the bidder.

This specification covers the general and technical requirements for design, manufacturing, testing, supply, installation & commissioning of grid connected solar, generating system to be provided at Palanpur for meeting the Electrical load in such a fashion that solar supply only to be utilized for loads of same capacity against local supply.

1. DRAWINGS & MANUALS: i Two sets of Engineering, electrical drawings and Installation and O&M manuals are to be supplied. Bidders shall provide complete technical data sheets for each equipment giving details of the specifications along with make/makes in their bid along with basic design of the power plant and power evacuation, synchronization along with protection equipment. ii. Approved ISI and reputed makes for equipment be used.

2. PLANNING AND DESIGNING:

i. The bidder should carry out Shadow Analysis at the site and accordingly design strings & arrays layout considering optimal usage of space, material and labor. The bidder should submit the array layout drawings along with Shadow Analysis Report to the Engineer in charge for approval.

ii. DFCCIL reserve the right to modify the landscaping design, Layout and specification of sub-systems and components at any stage as per local site conditions/requirements.

iii. The bidder shall submit preliminary drawing for approval & based on any modification or recommendation, if any. The bidder submits three sets and soft copy of final drawing for formal approval to proceed with construction work.

3. DRAWINGS TO BE FURNISHED BY BIDDER AFTER AWARD OF CONTRACT
The Contractor shall furnish the following drawings and obtain approval

i. General arrangement and dimensioned layout.
ii. Schematic drawing showing the requirement of SPV panel, Power conditioning Unit(s)/ inverter, Junction Boxes, AC and DC Distribution Boards, meters etc.
i. Structural drawing along with foundation details for the structure. The contractor shall have to obtain certified structural Engineer certificate along with calculation sheet for the foundation & mounting structure strength.
ii. Itemized bill of material for complete SPV plant covering all the components and associated accessories.
iii. Layout of solar Power Array.
iv. Shadow analysis of the site.

4. SAFETY MEASURES: The bidder shall take entire responsibility for electrical safety of the installation(s) including connectivity with the grid and follow all the safety rules & regulations applicable as per Electricity Act, 2003/Gujarat Electricity Act, 2003 (or latest) and CEA guidelines etc.
5. PV systems shall be provided with adequate rating fuses, fuses on inverter input side (DC) as well as output side (AC) for overload and short circuit protection as well as disconnecting switches to isolate the DC and AC system for maintenances.
6. Fuses of adequate rating shall also be provided in each solar array module to protect them against short circuit.
7. For safety reasons, PV inverter system shall be disconnected from the network following a fault or loss of supply on the power network.
8. Design and construction of foundation/ grouting for holding module mounting structures without puncturing the roof, maintaining proper drainage of rain water through the installation area, cable routings through PVC pipes not obstructing the movement on terrace.
9. Before commencement of work, the contractor has to obtain all approvals for related drawings from the concerned authorities.
10. Special care to be taken while designing all structures for modules to cater to heavy rainfall, strong winds and earthquake that may be prevalent in the area.
11. Test running of the grid connected solar facility including load trials at Projects Site, Prior to handover and commencing energy export for metering.
12. The interconnection of the solar system with the network of the DFCCIL will be made as per the technical standards for connectivity of distributed generated resources regulations as may be notified by the competent authority.
13. The contractor will take all necessary and reasonable safety precaution with respect to providing the installation work solar power and system operations that will comply with all applicable law Laws pertaining to the health and Safety of persons and real and personal property.
14. Contractor Safety management to be strictly complied with by the contractor throughout project activity.
15. The contractor shall comply with the provision of all applicable Laws and Applicable Permits and conforms to Good Industrial practice for securing the safety of the solar power system.
16. Contractor shall liaison with statutory authorities as applicable for all the project approvals.
17. Contractor shall supply material and providing services which are not specifically mentioned but required for the successful commissioning of solar generating system.
18. The contractor shall maintain a high standard in the appearance and aesthetic quality of the solar project and achieve integration of the Solar power system.
19. Contractor has to use mono crystalline/ Poly crystalline/advance technology Solar PV Module as per suggestion given by DFCCIL.

20. The following Statutory Clearances to be obtained by the contractor wherever applicable:

a. Electrical System approval (Electrical Inspector.)
b. Structure design approval. (Structure Architecture)
c. All equipment, accessories, Materials, civil construction & erection work should comply with statutory requirements and IS standards.

21. INTEGRATION OF PV POWER WITH GRID:

The output power from SPV would be fed to the inverters which converts DC produced by SPV array to AC and feeds in to the main electricity grid after synchronization. In case of grid failure, or low or high voltage, Solar PV system shall be out of synchronization and shall be disconnected from the grid. Once the DG Set comes in to service PV system shall again be synchronized with DG supply and load requirement would be met to the extent of availability of power. 4 pole isolation of inverter output with respect to the grid/ DG power connection need to be provided. `

22. METERING:

a) The bidirectional electronic energy meter (0.5 S class) shall be installed for the measurement of import/export of energy.
b) The bidder must take approval /NOC from the concern DISCOM for the connectivity, technical feasibility, and synchronization of SPV plant with distribution network and submit the same to DFCCIL before commissioning of SPV plant.
c) The bidder shall bear all the necessary charges for approval and commissioning NET metering of the solar plant from GEDA.
d) Reverse power relay shall be provided by bidder (If necessary), as per the local DISCOM requirement.

23. POWER CONSUMPTION:

Regarding the generated power consumption, priority need to give for internal consumption first and thereafter any excess power can be exported to grid same can be accounted through net metering as per state regulation guidelines applicable from time to time.

24. CONNECTIVITY:

The maximum capacity for interconnection with the grid at a specific voltage level shall be as specified in the distribution Code/Supply Code of the state and amended from time to time. Following criteria have been suggested for selection of voltage level in the distribution system for ready reference of the solar suppliers.

Plant Capacity	Connecting Voltage
Up to 10 kW	240V-Single phase or 415V-Three Phase at the option of the consumer.
Above 10kW and up to 100 kW	415V-Three Phase.

Connecting Voltage guideline Gujrat solar power policy and Gujrat electricity grid code, Gujarat Net metering regulations applicable from time to time may be followed.

a) Utilities may have voltage levels other than above, DISCOMS may be consulted before finalization of the voltage level and specification be made accordingly.
b) Solar plant output termination is to be done in such a way that, below 100 kW. i.e. Multiple termination with separate devices may be required.

25. Provision of Civil works:

The price shall cover the civil works required for installation of 50 kWp ground mounted solar power project in the premises of Palanpur such as Structure pillars and its foundations incl. sand cement ballast etc., incl. inverter stand in case of ground mounted project. Also, levelling of ground to be done by the

contractor, if required at the site. The site location may be changed to meet the feasibility for installation of Ground mounted Solar power project or as desired by the officer-in-charge.

NOTE: Even though, ground mounted solar power plant shall be the preferred option, if necessary, DFCCIL can at their option specify a roof-top mounting solar panels for a part or full system kWp capacity based on site conditions/requirements.

- Technical details to be furnished by the purchaser in his tender: [As per Annexure-C of Spec. no. RDSO/PE/SPEC/PS/0092-2008 (Rev.'0'),Amdt.-5]

1.	System Power Rating (KWp) and place of installation.	50 KWp (Ground Mounting) at Palanpur.
2.	Is Compliance and certification to salt mist corr osion testing as per IEC 61701 required {Refer Cl. 6. 9.1}*	Yes.
3.	Required galvanization thickness (Refer Cl. 6.10.3)*	120 µm
4.	Support structure, design and foundation wind withstanding capability required (see Cl. 6.10.5)*	200 kmph
5.	Is supply of Export Metering (Bi-directional metering) required {Refer Cl. 4.1, 5.4}*	Yes
6 (a).	Is ground mounted solar system required {Refer Cl. 5.2}*	Yes.
6 (b).	If the answer to 6(a) is 'yes', then please specify the mounted system's KWp capacity, site location	50 Kwp, ground Palanpur.
7 (a).	Will the overall rooftop KWp capacity be distrib uted across multiple rooftops {Refer Cl. 5.3}*	NA.
7 (b).	If the answer to 7(a) is 'yes', then please give necessary details i.e. KWp distribution on multiple rooftops, inverters, site locations, etc.	NA
8.	In what manner does the railway/DFCCIL propose to continue to avail of web based monitoring service after the completion of warranty period:	
8 (a).	As a part of AMC services {Cl. 12.0}*	No.
8 (b).	web based monitoring required entire life of {Cl. 6.7.2}*	No.

'*' Cl. Of Spec. no. RDSO/PE/SPEC/PS/0092-2008 (Rev. '0'), Amdt.-5

- Technical data to be furnished by the tenderer in his offer: [As per Annexure-D of Spec. no. RDSO/PE/SPEC/PS/0092-2008 (Rev.'0'), Amdt.-5]

I. Power rating of Solar Systems.
System power rating (KWp): 50 KWp (Ground Mounting)

II. Solar Panel

		For 50 KWp.
a)	Make and model no.	
b)	Power rating of the module	
c)	Name of the manufacturer of PV Module	

d)	Name of the Manufacturer of Solar cells	
e)	Country of origin (separately for solar cells and module- Refer Clause 6.9.1)*	

f) g)	Peak Wattage, Im and Vm for the module(Refer Clause 6.9.1)* Operating voltage of array(Refer Clause 6.12)*	
h)	Efficiency of the module(Refer Clause 6.9.4)*	
i)	Fill Factor of the module(Refer Clause 6.9.5)*	
j)	Variation band of rated output of the module (Refer Clause 6.9.10)*	
k)	Galvanization thickness of the module mounting structure (Refer Clause 6.10.3)*	

III. Power Conditioning Unit (PCU)

		For 50 KWp,
a)	Make and model no.	
b)	Power rating	
c)	Output voltage and frequency range (Refer Clause 6.12)*	
d)	Voltage range of grid synchronization (from nominal)	
e)	Frequency range of grid synchronization (from nominal)	
f)	Communication interfaces offered	
g)	Data communication protocols	
h)	Input voltage range for MPPT operation(Refer Clause 6.12)*	
i)	Efficiency(Refer Clause 6.12.4)*	
j)	Voltage and Current THD (Refer Clause 6.12.2)*	
k)	IP protection (Refer Clause 6.12.5)*	
l)	Noise level (Refer Clause 6.12.18)*	
m)	Idling current	
n)	Surge protection on DC and AC side	
o)	Name of URL at which the purchaser can view the system performance data (Refer Cl. 6.7.2)*	

IV. Details of Export Meter offered {Refer Cl. 5.4}*

V. Details of all cables to be supplied by the firm.

VI. Details of RCD (in case galvanic isolation doesn't exist in PCU)

Note: '*' Cl. Of Spec. no. RDSO/PE/SPEC/PS/0092-2008 (Rev. '0'), Amdt.-5

DETAILED SPECIFICATIONS AND SPECIAL CONDITIONS FOR SCHEDULE "H"

(Item no. 7, 8, And 26)

The work shall be carried out as per DSR-2022 item descriptions and specifications of CPWD DSR and latest instructions/guideline issued.

TELEPHONE, CCTV, NETWORKING ITEMS

ITEM NO. 1, 2, 3

Small EPABX System with In Built 4 Port Voice Mail [F] No. Extension - 128, No. of Junction -24, No. of expandable ports -512, Operators Console -01 Compatible - ISDN & Networking

EPABX SYSTEM:

Features	**Required or Not**
Technology	PCM TDM
KTS Support	Yes
ISDN BRI & PRI	Yes
E & M Support	Yes
E1 Support	Yes
Hybrid technology	Yes
External Caller ID display on Console and Key phone	Yes
External Music	Yes
Paging Port	Yes
Conference facility	Yes-8 Party
Memory Storage	32 MB Secure Digital (SD) RAM
DISA Card	Yes. 4 Port. 64 different messages. 8 minutes storage
DOSA Feature	Yes
VoIP	Yes. Open Industry standard
System connectivity	V.24 Port and USB Port built in on system
Range of Key phone	Yes
Auto Redial on Key Phones	Yes
Back Lit Key Phones	Yes
USB/Comp. connectivity on Key phones	Digital-XDP. Also USB
No. of keys on Key Phones	9 to 37 keys
DSS Connectivity	60 keys
Supports PC Console	Yes
OHCA on Key Phone	Yes
Jog Dialler/Navigator Keys	4 Navigator Keys
Absence messages	yes. On Key phones and also simple phones
Incoming call routing based on caller ID	Yes
Two way recording of external call	Yes
Personal greeting to external caller	Yes
MS Outlook integration	Yes

POP UP of incoming caller	Yes
WEB Site/URL integration	Yes
Call details/log of incoming callers	Yes

Tenant Facility	Yes
System modes	3. Day, night and lunch
Appointment reminders	Yes
19 inch variants	Yes

ITEM NO. 4

Main Distribution (MDF) indoor type, back mounted frame as per DoT standard approved with krone strips (b) Suitable for 50 pair OR 200 pair

The telephone tag blocks shall be suitable for the multi core telephone cables and shall have two terminal blocks, cross connect type. All incoming and outgoing cables shall be terminated on separate terminal blocks and termination shall be silver soldered. The cross connecting jumpers shall be insulated wires of same diameter and screw connected.

The tag blocks shall be mounted inside fabricated sheet steel boxes with removable hinged covers and shall be fully accessible. The enclosure shall be painted with 2 coats of red oxide and stove enamelled.

B. WORKMANSHIP

All cables shall be on cable racks and neatly stitched together.
The connection at the tag blocks shall be silver soldered so as to achieve minimum contact resistance.

The final branch connections with single pair cables in conduits and the maximum number of cables in each conduit shall be as follows:

Conduit Inch	diameter mm.	Max. No. of cables
3/4"	20	2 Nos. Single pair
1"	25	6 Nos. Single pair
1¼"	32	12 Nos. Single pair
1½"	40	18 Nos. Single pair

The tag blocks shall be mounted inside fabricated sheet steel boxes with removable hinged covers and shall be fully accessible. The enclosure shall be painted with 2 coats of red oxide and stove enamelled.

ITEM NO. 5

Telephone Cable electrolytic copper conductor PE insulation twisted in two pairs, & wrapped with FRLS PVC tape & sheathed with FRLS PVC or HFFR outer Jacket suitable for telephone wiring & confirming to C-DOT erected in existing pipe. of following size of conductors & nos. of pairs. With necessary connections. (A) Conductor Size 0.5 mm (B) Armoured jelly filled- Twenty Pairs
The type of cables and the services shall be as follows:

Indoor – Multipair PVC sheath armoured / un-armoured as specified 0.5 mm tin Cu. Cable.
Outside -- Multipair PVC sheath armoured / jelly filled as specified 0.5 mm tin Cu. Cable.

All multi core cables and wires shall be of tinned copper conductor of not less than 0.6 mm dia and shall be colour coded twisted pairs with rip cord.

The conductor resistance shall be less than 150 ohms per KM and the insulation resistance between the conductors not less than 50 mega ohms and the nominal capacitance of about 0.1 microfarad per kilometre.

Cables laid underground or locations subject to dampness and flooding shall be filled with polyethylene compound and shall have sufficient protection against moisture and water ingress.

All armouring shall be of galvanized steel wires and protected against corrosion by an outer sheath of PVC in the case of indoor cables and polyethylene in the case of outdoor cables. Outer sheathing must be fire retarding and anti-termite.

All un-armoured single core cables and inner sheath of armoured cables shall be provided with ripcord.

ITEM NO. 6, 18, 19, 21.

- Two separate network to be designed as (i) Data (Wired & Wireless), communication System, Telepresence & Collaboration System and Audio Visual Systems, (ii) Utilities like IP Based Video Surveillance, Access Control System, Public Addressing System, Fire Alarm & Detection System.
- Installation, identification and termination of cables between information outlets and network rack shall be considered as a part of bidder's work.
- Cabling utilized for Voice and Data Nodes shall originate from Network Racks and terminated at Information Outlets at Wall.
- All cables and IOs shall be identified at both the ends (IO &Rackside) with appropriate ferruling.
- All balanced twisted pair cables laying and termination shall comply and be tested as per TIA/EIA 568-B series standard for Cat5, Cat5E and Cat6 installations.
- UTP Cabling system conforming to ANSI/TIA/EIA 568-B series and ISO/IEC 11801 2nd edition, EN- 50173-1.

Sr. No.	Conduit Diameter	Max. Cables per Conduit

	Inch	Mm	
1	1”	25	3 Nos. x Cat 6 Cables.
2	1 ½”	40	6 Nos. x Cat 6 Cables.
3	1”	25	SingleCableper Loop Public Addressing Systems.
4	1 ¼”	32	Two run of Fiber Cable.

- The SITC job includes Supply, installation, testing and commissioning of UTP Cat6 cables in existing conduit either on flooring / wall / ceiling / slab etc.
- The bidder has to furnish working drawings and commence work after approval of end user or consultant. The successful bidder has to submit as-built drawings.
- The structure cabling system should support various applications but not limited to Voice, Video and ISDN Applications, Ethernet Applications, IEEE802.3af PoE and IEEE802.3at PoE+, Fiber Channel Applications, IEEE802.11a/b/g/n/ac Wireless LAN Applications, DSL Applications, Various Audio & Video Streaming Applications.

1.1 UTP Components for Structure Cabling System:

Sr. No.	Description	Specification	Compliance
1	Common specifications shall apply to all UTP Cat6 Structure Cabling System components (i.e. Cable, Patch Cords, Information Outlets (IOs) and Patch Panels). All components of Structure Cabling System must be from same OEM		
a.	OEM Criteria	All passive material i.e. Copper and Fiber must be from the same OEM.	
b.	Standards and Compliance	Un-shielded Twisted Pair cabling systems, conforming to ANSI/TIA/EIA 568-B Series, Cat6 Cabling System, ISO/IEC 11801 2nd edition, EN-50173-1.	

c.	Warranty	System Performance Guarantee of 20 Year along with actual test results conducted at site like NEXT & ACR, Attenuation, and Return-Loss etc. The cable shall be tested for minimum guaranteed performance as per standards 500MHz operation.	
2.	**Cat 6 UTP Cable**		
a.	Standard and Compliance	As per Above (1.a)	
b.	Conductors	23 or 24AWG Solid Copper Cable.	
c.	Insulation	PVC Jacket	
3.	**Cat 6 UTP Patch Cords**		
a.	Standards and Compliance	As per Above (1.a)	
b.	Conductors	23 or 24AWG Multi-stranded Copper Cable.	
c.	Connectors	RJ-45	
d.	Length	3 Ft or 10 Ft in a variety of colour as required	
e.	Insulation	PVC Jacket	
4.	**Cat 6 Information Outlets**		
a.	Standard and Compliance	As per Above (1.a)	
b.	Colors	In a variety of color as required.	
5.	**Face Plates**		
a.	Standard and Compliance	As per Above (1.a)	
b.	No. of Ports	One, Two, Four Ports	
c.	Material	ABS / UL 94 V-0, Color: White	

6.	**Patch Panels**		
a.	Standard and Compliance	As per Above (1.a)	
b.	Height	1U – 1.75”	
c.	No. of Ports	24 Ports, Fully Loaded with Key Stone Jack.	
d.	Port Type	Individual Key Stone Type or 6 Port Modular. Blank Inserts for un-used ports.	
e.	Panel	Fully Powder Coated, Pencil Grey Color.	
f.	Termination Type	TIA/EIA 568 A & B.	
g.	Performance	NEXT, PS NEXT, FEXT, Attenuation, Return-Loss	
h.	Approval	UL Listed.	

1.1 19” Wall Mount Network Enclosures:

Sr. No.	Description	Specification	Compliance
1.	Network Rack Size	Wall Mount, 19”, CRCA Powder Coated Network Rack of 15U. Front Glass Door, 600mmW x 600mmD.	

ITEM NO. 9
Specification

Under floor pre galvanised corrosion proof rectangular sheet steel cable trunking of 1.6 mm thick having with stand point load up to 1.33 Ton & free from seepage of concrete of screed water with all accessories, Junction Box, Joints as required and demanded by engineer-in charge and laying/erecting as per OEM guidelines and as per instruction of engineer in charge having following size of dimensions and No of compartments (W x D x T) Cat-III [5] 250mm x 25mm x 1.6 mm with Three Compartments

Measurement will be done on metre basis

ITEM NO. 10
General

UPS System

3 KVA Single Phase UPS System for Min 90 min backup

Specification

Un-interruptible Power Supply system with IGBT Based rectifier and Inverter & sealed maintenance free batteries. Single phase Input and Single Phase output with Inbuilt Isolation transformer with 0.8 load power factor with battery, over under voltage output with over load & short circuit protection equipment. The system housed in CRC sheet duly powder coated paint with following capacity & with Following size of batteries for 90 Min Backup (Minimum 2688 VAh) 3 KVA UPS with 100 AH, 8 Nos. Measurement will be done on each basis.

(ITEM NO. 11 to 16)
CTV MONITORING & RECORDING SYSTEMS
GENERAL

The Closed Circuit Television System (CCTV system) shall provide an on-line display of video images on monitor. Cameras with suitable lenses shall be used to view specific areas of interest. The primary objective of implementing a CCTV system is to ensure effective surveillance of an area and also create a record for post event analysis.

EQUIPMENT

The CCTV System shall comprise of Fixed Lens, C-CS Mount high resolution colour Cameras, Hi-Speed Dome Camera's, Standalone Digital Video recorder, Monitor and other associated accessories.

IR DOME / BULLET CAMERA:

- Ultra high resolution: 700 TVL
- Built-in IR LEDs with up to 30m IR visible range
- Minimum Illumination: Color 0.01 Lux, B/W 0 Lux (IR ON)
- TDN (ICR-Cut), OSD Menu, ATR, SDNR, HLC, BLC
- 3.6mm / 6.0mm lens available
- PAL / NTSC available

TECHNICAL SPECIFICATION:

Signal System	PAL	NTSC
Image Sensor	1/3" Progressive CMOS	
Total Pixels Number	1028(H) x 596(V) 610K	1028(H) x 508(V) 520K
Effective Pixels Number	976(H) x 582(V) 570K	976(H) x 494(V) 480K

Scanning System	2:1 Interlace	
Scanning Frequency(H)	15.625 KHz	15.734 KHz
Scanning Frequency(V)	50 Hz	59.94Hz
Horizontal Resolution	Color: 700TVL, B/W: 720TVL	
Min. Illumination	Color: 0.01 Lux (15IRE), B/W: 0 Lux (IR ON)	
Sync. System	Internal / External	
S/N Ratio	More than 52dB (AGC Off)	
Video Output Level	1.0V p-p (75Ohm Unbalanced, Composite)	
Shutter Speed	1/60 (1/50), 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000 Sec.	
Lens	3.6mm fixed lens	
Day & Night System	TDN (ICR-Cut)	
IR Distance	Up to 30m	
Super DNR	OFF/ 2D (Y 0-15)	
White Balance	ATW, PUSH, USER1, USER2, ANTI CR, MANUAL, PUSH LOCK	
AGC	AUTO (0FF, 37dB), MANUAL (6.00dB ~ 44.80dB)	
BLC	BLC, OFF, HLC (High Light Compensation)	
OSD Language	English, Chinese, Japanese, German, French, Russian, Portuguese, Spanish	
Picture Adjustment	Image Mirror, Adjust Brightness, Adjust Contrast, Adjust Sharpness, Adjust HUE, GAIN	
ATR	Off / ON (Luminance (L,M,H),Contrast (L,ML,M,MH,H))	
Privacy Zone	8 Areas (On/Off, Color, Position)	
Motion Detection	4 Areas (On/Off, Position, Sensitivity)	
Protection	IP66 weather-proof	
Operating Temperature	-10°C to +50°C	
Operating Humidity	30% to 80% RH	
Voltage & Consumption	12VDC (±10%), Max. 4W / 330Ma	
Dimensions	127 (D) x 86.5 (H) mm	
Weight	Approx. 450g	
Certificate	CE, FCC	

NVR:

• **High Resolution Recording:** Real-time @ D1 and WD1 / 960H resolution, max. Resolution of 960 x 576 (PAL) / 960 x 480 (NTSC)
• 8 **SATA HDD:** total storage 10 x 8TB = 80TB
• **Multiplex operation:** live view, record, play back, backup and remotely control the system simultaneously.
• **USB flash drive:** 2 USB ports support mouse and data transfer.
• HDMI and VGA output
• **Ethernet LAN with an RJ-45 connector:** for remote access, supports TCP/IP, free DDNS service and UPnP.
• **PTZ control:** PELCO-D and PELCO-P support.
• **Free DDNS Server Service:** support remote control through DDNS service by free of charge.

• **CAWDView:** free Android and Apple app for 960H NVR series to give you full access to your surveillance system anytime, anywhere.

TECHNICAL SPECIFICATION:

Video			
Video Input	4 channels, 1.0Vp-p, 75Ohm	8 channels, 1.0Vp-p, 75Ohm	16 channels, 1.0Vp-p, 75Ohm
Video Standard	PAL/NTSC		
Video Output	CVBS/VGA/HDMI		
VGA Output	1024 x 768, 1280 x 1024, 1440 x 900,720P (1280 x 720),1080P (1920 x 1080)		
Image & storage Resolution	4 channels WD1 record& 2 channels WD1 real time playback	8 channels WD1 record& 8 channels WD1 real time playback	16 channels WD1 record &16 channels WD1 real time playback
Audio			
Audio Input	4 channels RCA Input	8 channels RCA Input	4 channels RCA Input
Audio Output	1 channel RCA Output	1 channels RCA Output	1 channels RCA Output
Recording			
Compression Format	H.264 VBR/CBR		
Compression Resolution	WD1 Real Time		
Recording Mode	Manual/alarm/motion detection/timing		
Motion Detection	Each Channel Area Selectable (Sensitivity Adjustable)		

Data Authentication	NO Watermarking		
Playback			
Playback	4 channels	8 channels	16 channels
Playback Mode	Normal Playback, Various playback speed (Forward, Backward, Step)		
Search Mode	Date/Time		
Alarm			
Alarm Input	4 Alarm inputs	4 Alarm inputs	8 Alarm inputs
Alarm Output	1 Alarm output	1 Alarm output	1 Alarm output
Display			
Multi-screen Display	1/4 Windows	1/4/9 Windows	1/4/9/16 Windows
Languages			
Languages	English, Chinese, Korean		
Storage & Backup			
DVD Writer	N.A.		
Internal HDD	8 SATA HDD		
Data Backup	Internet (Support network download and backup) USB2.0 (Flash disk, portable disk, USB burner and etc.)		
Serial Port			
PTZ Camera Control	N.A.		
Operation			
Control Applications	Via Front Panel Control, USB Mouse, Remote Controller, TCP/IP (Network), Cell Phone Interface		
Network			
Remote Access Tool	ActiveX Base Web Live & Search/CAWD-CS Access (Live, Setting, Search, Recoding, ETC.)/Cell phone Network		
Network Service	Protocol: TCP/IP, PPPOE, SMTP,UPNP,DHCP and DDNS, 3G		
Network Interface	10/100 base-T Ethernet (RJ-45)		
System Time Sync	Support Network Time Protocol		
Others			
Operating Temperature	-10°C~55°C		
Operating Humidity	10%~90% / Non-condensing		
Power	DC 12V,4A		
Dimensions	380 (W)×295 (D)×55 (H) mm		
Weight	Approx. 3kg (Exclude HDD)		

Certificates	CE, C-tick

MONITOR

The monitor shall be suitable with the standards of the selected cameras. It shall be solid state and modular in design. It shall provide a bright, clear and well defined picture display on the screen.

All controls for brightness, contrast etc. shall be provided on the front panel for readily adjusting the levels of the video signal. The rear panel shall be provided with input and output BNC connectors for coupling the video output to other Monitors. The video monitors installed shall be at least 21" size or more and shall comply with the specification.

POWER SUPPLY UNIT:

The Power Supply Unit shall be capable for 12Vdc Regulated Output for Camera with Overload & Short Circuit Protection.

(ITEM NO. 17)

CEILING MOUNTED WIFI ROUTER

SPECIFICATION

- Dual Band Wifi 6 (802.2ax).
- 300+ Concurrent Client Capacity & Operates at Full 4x4 Mimo with 160 MHz Bandwidth.
- Guest Traffic Isolation, which Enhances Wireless Network Security & Lowers Traffic Congestion.
- 2.4 GHz (2x2 MU-MIMO & OFDMA) Band with a 573.5 Mbps Throughput Rate & 5 GOFDMA) Band with a 4.8 Gbps Throughput Rate.
- Additional Details
- Antenna
- DATA

  Power Method: 802.3at PoE+

  Gain: 2.4 GHz: 4 dBi & 5 GHz: 6 dBi

  802.2b: 1, 2, 5.5 & 2 Mbps

  802.2a: 6, 9, 12, 18, 24, 36, 48 & 54 Mbps

  802.2g: 6, 9, 12, 18, 24, 36, 48 & 54 Mbps

  802.2n (WiFi 4): 6.5 Mbps to 600 Mbps (MCS0 - MCS31, HT 20/40)

  802.2ac (Wi-Fi 5): 6.5 Mbps to 3.4 Gbps (MCS0 - MCS9 NSS1/2/3/4, VHT 20/40/80 &160)

  802.2ax (Wi-Fi___33 6): 7.3 Mbps to 4.8 Gbps (MCS0 - MCS2 NSS1/2/3/4, HE 20/40/80 &160)

- INTERFACE Management Ethernet Bluetooth
- INERFACE PORT Networking GbE RJ 45
- MATERIAL Plastic
- POWER 10-15W
- STANDARD CE, FCC & IC
- VOLTAGE Adapter : 48V 44-57V DC
- WIFI 802.2a/b/g WIFI 4/5/6

ITEM NO. 20, 22, 23

24 PORT PATCH PANEL / PATCHMAX PANEL (CAT-6) - D LINK

Identification:

ID Plate: PC, transparent color with paper

Panel: SPCC, 1.5mm thickness with black color

RJ45 Jack

Housing: PBT +Glass fiber UL94V-O

Contact Brackets: PBT + Glass fiber UL94V-0, black colour

RJ45 Jack Contact

Material: Phosphor bronze with nickel plated

Finish: 50 micro-inch Gold plated on plug contact area

IDC

Housing: PC, UL 94V-0

Terminal: phosphor bronze with tin plated

Jack bracket set:

ABS

Support Bar

SPCC, 1.5mm thickness with Black colour painted

Contact Resistance	:	20 Milliohms max.
Insulation Resistance	:	100 Mega ohms min. @ 500 VDC
RJ45 Jack Life	:	750 Times min
IDC Life	:	200 Times min

Storage	:	-40 To +70
Operation	:	-10 To +60

ITEM NO. 24

15U Wall mounted IT rack with exhaust fan, 5A Socket power strip, tray complete with all accessories

Rack Standard	:	Conforms to DIN 41494 or equivalent standard
Construction	:	Welded
Front Door	:	Lockable Toughened Glass Door
Basic Frame	:	Steel
Equipment Mounting	:	DIN Standard Slots
Mounting Angle	:	19” Mounting angles made of formed steel Standard Finish
	:	Powder Coated
Top and Bottom Cover	:	Welded to Frame, Vented and Field Cable entry exit cut outs
Standard Color	:	Grey / Black
Static Load	:	25 kgs
Dimensions	:	550(W) x 600 (D) x 620 (H)
Exhaust fan	:	2 nos.
5A Socket strip	:	6 nos. 5A socket in strip
1U Cable manager	:	provided
Hardware packet	:	provided
Cantilever tray	:	provided

ITEM NO. 25

General

42’ INCH Screen for monitoring

Specification

SCREEN SIZE 105.41 cm diagonal (42” INCH), RESOLUTION FHD (1920*1080), USB INPUT (2.0 SUPPORT) 2*Side(USB2.0), HDMI INPUT 2*Side(HDMI 1.4), USB DEVICE SUPPORT USB Supported HDD, HOTEL MODE Yes, Basic, BLUETOOTH Yes (Ver. 4.1), WIFI TYPE(STANDARD) 802.11a/b/g/n 2.4G 2T2R, Built-in, WIFI BAND TYPE 2.4GHz, OS & VERSION INFO Android 'P' - 9.0, MEMORY FLASH 8GB EMMC, RAM 1.5.0GB , DDR3 2133Mhz.

Mode of Measurement

Measurement will be done on each basis

LIST OF APPROVED MAKES OF MATERIALS FOR ELECTRICAL & ELV WORKS

THE DFCCI RESERVES THE RIGHT TO SELECT ANY OF THE BRANDS INDICATED IN THE `LIST OF APPROVED MAKES'. THE TENDERER SHALL QUOTE HIS RATES ON THE BASIS OF THE PRICE OF THE BRAND/MAKE STIPULATED IN THE ITEM OF WORKS AS DESCRIBED IN BOQ & SPECIFICATION AS WELL AS IN THE LIST OF APPROVED MAKE. THE CONTRACTOR CANNOT CLAIM ANYTHING EXTRA IF THE DFCCI CHANGES THE MAKE BUT WITHIN THE LIST OF APPROVED MAKE, BEFORE PLACING THE ORDER. ORDER OF THE MAKES IS NOT PREFERENTIAL. FINAL CHOICE OF MAKES LIES WITH THE DFCCI. ALL MATERIALS SHALL BE WITH ISI MARK. CONTRACTOR SHALL GET MAKES APPROVED BEFORE PROCUREMENT.

The successful tenderer shall have to use the makes from Below in consultation with the DFCCI AND/OR ITS ARCHITECT. And items which are not in below list also have to approved by engineer in charge.

For at par comparison tenderer shall consider 1st listed make as long as possible.

(a) **Casing caping/conduit:** Protoplast, Precision, Modi, Volex, Press Fit, Polycab, Anchor, Premium.

(b) **Copper / aluminium Wire:** Polycab, Finolex, RR Kabel, Havells, Avocab, Anchor, Pyroflex, Paragon, CCI, HPL, Bentec, .

(c) **Holder, ceiling rose, switches:** Anchor, Leader, Cona, Harison, Indoasian, legrand, MK, Crabtree.

(d) **Modular switch and socket:** Anchor/ Roma, Penta, Cona, Leader, Crabtree, Legrand. MK

(e) **Plug/socket 6/16 Amp, adopter:** Anchor, Cona, Leader, Roma, Penta, Havells, legrand, Indoasian, Crabtree, MK, Precision, Veto.

(f) **Call Bell:** Cona, Anchor, Leader, Precision, Veto, havells. MK

(g) **DP switch with fuse:** Anchor, Leader, Cona, Harison, Havells, Veto, C&S, L&T, GE, Indo-Asian.

(h) **Electronic fan regulator:** Anchor, Penta, Roma, Rider, Jainex, MI, Cona, Legrand, Leader, Crabtree, MK, Ave, Philips, Havells.

(i) **MCB-DB, ELCB, RCCB, RCBO:** GE, Indoasian, HPL, Havells, Legrand, C&S, Oreva, Bentec, L&T.

(j) **MCCB:** L&T, GE, Siemens, HPL, Indoasian, Havells, Legrand, ABB, Schneider, C&S.

(k) **GI Pipe:** Zenith, Prakash Surya, Jindal, TATA, Swastika, Asian.

(l) **Measuring Instrument Voltmeter/Ammeter:** AE, IMP, Motwani, Meco, Trinity, Toshniwal, Jaipurmeter, Simco, Macco, Ruttonsha, Simpson, Hitachi, L&T, Baroda meter, Havells.

(m) **Electronic Energy Meter:** L&T, Siemens, Jaipur, Meco, Enercon, Udaipur, Havells, HPL, Bentec.

(n) **Indication lamp:** L&T, Siemens, C&S, Teknik.

(o) **Insrument transfomer (CT/PT):** Ashmor, C&S, L&T, MECO, Virat, Kuppa, AE.

(p) **Paints:** Asian, Nerolac, Dulex, Shalimar.

(q) **Exhaust/ padustal fan:** Crompton Greaves, Usha, GEC, Alfa, Unique, Almonard, Inova, Khetan, Havells, and Bajaj.

(r) **Data and Voice wires :** D link, Honeywell, Schneider

(s) **Telephone cables :** Armoured / Unarmored / Jelly filled as per SOQ of Delton / Finolex /RR Cabel / KEI / Polycab

(t) **EPBX :** Matrix / Panasonic/ NEC

(u) **Telephone :** Beetel / Panasonic

(v) **PVC Armoured XLPE LT Cable:** XLPE armoured cable for 1.1 KV as per IS: 7098. Polycab / Finolex / KEI / RR Cabel / Havell's

(w) **Glands:** Comet, Dowells, HMI, Standard Metal Industries, Hansel, Lapp.

(x) **Cable Lugs :** Dowells, 3-D, Comet, HMI

(y) **Telephone tag block :** Krone / Legrand

(z) **Light Fixture - Commercial – Indoor / Outdoor :** Wipro , Philips, GE, Jaquar, Havell's

(aa) **Ceiling Fans :** Crompton, Orient, Usha

(bb) **TV Cable – co axial :** Finolex, RR Cabel, Polycab

(cc) **CCTV SYSTEM (CAMERA / NVR) :** Hikvision, Sony

(dd) **NETWORK SWITCH / PATCH PANEL :** D link, Netgear, Cisco

(ee) **Motion Sensor :** Wipro, Philips, Havells, Legrand

(ff) **Ceiling mounted WiFi :** D link, Ubiquit

(gg) **Water cooler :** Blue star, Usha, Voltas

(hh) **Lift :** Schindler / OTIS / Omega / TRIO

(ii) **HVAC VRV System :** Daikin, Blue star, Toshiba, Hitachi

(jj) **DG Set :** Cummins, Kirlosker, CG, Honda

(kk) **Transformer :** Voltamp, Kirlosker, CG, National

(ll) **VCB :** L & T, ABB, Siemens, Crompton, Schneider

(mm) **SOLAR PV Module :** ALMM list for Solar PV Module i.e. List of Models and Manufactures for solar PV Modules

(nn) **INVEWRTER FOR SOLAR :** Polycab, Havells, Delta, Sungrow, ABB

PART-IV

CHAPTER – I

MILESTONES AND TIME SCHEDULE

MILESTONES AND TIME SCHEDULE

4.1.1 Time Schedule:

4.1.1.1 Time of start and completion:

The time allowed for execution of the works is 10 (Ten Months) from the date of issue of letter of acceptance from DFCCIL.

The contractor shall be expected to mobilize to the site of works and commence execution of the works within 10 (days) from issue of Acceptance Letter by DFCCIL.

The contractor shall be expected to complete the whole work ordered on the contractor within 10 (Ten Months) from the date of issue of Acceptance Letter by DFCCIL.

If the contractor commits defaults in commencing execution of the works as afore stated, DFCCIL shall without prejudice to any other right to remedy, be at liberty to forfeit fully the Earnest Money Deposit and performance guarantee of the contractor.

4.1.1.2 Progress of works:

The contractor shall submit a programme of work in the form of a Bar Chart of all the activities in consistence with milestone target envisaged below. In case this bar chart requires to be modified, the Engineer and the contractor shall agree upon a time and progress chart. The chart shall be prepared in direct relation to the time stated as 7 months for the completion of the works as the milestone targets specified below of these special conditions. It shall indicate the forecast of the dates of commencement and completion of various activities of the work and may be amended as necessary by agreements between the Engineer and the contractor within the limitation of 1 0 (Ten Months) as overall completion period.

4.1.2 Achievement of milestone progress:

In order to ensure progress during the execution of the work the contractor will be expected to achieve the following milestone targets ahead of dates mentioned against each. Failure to achieve accomplished milestone targets within allocated timeframe, save for reason accepted as laid by the Engineer shall create and constitute the ground for failure on the part of contractor for maintaining progress of the work as per agreed programme.

Milestone Targets	Time allocated within which to achieve completion in total 10 (Ten) month time
(a) Physical commencement of work	D + 10 days
(b) Mobilization of equipment, machinery, men and material	D + 15 days
(c) Construction of foundation	D + 45 days

(d) Construction of frame structure completed	D+ 150 days
(e) Construction of Brick masonry work	D+200 days
(f) Flooring, plumbing and finishing work	D+250 days
(g) Lift and Lighting works (Elect.)	D+275 days
(h) Colour/Painting	D+290 days
(i) Balance Works Completed	D+300 days

Note: "D" is the date of issue of Letter of Acceptance by DFCCIL to the contactor.

PART- IV

CHAPTER II

TENDER FORMS
(INCLUDING SCHEDULE OF PRICES)

TENDER FORMS

FORM No.	SUBJECT
Form No. 1	Offer Letter
Form No. 2	Tenderer's Credentials
Form No. 2A	Technical Eligibility Criteria Details
Form No. 2B	Financial Eligibility Criteria Details
Form No. 2C	Applicant's Party Information Form
Form No. 3	Summary of Prices
Form No. 4	Schedule of Prices and Total Prices
Form No. 5	Contract Agreement
Form No. 6	Performance Guarantee Bond
Form No. 7	Standing indemnity bond for on account payment.
Form No. 8	ECS / NEFT / RTGS
Form No. 9	Draft MOU for Joint Venture Participation
Form No.10	Draft Agreement for JV
Form No.11	Pro-forma of Participation from each partner of JV
Form No.12	Power of Attorney for authorized signatory of JV Partners
Form No.13	Power of Attorney to lead partner of JV
Form No. 14	Performa for Time Extension
Form No. 15	Certificate of Fitness
Form No. 16	Performa of 7 days" Notice
Form No. 17	Performa of 48 Hours" Notice
Form No. 18	Performa of Termination Notice
Form No. 19	Format of Bank Guarantee for Mobilisation
Form No. 20	Format of Integrity Pact
Form No. 21	Anti-profiteering
Form No.22	Format for certificate to be submitted /uploaded by tenderer along with the tender documents
Form No.23	Tender's Credential (BID Capacity)
Form No.23A	Statement of Works in Progress for Bid Capacity
Form No. 24	Final Supplementary Agreement
Form No. 25	Agreement towards Waiver under Section 12(5) and Section 31A (5) of Arbitration and Conciliation (Amendment) Act
Form No. 26	(Bid Security) Bank Guarantee Bond from any scheduled commercial bank of India
Form No. 27 A	Proforma Of 14 Days Notice For Offloading Of Part Of Contract Work
Form No. 27B	Notice For Part Of Contract Work Offloaded
Form No. 28	MOU- Electrical Work

FORM No. 1

OFFER LETTER

Tender No. ……

Work of *"Construction of proposed Officer Rest House at CGM Office, DFCCIL, Sabarmati, Ahmedabad.".*

To,

Chief General Manager,
DFCCIL, Ahmedabad

We, the undersigned, declare that:

(a) We have examined and have no reservations to the Bidding Documents, including Addenda.

(b) We offer to execute the Works in conformity with the Bidding Documents;

(c) Our bid shall be valid for a period of 60 days from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;

(d) We have not been blacklisted/banned in accordance with para.1.3.13 (iii) of Preamble and General Instructions to tenderers.

(e) We are neither Bankrupt/Insolvent nor in the process of winding-up nor there is a case pending before any Court on deadline of submission of the Bid in accordance with para. 1.3.13 (iii) of Preamble and General Instructions to tenderers.

(f) If our bid is accepted, we commit to obtain a Performance Guarantee in accordance with the Bidding Documents;

(g) If our bid is accepted, we commit to deploy key equipment and key personnel consistent with the requirements of the work.

(h) We understand that this bid, together with your written acceptance thereof included in your notification of award/Letter of Acceptance (LOA), shall constitute a binding contract between us, until a formal contract is prepared and executed; and

(i) All information, statements and description in this bid are in all respect true, correct and complete to the best of our knowledge and belief and we have not made any tampering or changes in the bidding documents on which the bid is being submitted and if any tampering or changes/incorrect information are detected at any stage, we understand the bid will invite summarily rejection and forfeiture of bid security, the contract will be liable to be terminated along with forfeiture of performance security, even if LOA has been issued.

(j) We understand that you are not bound to accept the lowest bid or any other bid that you may receive.

Name ..... In the capacity of ..... Signed ..... Duly authorized to sign the Bid for and on behalf of ..... Date ....

FORM No. 2

TENDERER'S CREDENTIALS

S. No	Description
1.	For technical experience/competence, give details of similar completed works during the last Seven financial years (i.e. current Financial year and three previous Financial Years) in the Performa given in Form-2A
2.	For financial capacity and organizational resources, give details of contractual payments received for the last three financial years (i.e. current Financial year and three previous financial years) as per audited balance sheet certified by Chartered Accountant in the Performa given in Form-2B
3.	Give constitution of your firm. Attach certified copies of legal documents in support thereof. Form-2C

FORM No. 2A

TECHNICAL ELIGIBILITY CRITERIA DETAILS

Details of the similar works completed (as per Para 1.3.13 (i) of Preamble and General Instruction to Tenders)

Similar Contract No.		
Contract Identification		
Award date		
Completion date		
Role in Contract	Prime Contractor	Member in JV
Total Contract Amount (Rs.)		
If member in a JV, Specify participation in total contract amount	[insert a percentage amount]	Total contract amount in Rs.
Total work done (Final Bill/Last Bill paid in case final bill under preparation)		
Amount of work executed having similar nature of work		
Employer's Name: Address: Telephone/Fax number E-Mail:		
Description of the similarity in accordance with Criteria 1.3.13 (i) (A)		

The Bidder shall attach Certified completion certificates issued by the client duly attested by Notary as per Eligibility Criteria of the tender documents.

Signature of the Tenderer with Seal

FORM No. 2B

FINANCIAL ELIGIBILITY CRITERIA DETAILS

Each Bidder or each member of JV must fill in this form separately.

Name of Bidder/JV Partner

Details of contractual payments received during the last three financial years and current financial year

Annual Contractual Turnover Data for the Previous 3/4 Years (Contractual Payment only)			
Year	Amount Currency	Exchange Rate	Indian National Rupees Equivalent
Average Annual Contractual Turnover for last 3 years			

1. The average annual contractual turnover shall be calculated as an average of "total contractual payments" in the previous three financial years. However, in case balance sheet of the previous year is yet to be prepared/ audited, the audited balance sheet of the fourth previous year shall be considered for calculating average annual contractual turnover.
2. The information supplied shall be substantiated by data in the audited balance sheets and profit and loss accounts for the relevant years in respect of the bidder or all members constituting the bidder.
3. Contents of this form should be certified by a Chartered Accountant duly supported by Audited Balance Sheet duly certified by the Chartered Accountant.

SEAL AND SIGNATURE OF THE BIDDER

Certified that all figures and facts submitted in this form have been furnished after full consideration of all observations/notes in Auditor's reports._____

(Signature of Chartered Accountant)

Name of CA:_____

Registration No: _____

(Seal)

FORM No. 2C

APPLICANT'S PARTY INFORMATION FORM

Applicant name: *[insert full name]*
Applicant's Party name: *[insert full name of Applicant's Party]*
Applicant's Party country of registration: *[indicate country of registration]*
Applicant Party's year of constitution: *[indicate year of constitution]*
Applicant Party's legal address in country of constitution: *[insert street/ number/ town or city/ country]*
Applicant Party's authorized representative information Name: *[insert full name]* Address: *[insert street/ number/ town or city/ country]* Telephone/Fax numbers: *[insert telephone/fax numbers, including country and city codes]* E-mail address: *[indicate e-mail address]*
1. Attached are copies of original documents of ☐ Articles of Incorporation (or equivalent documents of constitution or association), and/or registration documents of the legal entity named above. ☐ In case of a Government-owned enterprise or institution, documents establishing legal and financial autonomy, operation in accordance with commercial law, and absence of dependent status. 2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

Signature of
the Tenderer
with Seal

FORM No. 3

SUMMARY OF PRICES

(Summary of Prices has been separately attached as per SCHEDULE uploaded at IREPS site)

FORM No. 4

SCHEDULE OF PRICES & TOTAL PRICES
Tender Schedule

(Schedule of Prices & Total Prices has been separately attached as per SCHEDULE uploaded at IREPS site)

FORM No. 5

SAMPLE

A G R E E M E N T

CONTRACT AGREEMENT

THIS AGREEMENT ("Agreement") is made at Ahmedabad on the____day of_____

BETWEEN

Dedicated Freight Corridor Corporation of India Limited, incorporated under the laws of India and having its principal place of business at, **Office of the Chief General Manager, Dedicated Freight Corridor Corporation of India Limited, OCC Building, 'D' Cabin Road, Sabarmati, Ahmedabad-380019, Gujarat, India** (hereinafter called **„the Employer"**), and **----------,** a company / corporation / JV incorporated under the laws of ----------having its principal place of business at ---------- (hereinafter called "**the Contractor**").

WHEREAS in reference to a call for Tender for (Name of Work)---------- _____ as per Tender paper _____ at Annexure "A" here to, the Contractor has submitted a Tender hereto and whereas the said Tender of the contractor has been accepted for (Name of Work)_____ . As per copy of the Letter of Acceptance of Tender No ---------- dated --/--/2023 complete with enclosure at the accepted rates and at an estimated contract value of Rs._____(Rupees _____ only). Now the agreement with witness to that in consideration of the premises and the payment to be made by the Employer to the Contractor provided for herein below the Contractor shall supply all equipment's and materials and execute and perform all works for which the said Tender of the Contractor has been accepted, strictly according to the various provisions in Annexure "A" and "B" hereto and upon such supply, execution and performance to the satisfaction of the Purchaser, the Purchaser shall pay to the contractor at the several rates accepted as per the said Annexure "B" and in terms of the provisions therein.

IN WITNESS WHEREOF the parties here to have caused their respective Common Seals to be hereunto affixed/ (or have hereunto set their respective hands and seals) the day and year first above written.

For and on behalf of the Contractor	For and on behalf of the Employer
Signature of the authorized official	Signature of the authorized
official Name of the official	Name of the official

Stamp/seal of the Contractor

Stamp/Seal of the Employer

SIGNED, SEALED AND DELIVERED

By the said _____Name

By the said _____Name

On behalf of the Contractor in the presence of :
Witness
Name
Address

On behalf of the Employer in the presence of:
Witness
Name
Address

Enclosures:-

1. Annexure "A" - Tender Papers No.
2. Annexure "B" - Letter of Acceptance of Tender No._____Dated_____
   Along with Summary of Prices

FORM No. 6

SAMPLE

Name of the Bank _____

Managing Director/ DFCCIL Bank Guarantee Bond No._
Acting through_____(Designation Dated and address of contract signing authority)

PERFORMANCE GUARANTEE BOND

In consideration of the Managing Director / DFCCIL acting through Chief General Manager/DFCCIL/Ahmedabad (Designation & Address of Contract Signing Authority), Dedicated Freight Corridor Corporation of India Limited hereinafter called "DFCCIL") having agreed under the terms and conditions of agreement/Contract Acceptance letter No._____
dated _____made between _____(Designation & address of contract signing Authority) and
_____(hereinafter called "the said contractor(s)" for the work_
_____ (hereinafter called "the said agreement") having agreed for submission of an irrevocable
Bank Guarantee Bond for Rs._____(Rs._____Only) as a performance security Guarantee Bond from the contractor(s) for compliance of his obligations in accordance with the terms & conditions in the said agreement.

1. We (indicate the name of the Bank) hereinafter referred to as the Bank, undertake to pay to the Government an amount not exceeding Rs._____ (Rs. Only) on demand by the Government.
2. We_____(indicate the name of the bank, further agree that (and promise) to pay the amounts due and payable under this guarantee without any demur merely on a demand from the Government through the Chief General Manager/ DFCCIL/Ahmedabad or _____(Designation & Address of contract signing authority) DFCCIL, stating that the amount claimed is due by way of loss or damage caused to or would be caused or suffered by the Government by reason of any breach by the said contractor of any of the terms or conditions contained in the said agreement or by reason of the contractor failure to perform the said agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____ (Rs._____ Only)

3 (a) We,_____(indicate the name of Bank) further undertake to pay to the Government any money so demanded notwithstanding any dispute or dispute raised by the contractor (s) in any suit or proceeding pending before any court

or Tribunal relating to liability under this present being absolute and unequivocal.

(b) The payment so made by us under this bond shall be valid discharge of our liability for payment there under and the contractor(s) shall have no claim against us for making such payment.

4. We,_____(indicate the name of bank) to further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said agreement and that it shall continue to be enforceable till all the dues of the Government under or by virtue of the said agreement have been fully paid and its claims satisfied or discharged by _____ (Designation & Address of contract signing authority) on behalf of the Government, certify that the terms and conditions of the said agreement have been fully and properly carried out by the said contractor (s) and accordingly discharges this guarantee.

5. (a) Not withstanding anything to the contrary contained herein the liability of the bank under this guarantee will remain in force and effect until such time as this guarantee is discharged in writing by the Government or until (date of validity/extended validity) whichever is earlier and no claim shall be valid under this guarantee unless notice in writing thereof is given by the Government within validity / extended period of validity of guarantee from the date aforesaid.

(b) Provided always that we_____(indicate the name of the Bank) unconditionally undertakes to renew this guarantee to extend the period of guarantee form year to year before the expiry of the period or the extended period of the guarantee, as the case may be on being called upon to do so by the Government. If the guarantee is not renewed or the period extended on demand, we_____(indicate the name of the Bank) shall pay the Government the full amount guarantee on demand and without demur.

6. We, _____(indicate the name of Bank) further agree with the Government that the Government shall have the fullest liberty without our consent and without effecting in any manner out of obligations hereunder to vary any of the terms and conditions of the said contract from time to time or to postpone for any time or from time to time any to the powers exercisable by the Government against the said contractor (s) and to forbear or enforce any of the terms and conditions of the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said contractor (s) or for any bearance act or omission on the part of the Government or any indulgence by the Government to the said contractor (s) or by any such matter or thing whatsoever which under the law relating to sureties for the said reservation would relive us from the liability.

7. This guarantee will not be discharged by any change in the constitution of the Bank or the Contractor (s).

8. We,_____(indicate the name of the Bank) lastly undertake not to

revoke this guarantee except with the previous consent of the Government in writing.

9. This guarantee shall be valid upto_____(Date of completion plus 60 days beyond that).Unless extended on demand by Government. Notwithstanding anything to the contrary contained herein before, our Liability under this guarantee is restricted to Rs. _____Only) unless a demand under this guarantee is Made on us in writing on or before _____we, shall be discharged from our liabilities under this guarantee thereafter.

Dated _____the day of _____For _____(Indicate the name of bank)

Signature of Bank Authorize official
(Name):
Designation:
Full Address.

Witness:
1. _____
2. _____

FORM No. 7

SAMPLE
STANDING INDEMNITY BOND FOR "ON ACCOUNT" PAYMENTS

(On paper of requisite stamp value)

We, M/s_____hereby undertake that we hold at our stores Depot/s at_for and on behalf of the Managing Director/ DFCCIL acting in the premises through the Chief General Manager/ DFCCIL/Ahmedabad or his successor (hereinafter referred to as "The Employer") all materials for which "On Account" payments have been made to us against the Contract for (_____) on the section _____DFCCIL also referred to as Group/s_____vide letter of Acceptance of Tender _____dated_____and material handed over to us by the employer for the purpose of execution of the said contract, until such time the materials are duly erected or otherwise handed over to him.

We shall be entirely responsible for the safe custody and protection of the said materials against all risk till they are duly delivered as erected equipment to the employer or as he may direct otherwise and shall indemnify the employer against any loss /damage or deterioration whatsoever in respect of the said material while in our possession and against disposal of surplus materials. The said materials shall at all times be open to inspection by any officer authorized by the Chief General Manager/DFCCIL/Ahmedabad in charge of Dedicated Freight Corridor Corporation of India Limited (Whose address will be intimated in due course).

Should any loss, damage or deterioration of materials occur or surplus material disposed off and refund becomes due, the Employer shall be entitled to recover from us the 85% of supply portion of Part IV, Chapter – II (Form - 4) to the Contract (as applicable) and also compensation for such loss or damage if any long with the amount to be refunded without prejudice to any other remedies available to him by deduction from any sum due or any sum which at any time hereafter becomes due to us under the said or any other Contract.

Dated this day___day of_____2023
For and on behalf of
M/s_____(Contractor)
Signature of witness
Name of witness in Block letter.

Address.

FORM No. 8

ECS / NEFT / RTGS MANDATE FORM

Date:- To,
Dy.CPM/PM/Finance
DFCCIL/Ahmedabad
Sub: ECS / NEFT / RTGS payments

We refer to the ECS / NEFT / RTGS set up by DFCCIL for remittance of our payments using RBI's NEFT / RTGS scheme, our payments may be made through the above scheme to our under noted account.

Name of Bank	
Name of City	
Bank Code No	
Name of Bank Branch	
Branch Code No	
Address of Bank Branch	
Telephone Number of Bank Branch	
Fax No of Bank Branch	
Name of customer / Tenderer as per account	
Account Number of Tenderer appearing on cheque	
Type of Account (S. B. / Current / Cash credit)	
IFSC code for NEFT	
IFSC code for RTGS	
9-Digit-code number of the bank and branch appearing on the MICR cheque issued by the bank.	
Details of Cancelled Cheque leaf	
Telephone no of tenderer	
Cell Phone Number of the tenderer to whom details with regard to the status of bill submitted to Accounts Office i.e. Co6 & Co7 & Cheque Purchase Orders	
Tenderer's E - mail ID	

Confirmed by Bank signature of tenderer with stamp and address
Enclose a copy of crossed cheque

FORM No. 9

DRAFT MEMORANDUM OF UNDERSTANDING (MOU)
For JOINT VENTURE PARTICIPATION
BETWEEN
(IF APPLICABLE)

M/s …….. Having its registered office at …… (Hereinafter referred to as ……) acting as the Lead Partner of the first part,

and

M/s …….having its registered office at ……. (Hereinafter referred to as `……..) in the capacity of a Joint Partner of the other part.

and

M/s …….having its registered office at ……. (Hereinafter Referred to as `…….") in the capacity of a Joint Partner of the other part.

The expressions of …….. And …….. Shall wherever the context admits, mean and include their respective legal representatives, successors-in-interest and assigns and shall collectively be referred to as "the Parties" and individually as "the Party"

WHEREAS:

Dedicated Freight Corridor Corporation of India Limited (DFCCIL) [hereinafter referred to as "Client"] has invited bids for ……..."[Insert name of work]……..."

NOW, THEREFORE, THE PARTIES AGREE AS FOLLOWS:

1. The following documents shall be deemed to form and be read and construed as an integral part of this MOU.
   (i) Notice for Bid, and
   (ii)Bidding document
   (iii) Any Addendum/Corrigendum issued by Dedicated Freight Corridor Corporation of India Limited
   (iv) The bid submitted on our behalf jointly by the Lead Partner.

2. The `Parties" have studied the documents and have agreed to participate in submitting a `bid" jointly.

3. M/s ……shall be the lead member of the JV for all intents and purpose and shall represent the Joint Venture in its dealing with the Client. For the purpose of submission of bid proposals, the parties agree to nominate …….. As the leader duly authorized to sign and submit all documents and subsequent clarifications, if any, to the Client. However M/s
   …… shall not submit any such proposals, clarifications or commitments before securing the written clearance of the other partner which shall be expeditiously given by M/s……..……to M/s…….

4. The `Parties" have resolved that the distribution of responsibilities and their proportionate share in the Joint Venture is as under:
   (a) Lead Partner;

(i) ……
(ii) ……...
(iii) …….
(b) Joint Venture Partner
(i) ……
(ii) …….
(iii) ……..
[Similar details to be given for each partner]

5. JOINT AND SEVERAL RESPONSIBILITIES

The Parties undertake that they shall be jointly and severally liable to the Client in the discharge of all the obligations and liabilities as per the contract with the Client and for the performance of contract awarded to their JV.

6. ASSIGNMENT AND THIRD PARTIES

The parties shall co-operate throughout the entire period of this MOU on the basis of exclusivity and neither of the Parties shall make arrangement or enter into agreement either directly or indirectly with any other party or group of parties on matters relating to the Project except with prior written consent of the other party.

7. EXECUTIVE AUTHORITY

The said Joint Venture through its authorized representative shall receive instructions, payments from the Client. The management structure for the project shall be prepared by mutual consultations to enable completion of project to quality requirements within permitted cost and time.

8. BID SECURITIES

Till the award of the work, JV firm/Lead Partner of JV firm shall furnish Bid Security to the Client on behalf of the joint venture which shall be legally binding on all the members of the Joint Venture.

9. BID SUBMISSION

Each Party shall bear its own cost and expenses for preparation and submission of the bid and all costs until conclusion of a contract with the Client for the Project. Common expenses shall be shared by all the parties in the ratio of their actual participation.

10. INDEMNITY

Each party hereto agrees to indemnify the other party against its respective parts in case of breach/default of the respective party of the contract works of any liabilities sustained by the Joint Venture.

11. For the execution of the respective portions of works, the parties shall make their own arrangements to bring the required finance, plants and equipment, materials, manpower and other resources.

12. DOCUMENTS & CONFIDENTIALITY

Each Party shall maintain in confidence and not use for any purpose related to the Project all commercial and technical information received or generated in the course of

preparation and submission of the bid.

13. ARBITRATION

Any dispute, controversy or claim arising out of or relating to this agreement shall be settled in the first instance amicably between the parties. If an amicable settlement cannot be reached as above, it will be settled by arbitration in accordance with the Indian Arbitration and Conciliation Act 1996 or any amendments thereof. The venue of the arbitration shall be Delhi.

14. VALIDITY

This Agreement shall remain in force till the occurrence of the earliest to occur of the following, unless by mutual consent, the Parties agree in writing to extend the validity for a further period.

a. The bid submitted by the Joint Venture is declared unsuccessful, or
b. Cancellation/ shelving of the Project by the client for any reasons prior to award of work
c. Execution of detailed JV agreement by the parties, setting out detailed terms after award of work by the Client.

15. This MOU is drawn in ….. Number of copies with equal legal strength and status. One copy is held by M/s …… and the other by M/s……. & …….M/s …….. And a copy submitted with the proposal.

16. This MOU shall be construed under the laws of India.

17. **NOTICES**

Notices shall be given in writing by fax confirmed by registered mail or commercial courier to the following fax numbers and addresses:

Lead Partner	Other Partner(s)
…….	……
(Name & Address)	(Name & Address)

IN WITNESS WHEREOF THE PARTIES, have executed this MOU the day, month and year first before written.

M/s……..	M/s…….
……	……..
(Seal)	(Seal)

Witness

1…….. (Name & Address)

2…….. (Name & Address)

Notes: (1) In case of existing joint venture, the certified copy of JV Agreement may be furnished.

FORM No. 10

DRAFT FORMAT OF JOINT VENTURE AGREEMENT

To be executed on non-judicial stamp paper of appropriate value in accordance with relevant Stamp Act and to be registered with appropriate authority under Registration Act.

The JV agreement shall be structured generally as per contents list given below:

A. CONDITIONS AND TERMS OF JV AGREEMENT

1. Definitions and Interpretation
2. Joint Venture – Include Equity of members, transferability of shareholding of equity of a partner leaving during the subsistence of the contract.
3. Proposal Submission
4. Performance – To indicate scope of responsibility of each member
5. Language and Law
6. Exclusively
7. Executive Authority
8. Documents
9. Personnel
10. Assignment and Third Parties
11. Severability
12. Member in Default
13. Duration of the Agreement
14. Liability and sharing of risks
15. Insurance
16. Sharing of Promotion and Project Costs, Profits, Losses and Remuneration
17. Financial Administration and Accounting
18. Guarantees and Bonds
19. Arbitration
20. Notices
21. Sole Agreement and Variation

B. SCHEDULES

1. Project and Agreement Particulars
2. Financial Administration Services
3. Allocation of the obligations
4. Financial Policy and Remuneration

*****

FORM No. 11

PRO-FORMA LETTER OF PARTICIPATION FROM EACH PARTNER OF JOINT VENTURE (JV)

(To be executed on non-judicial stamp paper of appropriate value in accordance with relevant Stamp Act and to be registered with appropriate authority under Registration Act.)

No…. Dated

From:
……..
……..

To,
Chief General Manager,
Dedicated Freight Corridor Corporation of India Limited, OCC Building, 'D' Cabin Road, Sabarmati, Ahmedabad-380019, Gujarat.

Re: …"*[Insert name of work*]……."

Ref: Your notice for Invitation for Bid (IFB) No…….
Dated ……..

1. We wish to confirm that our company/firm has formed a Joint Venture with (i)……. & ii)…….. For the purposes associated with IFB referred to above.

(Members who are not the lead partner of the JV should add the following paragraph).*

2. "The JV is led by … whom we hereby authorise to act on our behalf for the purposes of submission of Bid for ……. and authorise to incur liabilities and receive instructions for and on behalf of any and all the partners or constituents of the Joint Venture."

OR

*(Member(s) being the lead member of the group should add the following paragraph)**

2. "In this group we act as leader and, for the purposes of applying for Bid, represent the Joint Venture:
3. In the event of our JV being awarded the contract, we agree to be jointly with i) & ii)

…… (names of other members of our JV) and severally liable to the Dedicated Freight Corridor Corporation of India Limited, its successors and assigns for all obligations, duties and responsibilities arising from or imposed by the contract subsequently entered into between Dedicated Freight Corridor Corporation of India Limited and our JV.

4. ***I/We, further agree that entire execution of the contract shall be carried out exclusively through the lead partner.**

Yours faithfully,
(Signature)
(Name of Signatory)…….
(Capacity of
Signatory)……
Company Seal * Delete as applicable

Note: In case of existing joint venture, the certified copy of JV Agreement may be furnished.

FORM No. 12

FORMAT FOR POWER OF ATTORNEY FOR AUTHORISED SIGNATORY OF JOINT VENTURE (JV) PARTNERS

POWER OF ATTORNEY*

(*To be executed on non-judicial stamp paper of the appropriate value in accordance with relevant stamp Act. The stamp paper to be in the name of the company who is issuing the power of Attorney*)

Know all men by these presents, we … do hereby constitute, appoint and authorise Mr/Ms …. who is presently employed with us and holding the position of ……as our attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to our bid for the work of…….. Including signing and submission of all documents and providing information / responses to Dedicated Freight Corridor Corporation of India Limited, representing us in all matters, dealing with Dedicated Freight Corridor Corporation of India Limited in all matters in connection with our bid for the said project.

We hereby agree to ratify all acts, deeds and things lawfully done by our said attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid attorney shall and shall always be deemed to have been done by us.

Dated this the …… day of ……. 2023.

(Signature of authorised Signatory)

Signature of Lead Partner **Signature of JV Partner(s)**

…… **…….**

(Signature and Name in Block letters of Signatory)
Seal of Company

Witness

Witness 1:	Witness 2:
Name:	Name:
Address:	Address:
Occupation:	Occupation:

**Notes:*

i) To be executed by all the partners jointly, in case of a Joint Venture.

FORM No. 13

FORMAT FOR POWER OF ATTORNEY TO LEAD PARTNER OF JOINT VENTURE (JV)

(***To be executed on non-judicial stamp paper of the appropriate value in accordance with relevant stamp Act. The stamp paper to be in the name of the company who is issuing the power of Attorney)***

POWER OF ATTORNEY*

Whereas Dedicated Freight Corridor Corporation of India Limited has invited Bids for the Work of ……(Name of Work)……..

Whereas, the members of the Joint Venture comprising of M/s. …, M/s. …, M/s……, and M/s. …. are interested in submission of bid for the work of …*[Insert name of work*]… in accordance with the terms and conditions contained in the bidding documents.

Whereas, it is necessary for the members of the Joint Venture to designate one of them as the Lead Partner, with all necessary power and authority to do, for and on behalf of the Joint Venture, all acts, deeds and things as may be necessary in connection with the Joint Venture's bid for the project, as may be necessary in connection the Joint Venture's bid for the project.

NOW THIS POWER OF ATTORNEY WITNESSETH THAT:
We, M/s. ……, hereby designate M/s. ……, being one of the partners of the Joint Venture, as the lead partner of the Joint Venture, to do on behalf of the Joint Venture, all or any of the acts, deeds or things necessary or incidental to the Joint Venture's bid for the contract, including submission of bid, participating in conferences, responding to queries, submission of information/ documents and generally to represent the Joint Venture in all its dealings with the Railway / DFCCIL or any other Government Agency or any person, in connection with the Bid/contract for the said work until culmination of the process of bidding till the contract agreement if successful, is entered into with the Dedicated Freight Corridor Corporation of India Limited and thereafter till the expiry of the contract agreement.

**To be executed by all the members of the JV except the lead member.*

The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executants(s) and when it is so required the same should be under common seal affixed in accordance with the required procedure.

We hereby agree to ratify all acts, deeds and things lawfully done by lead member, our said attorney, pursuant to this power of attorney and that all acts deeds and things done by our aforesaid attorney shall and shall always be deemed to have been done by us/ Joint Venture.

Dated this the ……. Day of ……... 2023

……..
(Signature)

…… (Name in Block letters of Executants) Seal of Company

Witness 1	
Name:	
Address:	
Occupation:	
Witness 2	
Name:	
Address:	
Occupation:	

FORM No. 14
Reference para 17B
Registered Acknowledgement Due

PROFORMA FOR TIME EXTENSION

No. _____ Dated:

_____
_____
_____

Sub: (i) _____*(name of work).*
(ii) Acceptance letter no. _____
(iii) Understanding/Agreement no. _____

Ref: _____(Quote specific application of Contractor for extension to the date received) _____

Dear Sir,

1. The stipulated date for completion of the work mentioned above is_____.From the progress made so far and the present rate of progress, it is unlikely that the work will be completed by the above date (or "However, the work was not completed on this date").

2. Expecting that you may be able to complete the work, if some more time is given, the competent authority, although not bound to do so, hereby extends the time for completion from_____to_____.

3. Please note that an amount equal to the liquidated damages for delay in the completion of the work after the expiry of_____ *(give here the stipulated date for completion with/without any penalty fixed earlier)* will be recovered from you as mentioned in Clause, 17-B of the Standard General Conditions of Contract for the extended period, notwithstanding the grant of this extension. You may proceed with the work accordingly.

4. The above extension of the completion date will also be subject to the further condition that no increase in rates on any account will be payable to you.

5. Please intimate within a week of the receipt of this letter your acceptance of the extension of the conditions stated above.

6. Please note that in the event of your declining to accept the extension on the above said conditions or in the event of your failure after accepting or acting up to this extension to complete the work by_____(here mention the extended date), further action will be taken in terms of Clause 62 of the Standard General Conditions of Contract.

Yours faithfully

For and on behalf of the Employer

Name of the Official:-
Stamp/Seal of the Employer

FORM No. 15

CERTIFICATE OF FITNESS

1. (a) Serial Number_____
   (b) Date _____

2. Name of person examined _____

3. Father's Name: son/daughter of _____,
   Residing at _____

4. Sex _____

5. Residence:_____

6. Physical fitness

7. Identification marks _____

8. Date of birth, if available, and/or certified age _____

I certify that I have personally examined (name) _____who is desirous of being employed in a factory or on a work requiring manual labour and that his/her age as nearly as can be ascertained from my examination, is _____ years.

I certify that he/she is fit for employment in a factory or on a work requiring manual labour as an adult/child.

9. Reasons for :
(a) Refusal to grant certificate, or _____
(b) Revoking the certificate _____

Signature or left hand

Thumb impression of the person examined.

Signature of Certifying Surgeon

Note: In case of physical disability, the exact details and cause of the physical disability should be clearly stated.

FORM No. 16
Registered Acknowledgement Due

PROFORMA OF 7 DAYS NOTICE
DFCCIL
(Without Prejudice)

To
M/s _____
_____

Dear Sir,

Contract Agreement No. _____
In connection with _____

1. In spite of repeated instructions to you by the subordinate offices as well as by this office in various letters of even no._____, dated_____; you have failed to start work/show adequate progress and/or submit detailed program me for completing the work.

2. Your attention is invited to this office/Chief Engineer's office letter no. _____, dated_____in reference to your representation, dated_____.

3. As you have failed to abide by the instructions issued to commence the work/to show adequate progress of work you are hereby given 7 days" notice in accordance with Clause 62 of Standard General Conditions of Contract to commence works / to make good the progress, failing which further action as provided in Clause 62 of the Standard General Conditions of Contract viz. to terminate your Contract and complete the balance work without your participation will be taken.

Kindly acknowledge receipt.

Yours faithfully

For and on behalf of the
Employer Name of the
Official:- Stamp/Seal of the
Employer

FORM No. 17
Registered Acknowledgement Due

PROFORMA OF 48 HRS. NOTICE
DFCCIL
(Without Prejudice)

To

M/s _____
_____

Dear Sir,

Contract Agreement No. _____
In connection with _____

1. Seven days" notice under Clause 62 of Standard General Conditions of Contract was given to you under this office letter of even no., dated_; but you have taken no action to commence the work/show adequate progress of the work.

2. You are hereby given 48 hours" notice in terms of Clause 62 of Standard General Conditions of Contract to commence works / to make good the progress of works, failing which and on expiry of this period your above contract will stand rescinded and the work under this contract will be carried out independently without your participation and your Security Deposit shall be forfeited and Performance Guarantee shall also be encased and consequences which may please be noted.

Kindly acknowledge receipt.

Yours faithfully

For and on behalf of the Employer
Name of the Official:-
Stamp/Seal of the Employer

FORM No. 18
Registered Acknowledgement Due

PROFORMA OF TERMINATION NOTICE
DFCCIL
(Without Prejudice)

No. _____ Dated _____

To
M/s _____
_____

Dear Sir,

Contract Agreement No. _____
In connection with _____

Forty eight hours (48 hrs.) notice was given to you under this office letter of even no. Dated_____; but you have taken no action to commence the work/show adequate progress of the work.

Since the period of 48 hours" notice has already expired, the above contract stands rescinded in terms of Clause 62 of Standard General Conditions of Contract and the balance work under this contract will be carried out independently without your participation. Your participation as well as participation of every member/partner in any manner as an individual or a partnership firm/JV is hereby debarred from participation in the tender for executing the balance work and your Security Deposit shall be forfeited and Performance Guarantee shall also be encased.

Kindly acknowledge receipt.

Yours faithfully

For and on behalf of the Employer
Name of the Official:-
Stamp/Seal of the Employer

FORM No. 19

SAMPLE
FORMAT OF BANK GUARANTEE FOR MOBILISATION ADVANCE

(Clause 1.5.20, Part - I, Chapter - V)

Bank guarantee made on this ……. Between …… (Hereinafter called "**the Bank**") of the One Part and Dedicated Freight Corridor Corporation of India Limited. (Hereinafter called "**the Employer**") of the other Part.

WHEREAS Dedicated Freight Corridor Corporation of India Limited has awarded the Contract no……. for "……" (hereinafter called "**the Contractor**"), having its registered office at ……..

AND WHEREAS vide Clause 1.5.20 of Part - I, Chapter V , Special Conditions of Contract, Mobilization Advance up to % (percent) of the original contract value of Rs…….. Is payable to the contractor against Bank Guarantees, the contractor hereby applies for Mobilization Advance of ___% (___percent) amounting to Rs……../- (Rupees……..) of the Contract Price,

Now, we the undersigned, Bank of ……., being fully authorized to sign and to incur obligations for and on behalf of and in the name of Bank of ……..hereby declare that the said Bank will guarantee the Employer the full amount of Rs. ……../- (Rupees……..) as stated above.

We, Bank of ……., do hereby unconditionally, irrevocably and without demur guarantee and undertake to pay the Employer immediately on demand any or all money payable by the contractor to the extent of Rs. ……./-(Rupees……..) without any demur, reservation, context, recourse or protest and/or without any reference to the contractor. Any such demand made by the Employer on the Bank shall be conclusive and binding notwithstanding any difference between the Employer and the contractor on any dispute pending before any court, Tribunal, Arbitrator or any other authority. We agree that the guarantee herein contained shall be irrevocable and shall continue to be enforceable till the Employer discharges this guarantee.

This guarantee is valid till ……..

At any time during the period in which this guarantee still valid of the contractor fails to fulfil its obligation under the Contract, it is understood that the Bank will extend this guarantee under the same condition for the required time on demand by the Employer at the cost of the contractor.

The Guarantee hereinbefore contained shall not be affected by any change in the constitution of the Bank or of the contractor.

The neglect or forbearance of the Employer in enforcement of payment of any money, the payment whereof is intended to be hereby secured or the giving of time by the Employer for the payment hereof shall in no way relieve the Bank of their liability under this Deed.

The expressions "the Employer", "the Bank" and "the contractor" hereinbefore used shall include their respective successors and assigns.

Notwithstanding anything contained herein:
Our liability under this Bank Guarantee shall not exceed Rs……./- (Rupees…….)

This bank Guarantee shall be valid up to…….

We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only and only if you serve upon us a written claim or demand on or before ……(date of expiry of Guarantee).

In witness whereof we of the Bank have signed and sealed this Guarantee on the ……. Day of ……. Being herewith duly authorized.

For and on behalf of the Bank of.....

Signature of Authorized Bank Official

Name .....
Designation .....
Stamp/Seal of the bank .....
Signed, sealed and delivered for and on
Behalf of the bank by the above named

..... In the presence of
Witness 1
Signature .....
Name .....
Address .....
Witness 2
Signature .....
Name .....
Address .....

Form no.20

PRE CONTRACT INTEGRITY PACT

General

This pre-bid pre-contract Agreement (hereinafter called the Integrity Pact) is made on----------day of the month of---------- 2023, between, on one hand, the DFCCIL acting through Shri ---------- Designation of the officer, (hereinafter called the CLIENT, which expression shall mean and include, unless the context otherwise requires, his successors in office and assigns) of the First Part and M/s---------- represented by Shri ----------Chief Executive Officer (hereinafter called the "BIDDER/SELLER" which expression shall mean and include, unless the context otherwise requires, his successors and permitted assigns) of the Second part.

WHEREAS the CLIENT proposes to procure (Name of the Stores/Equipment/Item, Name of the Consultancy Service, Name of Works Contract, Name of Services) and the [A] is willing to Offer/has offered for stores or works.

WHEREAS the [A] is a private company/ public company/ Government undertaking/ partnership/ registered export agency, constituted in accordance with the relevant law in the matter and the CLIENT is a PSU performing its functions or behalf of the President of India/DFCCIL.

NOW, THEREFOR,

To avoid all forms of corruption by following a system that is fair, transparent and free from any influence/prejudiced dealings prior to, during and subsequent to the currency of the contract to be entered into with a view to:-

Enabling the CLIENT to obtain the desired said (Name of the Stores/Equipment/Item, Name of the Consultancy Service, Name of Works Contract, Name of Services) at a competitive price in conformity with the defined specifications by avoiding the high cost and the distortionary impact of corruption on public procurement, and

Enabling BIDDERs to abstain from bribing or indulging in any corrupt practice in order to secure [B] by providing assurance to them that their competitors will also abstain from bribing and other corrupt practices and the CLIENT will commit to prevent corruption, in any form, by its Officials by following transparent procedures.

The parties hereto hereby agree to enter into this Integrity Pact and agree as

follows: Commitments of the CLIENT

1.1 The CLIENT undertakes that no official of the CLIENT, connected directly or indirectly with the [B], will demand, take a promise for or accept, directly or through intermediaries, any bribe, consideration, gift, reward, favour or any material or immaterial benefit or any other advantage from the [A] either for themselves or for any person, organization or third party related to the [B], in

exchange for an advantage in the bidding process, bid evaluation, contracting or implementation process related to the [B].

1.2 The CLIENT will, during the pre-contract stage, treat all BIDDERs alike, and will provide to all BIDDERs the same information and will not provide any such information to any particular BIDDER which could afford an advantage to that particular [A] in comparison to other BIDDERs.

1.3 All the officials of the CLIENT will report to the appropriate Government office any attempted or completed breaches of the above commitments as well as any substantial suspicion of such a breach.

2. In case any such preceding misconduct on the part of such official(s) in reported by the [A] to the CLIENT with full, and verifiable facts and the same is prima facie found to be correct by the CLIENT, necessary disciplinary proceedings, or any other action as deemed fit, including criminal proceedings may be initiated by the CLIENT and such a person shall be debarred from further dealings related to the [B] process. In such a case while an enquiry is being conducted by the CLIENT the proceedings under the [B] would not be stalled.

Commitments of BIDDERS

3. The [A] commits itself to take all measures necessary to prevent corrupt practices, unfair means and illegal activities during any stage of its bid or during any pre-contract or post- contract stage) in order to secure the [B] contract or in furtherance to secure it and in particular committee itself to the following:-

3.1 The [A] will not offer, directly or through intermediaries, any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission fees, brokerage or inducement to any official of the CLIENT, connected directly or indirectly with the bidding process, or to any person, organization or third party related to the (B] in exchange for any advantage in the bidding, evaluation, contracting and implementation of the [B].

3.2 The (A] further undertakes that it has not given, offered or promised to give, directly or indirectly any bribe, gift, consideration, reward, favour, any Material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the CLIENT or otherwise in procuring the Contract or forbearing to do or having done any act in relation to the obtaining or execution of the [B] or any other [B] with the Government for showing or forbearing to show favour or disfavour to any

person in relation to the [B] or any other [B] with the Government.

3.3 * [A] shall disclose the name and address of agents and representatives and Indian [A] shall disclose their foreign principals or associates.

3.4 * [A] shall disclose the payments to be made by them to agents/brokers or any other intermediary, in connection with this bid/contract.

3.5 The [A] further confirms and declares to the CLIENT that the [A] is the original manufacturer/ integrator/ authorized government sponsored export entity of the defense stores and has not engaged any individual or firm or company whether Indian or foreign to intercede, facilitate or in any way to recommend to the CLIENT or any of its functionaries, whether officially or unofficially to the award of the [B] to the [A] nor has any amount been paid, promised or intended to be paid to any such individual, firm or company in respect of any such intercession, facilitation or recommendation.

3.6 The [A] either while presenting the bid or during pre-contract negotiations or before signing the [B] shall disclose any payments he has made, is committed to or intends to make to officials of the CLIENT or their family members, agents, brokers or any other intermediaries in connection with the [B] and the details of services agreed upon for such payments.

3.7 The [A] will not collude with other parties interested in the [B] to impair the transparency, fairness and progress of the bidding process, bid evaluation, contracting and implementation of the [B].

3.8 The [A] will not accept any advantage in exchange for any corrupt practice, unfair means and illegal activities.

3.9 The [A] shall not use improperly, for purposes of competition or personal gain, or pass on to others, any information provided by the CLIENT as part of the business relationship, regarding plans, technical proposals and business details, including information contained in any electronic data carrier. The [A] also undertakes to exercise due and adequate care lest any such information is divulged.

3.10 The [A] commits to refrain from giving any complaint directly or through any other manner without supporting it with full and verifiable facts.

3.11 The [A] shall not instigate or cause to instigate any third person to commit any of the actions mentioned above.

3.12 If the, [A] or any employee of the [A] or any person acting on behalf of the [A], either directly or Indirectly, is a relative of any of the officers of the CLIENT, or alternatively, if any relative of an officer of the CLIENT has financial. Interest/stake in the Bidder‟s firm, the same shall be disclosed by the [A] at the time of filling of tender.

The term „relative‟ for this purpose would be as defined in section 6 of the companies‟ act 1956.

3.13 The [A] shall not lend to or borrow any money from or enter into any monetary dealings or transactions, directly or indirectly, with any employee of the CLIENT.

4. Previous Transaction

4.1 The [A] declares that no previous transgression occurred in the last three years immediately before signing of this integrity Pact, with any other company in any country in respect of any corrupt practices envisaged hereunder or with any public sector enterprise in India or any Government department in India that could justify BIDDER‟s from the tender process.

4.2 The [A] agrees that if it makes incorrect statement on this subject, [A] can be disqualified from the ender process or the contact, if already awarded, can be terminated for such reason.

5. Earnest Money (Security Deposit)

5.1 While submitting commercial bid, the [A] shall deposit an amount __ (to be specified in RFP) as Earnest Money/Security Deposit, with the CLIENT through any of the following instruments:-

i. Bank draft or a pay order in favour of _____.
ii. A confirmed guarantee by an Indian nationalized bank, promising payment of the guaranteed sum to the CLIENT on demand within three working days without any demur whatsoever and without seeking any reasons whatsoever. The demand for payment by the CLIENT shall be treated as conclusive proof or payment.
iii. Any other mode or through any other instrument (to be specified in the RFP).

5.2 The earnest money/Security deposit shall be valid up to a period of five

years or the contractual obligations to the complete satisfaction of both the BIDDER and the CLIENT, including warranty period, whichever is later.

5.3 In case of the successful [A] a clause would also be incorporated in the article pertaining to performance Guarantee in the [B] that the provisions of sanctions for violation shall be applicable for forfeiture of performance bond in case of a decision by client to forfeit the same without assigning any reason for imposing sanction for violation of this pact.

5.4 No interest shall be payable by CLIENT to the [A] on earnest Money/Security Deposit for the period of its currency.

6. Sanctions for Violations

6.1 Any breach of the aforesaid provisions by the [A] or any one employed by it or acting on its behalf (whether with or without the knowledge of the [A] shall entitle the CLIENT to take all or any one of the following actions, wherever required :-

(i) To immediately call off the pre-contract negotiations without assigning any reason or giving any compensation to the [A]. However, the proceedings with the other BIDDER(s) would continue.

(ii) The earnest money deposit (in pre-contract stage) and/or security Deposit/performance Bond (after the [B] is signed) shall stand forfeited fully and the CLIENT shall not be required to assign any reason therefore.

(iii) To immediately cancel the [B], if already signed, without giving any compensation to the [A].

(iv) To recover all sums already paid by the CLIENT, and in case of an Indian [A] with interest thereon at 2% higher that the prevailing prime lending rate of state bank of India, while in case of a [A] from the country other than India with interest thereon at 2% higher than the LIBOR. If any outstanding payment is due to [A] from the CLIENT in connection with any other [B], such outstanding payment could also be utilized to recover the aforesaid sum and interest.

(v) To encash the advance bank guarantee and performance bond, if furnished by the [A], in order to recover the payments, already

made by CLIENT, along with interest.

(vi) To cancel all or any other contracts with the [A]. The [A] shall be liable to pay compensation for any loss or damage to the Client resulting from such cancellation/rescission and the client shall be entitled to deduct the amount so payable from the money(s) due to the [A].

(vii) To debar the [A] from participating in future bidding processes of the Government of India for a minimum period of five years, which may be further extended at the discretion of the CLIENT.

(viii) To recover all sums paid in violation of this pact by [A]) to any middleman or agent or broker with a view a view to securing [B] the contract.

(ix) In cases where irrevocable letters of credit have been received in respect of any [B] signed by the client with the [A], The shall not be opened.

(x) Forfeiture of Performance Bond in case of a decision by the client to forfeit the same without assigning any reason for imposing sanction for violation of this pact.

6.2 The client will entitled to take all or any of the actions mentioned at para 6.1(i) to (x) of this pact also on the commission by the [A] or any one employed by it or acting on its behalf (whether with or without the knowledge of the [A], of an offence as defined in chapter IX of the Indian penal code, 1860 or prevention of Corruption Act, 1988 or any other statute enacted for prevention of corruption.

6.3 The decision of the CLIENT to the effect that a breach of the provisions of this pact has been committed by the [A] shall be final and conclusive on the [A]. However, the [A] can approach the Independent Monitor(s) appointed for the purposes of this Pact.

7. Fall Clause

7.1 The [A] undertakes that it has not supplied/is not supplying similar product/systems or subsystems at a price lower than that offered in the present bid in respect of any other Ministry/Department of the Government of India or PSU and if it is found at any stage that similar product/system or sub systems way supplied by [A] to any other Ministry/Department of the Government of India or a PSU at a lower

price, then that very price, with due allowance for elapsed time, will be applicable to the present case and the difference in the cost would be refunded by the [A] to the CLIENT, if the [B] has already been concluded.

8. Independent Monitors

8.1 The CLIENT has appointed Independent Monitors (hereinafter referred to as Monitors) for this pact in consultant with the central vigilance commission (Names and addresses of the Monitors to be given)

8.2 The task of the Monitors shall be to review independently and objectively, whether and to what extent the parties comply with the obligations under this pact.

8.3 The monitors shall not be subject to instructions by the representatives of the parties and perform their functions neutrally and independently.

8.4 Both the parties accept that the Monitors have the right to access all the documents relating to the project/procurement, including minutes of meetings.

8.5 As soon as the Monitor notices, or has reason to believe, a violation of this Pact, he will so inform the Authority designated by the CLIENT

8.6 The BIDDER(s) accepts that the Monitor has the right to access without restriction to all Project documentation of the CLIENT including that provided by the BIDOER. The [A] will also grant the Monitor, upon his request and demonstration of a valid Interest, unrestricted and unconditional access to his project documentation. The same is applicable to Subcontractors. The Monitor shall be und 'contractual obligation to treat the information and documents of the [A] with confidentiality.

8.7 The client will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the parties. The parties will offer to the Monitor the option to participate in such meetings.

8.8 The monitor will submit a written report to the MD/DFCCIL within 8 to 10 weeks from the date of reference or intimation to him by the CLIENT/BIDDER and, should the occasion arise, submit proposal for correcting problematic situations.

9. Facilitation of Investigation

In case of any allegation of violation of any provisions of this Pact or payment of commission, the CLIENT or its agencies shall be entitled to examine all the documents including the Books of Accounts of the [A] and the [A] shall provide necessary information and documents in English and shall extend all possible help for the purpose of such examination.

9.1 Law and Place of Jurisdiction

This pact is subject to Indian law. The place of performance and jurisdiction is the seat of the CLIENT.

10. Other Legal Actions

The actions stipulated in this integrity pact are without prejudice to any other legal action that may follow in accordance with the provisions of the extant law in force relating to any civil or criminal proceedings.

10.1 Validity

10.2 The validity of this integrity pact shall be from date of its signing and extend up to 5 years or the complete execution of the [B] to the satisfaction of both the CLIENT and the [A] including warranty period, whichever is later. In case [A] is unsuccessful, this integrity pact shall expire after six months from the date of the signing of the [B].

10.3 Should one or several provisions of this pact turn out to be invalid; the remainder of this pact shall remain valid. In this case, the parties will strive to come to an agreement to their original intentions.

11. The parties hereby sign this integrity pact at …… On ……

CLIENT	BIDDER
Name of the Officer	CHIEF EXECUCTIVE
OFFICER Designation	
Deptt./Ministry/PSU	
Witness	Witness
1. _____	1. ----------
2. _____	2._____

__ Note:

[A] - To be replaced by BIDDER/Seller/Consultant/Consultancy firm/Service provider as the case was may be.

[B] - To be replaced by Contract/Supply Contract/Consultancy Contract/Works Contract as the case was may be.

Form No. 21

ANTI-PROFITEERING DECLARATION

TO WHOMSOEVER IT MAY CONCERN

I ……, age ……, years, Son/Daughter of ……., resident of …….. Do solemnly affirm and state as under:

1) That I am the_____<Designation of the authorized signatory> of ……. And I am duly authorized to furnish this undertaking/declaration on behalf of ……. (Name of the company).

2) That …… (Name of the company) has been awarded the work …… (Name of Work) vide Letter of Award number …….. Dated ……. by M/s Dedicated Freight Corridor Corporation of India Limited.

3) That the Company is fully aware of the anti-profiteering provision under the Goods & Services Tax ("GST") Law(s),

4) That the Company …….. Has passed the benefit of input tax credit available on the ……. …….. (good/services) having HSN …… …. supplied to M/s Dedicated Freight Corridor Corporation of India Limited which it is getting on account of reduced tax liability and input tax credit because of enactment of GST Laws after introduction of Goods and Service Tax w.e.f. 1^{s1} July, 2017. The details and amounts being passed on to DFCCIL are provided in Annexure …….. Of this document and are as per applicable GST Laws. These are true and correct to the best of my knowledge, information and belief.

5) Further, it is to confirm also that in case…….. (name of the organization) will receive any further benefit in future after 1st July, 2017 by way of availment of input tax credits which were not allowed to be availed before 1^{sl} July, 201**7** or

reduction in tax rates or in any other manner which results in reduction of cost of the goods/services supplied to M/s Dedicated Freight Corridor Corporation of India Limited, then Company will pass that benefit to M/s Dedicated Freight Corridor Corporation of India Limited also.

6) That I declare that the foregoing is true and correct and the same is a legal obligation and failure to fulfil it could result in penalties under the law.

7) I confirm that I am aware of the implication of the above undertaking and our liability on account of incorrect/misleading declaration under the GST Laws.

Signature of the Authorized signatory/ person

Name and Designation of the Auth. Sign/person of the person

Name of the Organization and Seal

Executed on a non-judicial stamp paper of Rs.300/- duly notarized by notary public

Form No. 22
(Ref para 1.3.13(ii).(iv))

FORMAT FOR CERTIFICATE TO BE SUBMITTED / UPLOADED BY TENDERER ALONGWITH THE TENDER DOCUMENTS

I…… (Name and designation)** appointed as the attorney/authorized signatory of the tenderer (including its constituents),

M/s.....(hereinafter called the tenderer) for the purpose of the Tender documents for the work of..... as per the tender No..... of .....(DFCCIL/Railway)**, do hereby solemnly affirm and state on the behalf of the tenderer including its constituents as under:

1. I/we the tenderer (s) am/are signing this document after carefully reading the contents.
2. I/We the tenderer(s) also accept all the conditions of the tender and have signed all the pages in confirmation thereof.
3. I/we hereby declare that I/we have downloaded the tender documents from Indian Railway website www.ireps.gov.in

. I/we have verified the content of the document from the website and there is no addition, no deletion or no alteration to the content of the tender document. In case of any discrepancy noticed at any stage i.e. evaluation of tenders, execution of work or final payment of the contract, the master copy available with the railway Administration shall be final and binding upon me/us.

4. I/we declare and certify that I/we have not made any misleading or false representation in the forms, statements and attachments in proof of the qualification requirements.
5. I/We also understand that my/our offer will be evaluated based on the documents/credentials submitted along with the offer and same shall be binding upon me/us.
6. I/We declare that the information and documents submitted along with the tender by me/us are correct and I/we are fully responsible for the correctness of the information and documents, submitted by us.
7. I/we certify that I/we the tenderer(s) is/are not blacklisted or debarred by Railways or any other Ministry /Department of Govt. of India from participation in tender on the date of

submission of bids, either in individual capacity or as a HUF/ member of the partnership firm/LLP/N/Society/Trust.

8. I/we understand that if the contents of the certificate submitted by us are found to be forged/false or incorrect at any time during process for evaluation of tenders, it shall lead to forfeiture of the Bid Security besides banning of business for a, period of upto five year. Further, I/we (insert name of the tenderer) ** _____ and all my/our constituents understand that my/our offer shall be summarily rejected.

9. I/we also understand that if the contents of the certificate submitted by us are found to be false/forged or incorrect at any time after the award of the contract, it will lead to termination of the contract, along with forfeiture of Bid Security/Security Deposit and Performance guarantee besides any other action provided in the contract including banning of business for a period of upto five year.

10. I/We have read the clause regarding restriction on procurement from a bidder of a country which shares a land border with India and certify that I am/We are not from such a country or,

if from such a country, have been registered with the competent Authority. I/We hereby certify that I/we fulfil all the requirements, in this regard and am/are eligible to be considered (evidence of valid registration by the competent authority is enclosed)

SEAL AND SIGNATURE OF THE TENDERER

Place:

Dated:

** The contents in Italics are only for guidance purpose. Details as appropriate are to be filled in suitably by tenderer.

This certificate is to be given by each member of JV or Partners of Partnership firm/LLP/etc.

FORM No. 23

TENDERER'S CREDENTIALS (BID CAPACITY)
DFCCIL

For tenders having advertised value more than Rs 20 crore wherein eligibility criteria includes bid capacity also, the tenderer will be qualified only if its available bid capacity is equal to or more than the total value of the present tender. The available bid capacity shall be calculated as under:

Available Bid Capacity = [A x N x 2] – 0.33xNxB Where,

A = Maximum value of construction works executed and payment received in any one of the previous three financial years or the current financial year (up to date of inviting tender), taking into account the completed as well as works in progress.

N= Number of years prescribed for completion of work for which bids has been invited.

B = Existing commitments and balance amount of ongoing works with the tenderer as per the prescribed proforma of Railway for statement of all works in progress and also the works which are awarded to tenderer but yet not started upto the date of inviting of tender.

Note:

(a) The Tenderer(s) shall furnish the details of -

(i) Maximum value of construction works executed and payment received in any one of the previous three financial years or the current financial year (up to date of inviting tender) for calculating A, and

(ii) Existing commitments and balance amount of ongoing works with tenderer as per the prescribed proforma of Railway for statement of all works in progress and also the works which are awarded to tenderer but yet not started upto the date of inviting of tender for calculating B. In case of no works in hand, a 'NIL' statement should be furnished.

The submitted details for (i) and (ii) above should be duly verified by Chartered Accountant.

(b) In case if a bidder is JV , the tenderer(s) must furnish the details of

(i) Maximum value of construction works executed and payment received in any one of the previous three financial years or the current financial year (up to date of inviting tender) by each member of JV for calculating A, and

(ii) Existing commitments and balance amount of ongoing works with each member of JV either in individual capacity or as a member of other JV as per the prescribed proforma of Railway for statement of all works in progress and also the works which are awarded to each member of JV either in individual capacity or as a member of other JV but yet not started upto the date of inviting of tender for calculating B. In case of no works in hand, a 'NIL' statement should be furnished.

The submitted details for (i) and (ii) above should be duly verified by Chartered Accountant.

(c) Value of a completed work/work in progress/work awarded but yet not started for a Member in an earlier JV shall be reckoned only to the extent of the concerned member's share in that JV for the purpose of satisfying his/her compliance to the above mentioned bid capacity in the tender under consideration.

(d) The arithmetic sum of individual "bid capacity" of all the members shall be taken as JV's "bid capacity".

(e) In case, the tenderer/s failed to submit the above statement along with offer, their/his offer shall be considered as incomplete and will be rejected **summarily.**

(f) The available bid capacity of tenderer shall be assessed based on the details submitted by the tenderer. In case, the available bid capacity is lesser than estimated cost of work put to tender, his offer shall not be considered even if he has been found eligible in other eligibility criteria/tender requirement.

Statement of Works in Progress for Bid Capacity

Form No. 23A

S. N	Name and place of work	Organization for whom work is being carried out	Date of award of contract. Contract Agreement No. & Date	Original Cost of Work/Revised Cost (Up to latest corrigendum)	Date of Completion (Origin al/ Extended)	Payment Received till date of opening of present tender	Balance amount of the work to be executed	B "value of work to be done in "N" years

Note:-

1. Available Bid Capacity = [A × N × 2] – B

Where

A= Maximum value of construction works executed and payment received in any one financial year during the current and last three financial years immediately preceding the current financial year, upto date of opening of tender, taking into account the completed as well as works in progress.

N= Number of years prescribed for completion of work for which bids has been invited.

B = Value of existing commitments and balance amount of ongoing works with the tenderer to be completed in next „N" years.

2. This statement should be submitted duly verified by Chartered Accountants.

FORM No. 24

FINAL SUPPLEMENTARY AGREEMENT

1. Articles of agreement made this day _ in the year between the President of India, acting through the Railway Administration having his office at _ herein after called the Railway of the one part and of the second part.

2. Whereas the party hereto of the second part executed an agreement with the party hereto of the first part being agreement Number_____dated for the performance_____herein after called the „Principal Agreement".

3. And whereas it was agreed by and between the parties hereto that the works would be completed by the party hereto of the second part on_date last extended and whereas the party hereto of the second part has executed the work to the entire satisfaction of the party hereto of the first part.

4. And whereas the party hereto of the first part already made payment to the party hereto of the second part diverse sums from time to time aggregating to Rs ____including the Final Bill bearing voucher No._____dated_____of value _____duly adjusted as per price variation clause, if applicable (the receipt of which is hereby acknowledged by the party hereto of the second part in full and final settlement of all his /its claims under the principal agreement.

   And whereas the party hereto of the second part have received sum of Rs._____Through the Final Bill bearing voucher No.___dated _____duly adjusted as per price variation clause (PVC), if applicable (the receipt of which is hereby acknowledged by the party thereto of the second part) from the party hereto of the first part in full and final settlement of all his/its disputed claims under principal agreement.

   Now, it is hereby agreed by and between the parties in the consideration of sums already paid by the party hereto of the first part to the party hereto of the second part against all outstanding dues and claims for all works done under the aforesaid principal agreement excluding the security deposit, the party hereto of the second part have no further dues of claims against the party hereto of the first part under the said Principal Agreement. It is further agreed by and between the parties that the party hereto of the second part has accepted the said sums mentioned above in full and final satisfaction of all its dues and claims under the said Principal Agreement.

   (Applicable in case Final Supplementary Agreement is signed after release of Final Payment)

Form No. 25
Reference Para 64.(1)(ii)(b): & 64.6

Agreement towards Waiver under Section 12(5) and Section 31A (5) of Arbitration and Conciliation (Amendment) Act

I/we..... (Name of agency/Contractor) with reference to agreement no..... raise disputes as to the construction and operation of this contract, or the respective rights and liabilities, withholding of certificate and demand arbitration in respect of following claims :

Brief of claim:
(i) Claim 1- Detailed at Annexure-
(ii) Claim 2 –
(iii) Claim 3 –

I/we..... (post of Engineer) with reference to agreement no..... hereby raise disputes as to the construction and operation of this contract, or the respective rights and liabilities, withholding of certificate and demand arbitration in respect of following claims:

I/we.....do/do not agree to waive off applicability of section 12(5) of Arbitration and Conciliation (Amendment) Act.

Signature of Claimant_____ Signature of Respondent _____

Agreement under Section 31(5)

I/we..... (Name of claimant) with reference to agreement no..... hereby waive off the applicability of sub section 31-A (2) to 31-A (4) of the Arbitration and Conciliation (Amendment Act. We further agree that the cost of arbitration will be shared by the parties as per Clause 64(6) of the Standard General Conditions of Contract.

Signature of Claimant_____ Signature of Respondent_____

*Strike out whichever not applicable.

Form No. 26

(Bid Security)

Bank Guarantee Bond from any scheduled commercial bank of India

(On non-judicial stamp paper, which should be in the name of the Executing Bank)

Name of the Bank: _____

MD DFCCIL
Acting through Chief General Manager,
DFCCIL, Ahmedabad
Beneficiary: Dedicated Fright Corridor Corporation of India Limited, Ahmedabad
Date:_____

Bank Guarantee Bond No.: **Date:_____**

In consideration of the MD DFCCIL acting through Chief General Manager, DFCCIL Ahmedabad ***(Designation & address of Contract Signing Authority)***, …….. DFCCIL, ……,…. (hereinafter called "The DFCCIL") having invited the bid for_____through Notice inviting tender (NIT) No.._____, We have been informed that . . . . . [***Insert name of the Bidder***]..... (***hereinafter called "the Bidder***") intends to submit its bid (***hereinafter called "the Bid***") .

WHEREAS, the Bidder is required to furnish Bid Security for the sum of [***Insert required Value of Bid Security]***, in the form of Bank Guarantee, according to conditions of Bid.

AND

WHEREAS, ...[***Insert Name of the Bank***], with its Branch .....[***Insert Address***] having its Headquarters office at..... [***Insert Address***], hereinafter called the Bank, acting through ..... ***[Insert Name and Designation of the authorised persons of the Bank***], have, at the request of the Bidder, agreed to give guarantee for Bid Security as hereinafter contained, in favour of the Railway:

1. KNOW ALL MEN that by these present that I/We the undersigned [***Insert name(s) of authorized representatives of the Bank***], being fully authorized to sign and incur obligations for and on behalf of the Bank, confirm that the Bank, hereby, unconditionally and irrevocably guarantee to pay to the Railway/DFCCIL full amount in the sum of [***Insert required Value of Bid Security***] as above stated.
2. The Bank undertakes to immediately pay on presentation of demand by the Railway/DFCCIL any amount up to and including aforementioned full amount without any demur, reservation or recourse. Any such demand made by the Railway/DFCCIL on the Bank shall be final, conclusive and binding, absolute and unequivocal on the Bank notwithstanding any disputes raised/ pending before any Court, Tribunal, Arbitration or any Authority or any threatened litigation by the Bidder or Bank.
3. The Bank shall pay the amount as demanded immediately on presentation of the demand by Railway/DFCCIL without any reference to the Bidder and without the Railway/DFCCIL being required to show grounds or give reasons for its demand of the amount so demanded.

4. The guarantee hereinbefore shall not be affected by any change in the constitution of the Bank or in the constitution of the Bidder.
5. The Bank agrees that no change, addition, modifications to the terms of the Bid document or to any documents, which have been or may be made between the Railway/DFCCIL and the Bidder, will in any way absolve the Bank from the liability under this guarantee; and the Bank, hereby, waives any requirement for notice of any such change, addition or modification made by Railway/DFCCIL at any time.
6. This guarantee will remain valid and effective from…….[***insert date of issue***] till ……..[***insert date, which should be minimum 90 days beyond the expiry of validity of Bid***]. Any demand in respect of this Guarantee should reach the Bank within the validity period of Bid Security.
7. The Bank Guarantee is unconditional and irrevocable.
8. The expressions Bank and Railway/DFCCIL herein before used shall include their respective successors and assigns.
9. The Bank hereby undertakes not to revoke the guarantee during its currency, except with the previous consent in writing of the Railway/DFCCIL. This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No.758.
10. The Bank hereby confirms that it is on the SFMS (Structured Financial Messaging System) and shall invariably send the advice of this Bank Guarantee to the following bank details –

IFSC CODE	UBIN0546836
IFSC TYPE	BRANCH
BANK NAME	Union Bank of India
BRANCH NAME	Motibagh-1, Delhi Branch
CITY NAME	New Delhi
ADDRESS	Palika Bhawan, Motibagh-I, R.K. Puram, Delhi-110066
DISTRICT	New Delhi
STATE	New Delhi
BG ENABLED	YES

11. The Guarantee shall be valid in addition to and without prejudice to any other security Guarantee(s) of Bidder in favour of the Railway/DFCCIL. The Bank, under this Guarantee, shall be deemed as Principal Debtor of the Railway.

Date ……
……

Place…… Bank's Seal and authorized signature(s)

[Name in Block letters] ……...
[Designation with Code No.]……..……
[P/Attorney] No.

Witness:
1 Signature, Name & Address & Seal
2 Signature, Name& address & Seal Bank's Seal
[P/Attorney] No.

Note: All italicized text is for guidance on how to prepare this bank guarantee and shall be deleted from the final document.

Form No. 27 A

(Reference Clause 40(A)

Registered Acknowledgement Due

PROFORMA OF 14 DAYS NOTICE FOR OFFLOADING OF PART OF CONTRACT WORK
DFCCIL RAILWAY

(Without Prejudice)

To

M/s _____

_____

Dear Sir,

Contract Agreement No. _____

In connection with _____

In spite of repeated instructions to you by the subordinate offices as well as by this office through various letters of even no. _____, dated _____; you have failed to show adequate progress of work so as to complete the contract within the original / extended date of completion of contract and part(s) of contract work are yet to be started/ still lagging behind the agreed program of work, listed as under:

(Details of part(s) of work which is delayed and can be executed independently, to be mentioned).

2. Your attention is invited to this office/Chief Engineer's office letter no. _____ _____, dated _____ in reference to your representation, dated _____.

3. As you have failed to abide by the instructions issued to commence the work /to show adequate progress of work, you are hereby given 14 days' notice in accordance with Clause 40A of the Standard General Conditions of Contract to deploy adequate resources i.e. (the details of resource requirement, to be mentioned) and commence / to make good the progress for part(s) of works detailed above, failing which action as provided in Clause 40A of the Standard General Conditions of Contract shall be commenced after expiry of 14 days' notice period viz. to offload few/ all part(s) of work mentioned above to any of the existing or new contractor without your participation and at your Risk & Cost, not exceeding the value of Performance Guarantee of this contract, which may please be noted.

Kindly acknowledge receipt.

Yours faithfully

For and on behalf of the DFCCIL

Form No. 27 B
(Reference Clause 40(A)
Registered Acknowledgement Due

NOTICE FOR PART OF CONTRACT WORK OFFLOADED
DFCCIL RAILWAY
(Without Prejudice)

To
M/s _____
_____
Dear Sir,
Contract Agreement No. _____
In connection with _____

1. Fourteen days notice under Clause 40A of the Standard General Conditions of Contract was given to you under this office letter of even no., dated _____; but you have taken no/inadequate action to deploy adequate resources to commence the part(s) of work/show adequate progress of the part(s) of work, mentioned therein.

As you have failed to abide by the instructions issued to commence the part(s) of work/show adequate progress of the part(s) of work even at the lapse of 14 days' notice period under Clause 40A of the Standard General Conditions of Contract, few part(s) of the work under the contract have been offloaded and being executed by other mode(s) at the cost detailed below:
Or,
1. Please refer your request letter no….. dated ….., wherein it was requested under clause 40 A of the Standard General Conditions of Contract to offload part(s) of works at your risk & cost. The details of part(s) of the work under the contract which have been offloaded and being executed by other mode(s) at the cost detailed below:
(*List of Part(s) of work offloaded, Details of mode of execution of such offloaded work alongwith approximate cost thereof to be mentioned)*
2. The final measurement of work(s) already executed for above part(s) of work recorded as per clause 45 (A) or/and 45 (B) of the Standard General Conditions of Contract is enclosed herewith.
3. The Bill(s) of Quantities for Part(s) of work offloaded is enclosed herewith.
4. The additional cost in execution of offloaded work through mode(s) mentioned in para (1) above is determined as Rs. _____, over& above the cost of execution under this contract (including the PVC amount payable as per contract, as on the date of issue of this notice). This additional cost shall be recovered from your next on account bill(s) or any other dues payable to you under contract.
5. The Contract value gets reduced to Rs……..
6. You are requested to continue with the balance work in the contract subsequent to offloading of above part(s) of work.
Kindly acknowledge receipt.

Yours faithfully
For and on behalf of the DFCCIL

Form No. 28

MOU- ELECTRICAL WORK

(To be executed on non-judicial stamp paper of the appropriate value)

The Memorandum of Understanding (M.O.U) made & entered with this **(date).** ……..……. between. **(Name of tenderer with address) ……..**

…….……

AND

(Name of Electrical License holder party with address)……...

This indenture witnessed as follows:

Whereas **(Name of tenderer).....** has a considerable experience in Civil work like as ……. **(Building, drainage etc.)**

Whereas **(Name of Electrical License holder party) ……** contained considerable experience in Electrical works.

And whereas Chief General Manager, Ahmedabad OF DFCCIL, as have invite Tender for **(Name of work).....**in connection with Sanctioned work.

And where as in response to above tender invite by DFCCIL, both the party have expressed their desire to from consortium to submit competitive bid & execute this work in the event of award of this contract to **(Name of tenderer)……..** by DFCCIL, the intend being that **(Name of tenderer)……** will act as the prime bidder and **(Name of Electrical License holder party)……...** will participate as a associate of **(Name of tenderer)…….**

And where the purpose of present understanding is to set out the relation between the parties both during tendering and negotiation phase and also during the phase of execution of work on the basis of term and condition mutually agreed upon between the two parties.

And whereas parties agree to convert this memorandum of understanding in to formal agreement in due course of time incorporating the details of terms & condition etc. as mutually agreed upon.
The parties further agree as follows:

The nature of MOU is that of temporary working arrangement for the purpose of submission of bid as well as subsequent execution of work as per the respective scope work spelt out here after.

Signature of **(tenderer) party) with seal**
Place:
Date:

Signature of **(Electrical License holder with seal)**

PART V

DRAWINGS

The drawings are attached on IREPS site.

END OF DOCUMENT

****