



DEENDAYALPORT AUTHORITY
ENGINEERING DEPARTMENT



TENDER DOCUMENTS FOR

CONSTRUCTION OF ADMINISTRATIVE OFFICE BUILDING AT KANDLA.

“Invited by”
Executive Engineer (P), Project Division

Nirman Bhawan- Kandla-370210

Kutch District-Gujarat , India.

Mob (no.): 9724301528

Email: kptprojectdivision@gmail.com

Name of Work: Construction of Administrative office building at Kandla

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DEENDAYAL PORT AUTHORITY

COMPETITIVE BIDDING

NIT NO: P-05/2025

NAME OF WORK: “Construction of Administrative office building at Kandla.”

PERIOD OF DOWNLOADING OF BID

DOCUMENTS FROM:29/07/2025

TO:02/09/2025 upto 16:00 Hrs.

LAST DATE AND TIME FOR RECEIPT OF

BIDS DATE: 02/09/2025 TIME 16:00 HRS.

TIME AND DATE OF OPENING OF BIDS

16:30 Hrs. On 02/09/2025(Technical bid only)

PLACE OF OPENING OF BIDS

CHAMBER OF EXECUTIVE ENGINEER (P),

PROJECT DIVISION,

KANDLA – KUTCH (GUJARAT

STATE), PIN 370210.

Email:kptprojectdivision@gmail.com

OFFICER INVITING BIDS

EXECUTIVE ENGINEER (P), DEENDAYAL PORT AUTHORITY

DEENDAYAL PORT AUTHORITY

NOTICE INVITING TENDER

Tender No. P-05/2025

ONLINE TENDERING (E- Tendering)

NAME OF WORK: Construction of Administrative office building at Kandla

Online E-Tender are invited by Executive Engineer (P), DPA for the above work as per the details given in the table below.

Work Description	Tender Fee (In Rs.)	Estimated cost(In Rs.)	EMD (In Rs.)	Date of Pre-Bid Meeting	Last Date and time of online Submission of bid documents	Date and time of online opening
Construction of Administrative office building at Kandla	Rs. 5000 (+) 18% GST =Rs. 5900.00 (In the form of digital mode of payment) Beneficiary: Deendayal Port Authority Bank: Punjab National Bank, Kandla Branch Account no. 2177002100004628 IFSC code: PUNB0217700)	Rs. 47,92,17,705/-	Rs. 47,92,177/- (Payment towards EMD shall be submitted through Bank Guarantee issued by any nationalized/ scheduled bank except co-operative bank having its branch at Gandhidham as per format in the tender document Or in form of Insurance Surety Bond as per format and terms and condition in Form 23 A)	NIL	Up to 16:00 Hrs. on 02/09/2025	02/09/2025 at 16:30 hrs.

Detailed tender notice along with complete tender documents can be downloaded from website <https://tender.nprocure.com> from 29/07/2025 to 02/09/2025 **16:00** hrs. Tender Notice is also available on <http://deendayalport.gov.in>. Technical Bid will be opened on 02/09/2025 @ 16:30 Hrs. Date of opening of price bid shall be notified after scrutiny & evaluation of Technical Bid. For further details and general enquiries prospective bidders may contact **Executive Engineer (P), 2nd Floor, Nirman Bhavan, Kandla-370210, Kutch District, Gujarat State, INDIA**, during working hours before the last date and time of downloading of tender documents.

EXECUTIVE ENGINEER (P)
Deendayal Port Authority

DEENDAYAL PORT AUTHORITY
NOTICE INVITING ON LINE TENDER

Details about E/Online tender:

Department Name	Civil Engineering Department
Circle/ Division	Project Division, 2 nd Floor, Nirman Bhavan, Kandla-370210, Kutch District
Tender Notice No.	
Name of Project	<u>Construction of Administrative office building at Kandla.</u>
Name of Work	<u>Construction of Administrative office building at Kandla.</u>
Estimated Contract Value (INR)	Rs. 47,92,17,705/-
Period of Completion (in Months)	24Months.
Bidding Type	Open
Bid Call (Nos.)	One
Tender Currency Type	Single
Tender Currency Settings	Indian Rupee (INR)
Qualifying Criteria :	<p>1. Average annual financial turnover during the last three years ending 31st March 2024, should be at least Rs 1437.65 Lakhs. (The financial turnover document must be certified by a Chartered Accountant (CA) with the CA's stamp, signature, and UDIN/membership number. Additionally, all necessary documents for the verification of turnover must be provided. Failure to comply with these requirements bid will be treated as non-responsive).</p> <p>2. Experience of having successfully completed similar works during last 7 years ending last day of month previous to the one in which applications are invited should be either of the following:</p> <p style="text-align: center;">Three similar completed works each costing not less than Rs. 1916.87 Lakhs (Excluding GST).</p> <p style="text-align: center;">Or</p> <p style="text-align: center;">Two similar completed works each costing not less than Rs: 2396.09 Lakhs (Excluding GST).</p>

	<p>Or</p> <p>One similar completed works each costing not less than Rs. 3833.74 lakh (Excluding GST).</p> <p><i>“Similar Work” means Construction work of Institutional/Residential/Commercial RCC framed structure building with Piling, external development works, Electrical, Water supply, Firefighting, all complete work of a building constructed during last 7 years ending last day of month previous to the one in which applications are invited.</i></p>
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	<p>3. <u>Work experience in Private Organisation:</u> If the Bidder has completed works in a private organization as stipulated in the Minimum Qualification Criteria (work experience), the following documents must be enclosed with the BID for consideration:</p> <ul style="list-style-type: none"> • TDS Certificates: The Bidder must provide TDS certificates issued by the competent authority with respect to the work experience. • CA Certificate: The Bidder must submit a certificate issued by their Chartered Accountant (CA) stating that the amount shown in the TDS certificate has been received with respect to the work experience submitted by the Bidder. This document must be certified by the CA with their stamp, signature, and UDIN number. <p>Failure to provide these documents will result in the bid being treated as non-responsive.</p> <p>4. <u>Work Experience as a sub-contractor:</u> In case the Bidder has carried out work experience as a subcontractor, the following conditions must be met by bidder:</p> <p>a) The subcontract experience shall be considered for qualification only, if the work was carried out for Govt./Autonomous Body working under Govt./Semi Govt., or Public Limited companies. The Bidder must submit the subcontract permission issued by the respective work authority prior to the execution of the work. It is mandatory to upload the subcontract permission online along with the bid. If the subcontract permission is not</p>
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authenticated, the respective bidder will be considered non-responsive.

b) The completion certificate/Form-3A issued/authenticated by the concerned Government, Semi-Government, or Public Limited companies, copy of work order, bill of quantity, copy of all bills must be uploaded along with the bid submission supported by TDS certificate & CA certificate as indicated in Para-3 above for private work.

c) The decision taken by DPA with regard to Sub-contract work experience shall be final and binding to bidder.

5. MSME:-

*In case of Micro and Small Enterprise (MSEs) holding valid certificate issued by any agencies/organization under The Ministry of Micro, Small and Medium Enterprises indicating the list of activity related to the subject as per National Industrial Classification – 2008 mentioned in the table below only shall become eligible for exemption from payment of Tender fee/EMD such bidder shall upload the scanned copy of valid certificate in preliminary bid tender shall become eligible for exemption from payment of Tender fee/EMD. Such bidder shall upload in preliminary bid as well as duly filled in and signed "**Bid Securing Declaration**" as per format provided in the tender document failing which the bid shall be treated as non-responsive. Bid securing declaration form is attached:*

SECTION F	CONSTRUCTION
Division 41	Construction of buildings
Group 410	Construction of buildings
Class 4100	Construction of buildings
Sub-Class 41001	Construction of buildings carried out on own-account basis or on a fee or contract basis
Division 43	Specialized construction activities
Group 433	Building completion and finishing
Class 4330	Building completion and finishing

6. Bid Capacity:

Bidders who meet the minimum qualification criteria will be qualified only if their available bid capacity is more than the total bid value. The available bid capacity will be calculated as under:

Assessed Available Bid capacity = $A \times M \times N - B$, Where,

“A” = Maximum value of works executed in any one year during last Five years (at current price level), taking into account the completed as well as works in progress.

“M” = Multiplier Factor (Usually 1.5)

“N” = Number of years prescribed for completion of the subject contract.

“B” = Value at current price level of existing commitments and ongoing works to be completed in the next 'N' years.

The Bidder shall furnish statements showing the value of existing commitments and ongoing works as well as the stipulated period of completion remaining for each of the works preferably countersigned by the Nodal Office or his nominee-in charge.

The bidder shall submit bid capacity calculations along with relevant information/documents with the bid, failing which bid will be considered as non-responsive.

7. Integrity Pact Agreement:

The bid/tender shall also be accompanied by Integrity Pact Agreement as per format in the tender.

- a) The potential bidders shall download and print the IP signed by the Employer and their witness and affix his/her signature on the IP agreement in the presence of a witness from his / her side, who shall also affix his/ her signature thereof. Having completed the signing procedure, the potential bidder shall upload the duly filled and signed IP Agreement on n-procure portal.
- b) The procedure mentioned above regarding signing of Integrity Pact Agreement by both the parties (Employer and Potential bidders) shall be completed online.

	<p>However, in case of any technical glitch due to which any potential bidder is unable to upload the IP Agreement, then he/she shall submit the hardcopy of the duly filled, signed IP Agreement to the department concerned of DPA within a period of seven days and prior to opening of the Technical Bid, failing which Bid of potential Bidder shall be treated as disqualified.</p> <p>c) In case of Partnership firm, IP agreement needs to be signed by all the partners of partnership firm and copy of partnership deed shall be submitted at preliminary bid stage, failing which bid will be treated as not responsive.</p> <p>d) In case of JV, IP agreement needs to be signed by all the partners of JV and copy of JV agreement shall be submitted at preliminary bid stage, failing which bid will be treated as not responsive.</p>
Joint Venture	<p>Applicable</p> <ol style="list-style-type: none"> 1. In case of JV to qualify experience in similar works, merging of work order value executed by two or more of its member JV either as a whole or as member of JV shall not be permitted to qualify eligible works in terms of similar completed works. Only no. of work orders executed by members of JV shall be merged to evaluate experience. 2. Lead partner should have executed at least one similar work costing Rs. 1916.87 Lakhs as per Minimum Eligibility Criteria. 3. The works reckoned for the above purpose are those executed by the tenderer as prime contractor or proportionately as member of joint venture or as a sub-contractor, authorized and approved by the Employer of the work(s) against which the tenderer has claimed his experience. 4. In the case of bid submitted by JV/ Consortium, the lead partner of the JV shall meet the Minimum Eligibility Criteria of Financial Turnover. 5. Bid Security as required shall be furnished by lead member of JV.
Rebate	Applicable
Bid Document Fee :	Rs. 5000.00 (+) 18% GST = Rs. 5900.00/-
Bid Document Fee Payable To:	In the form of digital mode of payment at Punjab National Bank, Kandla Branch Account no. 2177002100004628

	IFSC code: PUNB0217700
Bid Security/ EMD (INR) :	Rs. 47,92,177/-
Bid Security/ EMD (INR) In Favour Of :	In the form of BG Drawn in favour of Board of Deendayal Port Authority, Kandla, issued by any Nationalized / scheduled bank except Co- Operative Bank) having branch at Gandhidham(as per enclosed format or by Insurance Surety Bond as per format and terms and condition in attached Form-23 A.
Bid Document Downloading Start Date	29/07/2025
Bid Document Downloading End Date	02/09/2025 Up to 16:00 Hrs.
Date & Place of Pre Bid Meeting	N.A
Last Date & Time for Receipt of Bids	02/09/2025 Up to 16:00 Hrs.
Bid Validity Period	120 Days from the date of opening of preliminary bid.
Condition ::	Digital mode of payment for tender fee and Bank Guarantee (BG) of Nationalized Bank / Scheduled Bank (except Co-operative Banks) or Insurance Surety Bond (as Form-23 A) for EMD/ shall be submitted in electronics format through on line (by scanning) while uploading the bid. This submission shall mean that tender fee and EMD are received. Accordingly, offer of those shall be opened whose tender fee and EMD is received electronically. However, for the purpose of realization bidder shall send the same in original to Executive Engineer (P), Deendayal Port Authority at the time of tender opening or send the same through R.P.A.D./speed post or in person so as to reach to Executive Engineer, Project Division, 2nd Floor, Nirman Bhavan, Kandla-370210, Kutch District, Gujarat within 7 days from the date of opening.
Remarks::	Submission of Tender Fee, EMD and other Documents during office hours : up to / /2025 by R.P.A.D/Speed post or in person in the chamber of Executive Engineer, Project Division, 2nd Floor, Nirman Bhavan, Kandla-370210, Kutch District, Gujarat, Telephone : 9724301528.

Bid Opening Date::	Technical Bid will be opened on 02/09/2025@ 16:30 Hrs. Date of opening of price bid shall be notified after scrutiny & evaluation of Technical Bid.
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Documents required to be submitted by scanning through online:	<p>a. Documents' in support of fulfilling qualifying criteria as indicated above.</p> <p>b. EMD in form of Bank Guarantee/ Insurance Surety Bond shall also be acceptable as per format attached as Form-23 A.</p> <p>c. Tender fee Only through Digital mode of Payment.</p> <p>Beneficiary: Deendayal Port Authority Account No.: 2177002100004628 IFSC Code: PUNB0217700 Punjab National Bank, Kandla Branch</p> <p>d. Integrity Pact Agreement (Annexure I). The bid/tender shall also be accompanied by Integrity Pact Agreement as per format in the tender.</p> <p>1. The potential bidders shall download and print the IP signed by the Employer and their witness and affix his/her signature on the IP agreement in the presence of a witness from his / her side, who shall also affix his/ her signature thereof. Having completed the signing procedure, the potential bidder shall upload the duly filled and signed IP Agreement on n-procure portal.</p> <p>2. The procedure mentioned above regarding signing of Integrity Pact Agreement by both the parties (Employer and Potential bidders) shall be completed online. However, in case of any technical glitch due to which any potential bidder is unable to upload the IP Agreement, then he/she shall submit the hardcopy of the duly filled, signed IP Agreement to the department concerned of DPA within a period of seven days and prior to opening of the Technical Bid, failing which Bid of potential Bidder shall be treated as disqualified.</p> <p>3. In case of Partnership firm, IP agreement needs to be signed by all the partners of partnership firm and copy of partnership deed shall be submitted at</p>
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	<p>preliminary bid stage, failing which bid will be treated as not responsive.</p> <p>4. In case of JV, IP agreement needs to be signed by all the partners of JV and copy of JV agreement shall be submitted at preliminary bid stage, failing which bid will be treated as not responsive.</p> <p>e. As indicated in clause 4 of Section 1 – Instructions to bidders.</p>		
Officer- Inviting Bids::	Executive Engineer (P), Deendayal Port Authority.		
Bid Opening Authority ::	Executive Engineer (P), Deendayal Port Authority.		
Address::	Executive Engineer, Project Division, 2nd Floor, Nirman Bhavan, Kandla-370210, Kutch District, Gujarat , INDIA.		
Contract Details ::	Telephone : (MoB) 9724301528		

EXECUTIVE ENGINEER (P)
Deendayal Port Authority

Note :

In case bidders need any clarifications or if training is required to participate in online tenders, they can contact (n) Procure Support team at following address: -

(n) code Solutions – A division of GNFC Ltd.,

(n)Procure Cell,

403, GNFC Infotower, S.G. Road, Bodakdev,

Ahmedabad – 380054 (Gujarat).

Contact Details :

Airtel : +91-79-40007501, 40007512, 40007516, 40007517, 40007525

BSNL : +91-79-2684511, 26854512, 26854513 (EXT: 501, 512, 516, 517, 525)

Reliance : +91-79-30181689

Fax : +91-79-26857321, 40007533

E-mail : nprocure@gnvfc.net

TOLL FREE NUMBER : 1-800-233-1010 (EXT: 501, 512, 516, 517, 525)

INFORMATION AND INSTRUCTIONS FOR CONTRACTORS FOR E-TENDERING FORMING PART OF NIT AND TO BE POSTED ON WEBSITE.

1. Information and instructions for Contractors will form part of NIT and to be uploaded on website.
2. The intending bidder must have class-III digital signature to submit the bid.
3. The Bid Document as uploaded can be viewed and downloaded free of cost by anyone including intending bidder. But the bid can only be submitted after uploading the mandatory scanned documents in the form of digital mode of payment or Bank Guarantee/Insurance Surety Bond of any National / Schedule Bank (Except Co-Operative Banks) having its branch at Gandhidham towards cost of bid document, and EMD in favour of respective E-I-C.
4. Bidders may modify or withdraw their bids before last date and time of submission of bid as notified.
5. While submitting the modified bid, contractor can revise the rate of one or more item(s) any number of times (he need not re-enter rate of all the items) but before last time and date of submission of bid as notified.
6. On opening date, the contractor can login and see the bid opening process. After opening of bids he will receive the competitor bid sheets.
7. Contractor can upload documents in the form of JPG format and PDF format.
8. It is mandatory to upload scanned copies of all the documents including GST registration certificate as stipulated in the bid document. If such document is not uploaded his bid will become invalid and cost of bid document shall not be refunded.
9. If the contractor is found ineligible after opening of bids, his bid shall become invalid and cost of bid document shall not be refunded.
10. If any discrepancy is noticed between the documents as uploaded at the time of submission of bid and hard copies as submitted physically by the contractor the bid shall become invalid and cost of bid document shall not be refunded.
11. Certificate of Financial Turn Over: At the time of submission of bid contractor may upload Affidavit/ Certificate from CA mentioning Financial Turnover of last 3 (three) years or for the period as specified in the bid document and further details if required may be asked from the contractor after opening of technical bids. There is no need to upload entire voluminous balance sheet.

12. Contractor must ensure to quote rate of each item. If any cell is left blank and no rate is quoted by the bidder, rate of such item shall be treated as "0" (ZERO).
13. The Draft information and instructions to Contractors may be modified suitably by NIT approving authority as per requirement.
14. All the mandatory document required/prescribed for pre-qualification have to be enclosed by the bidder failing which his offer shall be rejected and treated as non-responsive. However, additional documents required if any for verification of the original documents shall be submitted by the bidder if required by DPA.

List of Documents to be scanned and uploaded within the period of bid submission:

- I. Payment towards EMD shall be submitted through Bank Guarantee/ Insurance Surety Bond as per format attached as Form-23 A, proof for which shall be uploaded against EMD as per Board decision.
- II. Payment towards tender fee shall be submitted through digital mode/online transfer in the account of Port and proof for transfer with transaction number shall be uploaded towards cost of Tender Fees.
- III. Duly signed integrity pact by the bidder & one witness to be submitted in preliminary bid.

Bid Document

- I. Certificates of Work Experience of successfully completed works issued by the client.
- II. Certificate of Financial Turnover from CA.
- III. Any other Document as specified in the NIT.
- IV. Affidavit as per provisions of NIT.
- V. Certificate of Registration for GST, PAN and acknowledgement of up to date filed return if required.
- VI. Bid capacity calculations along with balance financial liability of works in hand.

SECTION -1

INSTRUCTIONS TO BIDDERS

GENERAL

1. Scope of Bid

- 1.1 The Executive Engineer, Project. Division, Deendayal Port Authority., invites bids by E-Tendering for the construction of works of **“Construction of Administrative office building at Kandla ”** detailed in the table given in NIT. The bidders may submit on-line bids for the work detailed in the table given in NIT.
- 1.2 The successful bidder will be expected to complete the works by the intended completion date specified in the contract data.

2. Source of Funds

- 2.1 The employer has arranged the funds from internal resources and will have sufficient funds in Indian currency for execution of the works.

3. Eligible Bidders

- 3.1 The invitation for Bids is open to all eligible bidders meeting the eligibility criteria as defined in clause no .4
- 3.2 All bidders shall provide in Section-2, form of Bid and Qualification Information, a statement that the Bidder is not associated, nor has been associated in the past, directly or indirectly, with the consultant or any other entity that has prepared the design, specifications, and other documents for the Project Manager for the Contract. A firm that has been engaged by the Employer to provide consulting services for the preparation or supervision of the works, and any of its affiliates, shall not be eligible to bid.
- 3.3 Government-owned enterprises may only participate if they are legally and financially autonomous, operate under commercial law and are not a dependent agency of the Employer subject to fulfilment of Minimum Qualifying criteria.
- 3.4 Bidders shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by the employer in accordance with clause 37.

4. Eligibility Criteria

- 4.1
 - a. Experience of similar works executed during the last seven years, and details like monetary value, clients, and proof of satisfactory completion.
 - b. Documentary evidence of adequate financial standing and proof from client for satisfactory completion of works.
 - c. Solvency (Not Applicable)
 - d. Equipment requirement/ schedule **(Refer Section-5)**
 - e. Managerial/Manpower requirement **(Refer Section-5)**
 - f. Project Planning and Quality Control procedure to be adopted. **(Refer Section-5)**

- g. Information regarding projects in hand, current litigation, orders regarding exclusion, expulsion or blacklisting, if any.
- h. Trained & Certified workmen proposed to be employed at the work site of the project. The Contractor must undertake to employ of certified worker to the extent of 20% of total strength. Valid certificates by a recognized University, technical Board, or Ministry of Government of India would only be taken cognizance of. **(Refer Section-5)**

4.2 If the Employer has not undertaken pre-qualification of potential bidders, All bidders shall include the following information and documents with their bids in Section- 2.

- a. Copies of original documents defining the constitution or legal status, place of registration, and principal place of business, written power of attorney of the signatory of the Bid to commit the Bidder.
- b. Total monetary value of construction work performed for each of the last five years.
- c. Experience in works of a similar nature and size for each of the last five years, and details of works underway or contractually committed, and Employers who may be contacted for further information on those contracts.
- d. Major items of construction equipment proposed to carry out the contract.
- e. Qualifications and experience of key site management and technical personnel proposed for the contract.
- f. Reports on the financial standing of the Bidder, such as profit and loss statements and auditor's reports for the past three years.
- g. Evidence of adequacy of working capital for this contract (access to line(s) of credit and availability of other financial resources).
- h. Authority to seek references from the Bidder's bankers.
- i. Information regarding any litigation, current or during the last five years, in which the Bidder is involved, the parties concerned, and disputed amount.
- j. Proposal for subcontracting components of the works amounting to more than 10 percent of the Bid Price (for each qualification should attached); and **(Refer Section-5)**
- k. The proposed methodology and program of construction, backed with equipment planning and deployment, duly supported with broad

calculations and quality control procedures proposed to be adopted justifying their capability of execution and completion of the work as per technical specifications within the stipulated period of completion as per milestones (for all contracts over Rs 10M).

I. PAN, Registration with GST and Provident Fund Authorities.

m. Integrity Pact

4.3 To qualify for award of the contract, bidders are advised to note the minimum qualification criteria specified below.

i. Average annual financial turnover during the last three years ending 31st March 2024 should be at least **Rs. 1437.65 Lakhs** (The financial turnover document must be certified by a Chartered Accountant (CA) with the CA's stamp, signature, and UDIN/membership number. Additionally, all necessary documents for the verification of turnover must be provided. Failure to comply with these requirements bid will be treated as non-responsive).

ii. Experience of having successfully completed similar works during last 7 years ending last day of month previous to the one in which applications are invited should be either of the following:

a. Three similar completed works, each work costing not less than the **Rs. 1916.87 Lakhs (Excluding GST)**

or

b. Two similar completed works, each work costing not less than the **Rs. 2396.09 Lakhs (Excluding GST)**

or

c. One similar completed works each costing not less than the **Rs. 3833.74 Lakhs (Excluding GST).**

"Similar Work" means having experience of Construction work of Institutional/Residential/Commercial RCC framed structure building with Piling, external development works, Electrical, Water supply, Firefighting, all complete work of a building constructed during last 7 years ending last day of month previous to the one in which applications are invited.

(iii) **Work experience completed in Private Organisation:** If the Bidder completed the works in private organization as stipulated in Minimum Qualification Criteria (work experience) shall be considered only, if TDS certificates with respect to referred work issued by Competent Authority needs to be enclosed by the tenderer along with the BID. The Bidder has to submit the certificate issued by their CA stating that the amount shown in TDS certificate has been received with respect to work

experience submitted by Bidder as stipulated in Minimum Qualification Criteria (The CA certified document should have CA's stamp, signature and UDIN no. for verification, failing which the bid will be treated as non-responsive).

(iv) **Work experience completed as a Sub-Contractor:** In case the Bidder has carried out work experience as a subcontractor, the following conditions must be met:

- a) The subcontract experience shall be considered for qualification only, if the work was carried out for Govt./ Autonomous Body working under GoI/Semi Govt., or Public Limited companies. The Bidder must submit the subcontract permission issued by the respective work authority prior to the execution of the work. It is mandatory to upload the subcontract permission online along with the bid. If the subcontract permission is not authenticated, the respective bidder will be considered non-responsive.
- b) The completion certificate/Form-3A issued/authenticated by the concerned Government, Semi-Government, or Public Limited companies, copy of work order, bill of quantity, copy of all bills must be uploaded along with the bid submission supported by TDS certificate & CA certificate as indicated in Para- (iii) above for private work.
- c) The decision taken by DPA with regard to Sub-contract work experience shall be final and binding to bidder

(v) In addition to above, the criteria regarding satisfactory performance of the work, Personnel, establishment, plant, equipment, etc. may be incorporated according to the requirement of the project.

Note: Figures to be computed and indicated in the individual projects. **(Refer Section-5)**

- (vi) In case of JV to qualify experience in similar works, merging of work order value executed by two or more of its member JV either as a whole or as member of JV shall not be permitted to qualify eligible works in terms of similar completed works. Only no. of work orders executed by members of JV shall be merged to evaluate experience.
- (a) Lead partner should have executed at least one similar work costing **Rs. 1916.87 Lakhs** as per Minimum Eligibility Criteria.
- (b) The works reckoned for the above purpose are those executed by the tenderer as prime contractor or proportionately as member of joint venture or as a

subcontractor, authorized and approved by the Employer of the work(s) against which the tenderer has claimed his experience.

(c) In the case of bid submitted by JV/ Consortium, the lead partner of the JV shall meet the Minimum Eligibility Criteria of Financial Turnover.

4.4 To qualify for a package of contracts made up of this and other contracts for which bids are invited in the NIT, the bidder must demonstrate having experience and resources sufficient to meet the aggregate of the qualifying criteria for the individual contracts. **(Refer Section-5).**

4.5 Sub- contractors' experience and resources shall not be taken into account in determining the bidder's compliance with the qualifying criteria except to the extent stated in 4.4 above. **(Refer Section-5).**

4.6 Bidders who meet the minimum qualification criteria will be qualified only if

Their available bid capacity is more than the total bid value. The available bid capacity will be calculated as under:

Assessed Available Bid capacity = $A \times M \times N - B$, Where

“A” = Maximum value of works executed in any one year during last Five years (at current price level), taking into account the completed as well as works in progress.

“M” = Multiplier Factor (Usually 1.5)

“N” = Number of years prescribed for completion of the subject contract.

“B” = Value at current price level of existing commitments and ongoing works to be completed in the next 'N' years.

Note: For bring the value of works to current level, following multiplying factors shall be applicable with reference to escalation based on WPI.

Financial Year	2024-25	2023-24	2022-23	2021-22	2020-21
Index	154.9	151.4	152.5	139.4	123.4
Multiplying factor	1.00	1.02	1.02	1.11	1.26

*In case of work is completed in FY 2024-25, then the up-dation factor shall be considered as 1 (one).

The Bidder shall furnish statements showing the value of existing commitments and ongoing works as well as the stipulated period of

completion remaining for each of the works preferably countersigned by the Nodal Officer or his nominee- in charge.

The bidder shall submit bid capacity calculations along with relevant information/documents with the bid, failing which bid will be considered as non-responsive.

4.7 Even though the bidder meets the above qualifying criteria, they are subject to be disqualified if they have:

- Made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements: and/or
- Record of poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, litigation history or financial failures etc.

4.8 The accompaniments to the tender documents as described under Clause 4.2 shall be Scanned and submitted On-Line along with Tender documents. However, the originals/ attested hard copies shall have to be forwarded subsequently so as to reach the office of Executive Engineer (P) within 7 days of opening of the tenders. The envelopes shall be addressed to:

The Executive Engineer (P),
Project Division,
2nd Floor, Nirman Bhavan,
Deendayal Port Authority, Kandla,
Kutch District Gujarat-State,
INDIA.

and submitted on <https://dpatender.nprocure.com/>

Bear the following identification: Accompaniments for

“Construction of Administrative office building at Kandla ”

Bid reference No

Name and address of the bidder.

5. One Bid per Bidder

5.1. Each bidder shall submit only one bid. A bidder who submits more than one Bid (other than as a subcontractor or in cases of alternatives

that have been permitted or requested) will cause the entire proposal with the Bidder's participation to be disqualified.

5.2 Joint Venture

Companies/Contractors may jointly undertake contract/contracts. Each entity would be jointly and severally responsible for completing the task as per the contract, however declaration of the Lead member to be indicated by bidders, however JV has to designate in their MoU. The firms with at least 26% equity holding each be allowed to jointly meet the eligibility criteria.

6. Cost of Bidding

- 6.1 The bidder shall bear all costs associated with the preparation and submission of his Bid, and the Employer will in no case be responsible and liable for those costs.

7. Site Visit

- 7.1 The Bidder, at his own responsibility and risk is encouraged to visit and examines the site of works and its surroundings and obtain all information that may be necessary for preparing the Bid and entering into a contract for construction of the works. The costs of visiting the site shall be at the Bidders' own expense.

B. BIDDING DOCUMENTS

8. Content of Bidding Documents

- 8.1 The set of bidding documents comprises the documents listed in the below and addenda issued in accordance with clause-10:

- DC 1 Bid Reference
- NIT (Invitation of Bids)
- SECTION 1 Instruction to Bidders
- SECTION 2 Forms of Bid, Qualification Information and letter of Acceptance
- SECTION 3 Conditions of Contract and Special Conditions.
- SECTION 4 Contract Data
- SECTION 5 Site Conditions and Specifications SECTION 6 Forms of Securities
- SECTION 6 Drawing

- SECTION 7 Bill of quantities
- SECTION 8 Forms of Securities

8.2. One set of bidding documents will be issued to the bidder. The document should be completed and returned with the bid. **(Refer Section-5).**

8.2.1 NIL.

8.2.2 The bidder is expected to examine carefully all instructions, conditions of contract, contract data, forms, terms, technical specifications, bill of quantities, forms, drawings, annexure in the bid document. Failure to comply with the requirements of the bid document shall be at the bidder's own risk. Pursuant to clause 26 hereof, bids which are not substantially responsive to the requirements of the bid documents shall be rejected.

9. Clarifications of the Bidding Documents

9.1 A prospective bidder requiring any clarification of the bidding documents may notify the employer in writing or by electronic form and be confirmed by hardcopy at the Employer's address indicated in the invitation to bid. The employer will respond to any request for clarification which he received earlier than days (Suggested 7 days) prior to the deadline for submission of bids. The clarifications shall be uploaded on Website.

9.2 Pre – bid meeting (Refer Section-5).

9.2.1 The bidder or his official representative may attend a pre-bid meeting which will take place through online (VC link will be shared on DPA website before meeting) on@.....hrs.

9.2.2 The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.

9.2.3 The bidder is requested to submit any questions in writing or by cable to reach the Employer not later than one week before the meeting.

9.2.4. Minutes of the meeting, including the text of the questions raised (without identifying the source of enquiry) and the responses given will be transmitted without delay to all purchasers of the bidding documents without delay. Any modification of the bidding documents listed in Sub- Clause 8.1 which may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to Clause 10 and not through the minutes of the pre- bid meeting.

9.2.5 Non-attendance at the pre-bid meeting will not be a cause for disqualification of a bidder.

10. Amendment of Bidding Documents

10.1 Before the deadline for submission of bids, the Employer may modify the bidding documents by using addends.

10.2 Any addendum thus issued shall be part of the bidding documents and shall be communicated by uploading online on <http://tender.nprocure.com> and <https://www.deendayalport.gov.in/> Or in writing or by cable to all the purchasers of the bidding documents. Prospective bidders shall acknowledge receipt of each addendum by cable to the Employer.

10.3 To give prospective bidders reasonable time in which to take an addendum into account in preparing their bid, the Employer shall extend as necessary the deadline for submission of bids, in accordance with sub-clause 20.2 below.

C. PREPARATION OF BID:

11. Language of Bid

11.1 All documents relating to the bid shall be in the English language.

12. Documents comprising the Bid

12.1 The bid submitted by the bidder shall comprise the following:

A) Technical Bid:

- (i) Bid Security
- (ii) Qualification Information Form and Document (Pursuant to clause 4 hereof) and any other materials required to be furnished and submitted by the bidder in accordance with these instructions. The documents listed under Sections 2, 4 and 7 of Sub-Clause 8.1 shall be filled in without exception.

B) Financial Bid :

- (i) Bill of Quantity (Schedule –B) dully filled and digitally signed by the Bidder.

13. Bid Prices

13.1 The contract shall be for the whole works as described in sub clause 1.1 based on the priced Bill of Quantities submitted by the Bidder.

13.2 The bidder to quote bid price item wise as mentioned in **Schedule-B**.

13.3 All duties, (except GST) taxes, and other levies payable by the contractor under the contract, or for any other cause shall be included in the rates, prices and total Bid Price submitted by the bidder.

13.4

(a) The rates and prices quoted by the bidder shall be fixed for the duration of the contract and shall not be subjected to adjustment on any account.

14. Currencies of Bid and Payment

14.1 The unit rates and the prices shall be quoted by the bidder entirely in Indian Rupees.

15. Bid Validity

15.1 Bids shall remain valid for a period 120 days from the last date of submission of Bid. A bid valid for a shorter period shall be rejected by the Employer as non- responsive.

15.2 In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the bidders may extend the period of validity for a specified additional period. The request and the bidders' responses shall be made in writing or by cable. A bidder may refuse the request without forfeiting his bid security. A bidder agreeing to the request will not be permitted to modify his bid and also shall submit an extension for EMD, if it is in the form of Bank Guarantee.

16. Bid Security (Earnest Money Deposit-EMD)

- A. Earnest money Deposit (EMD) should be 1 % of the estimated cost of work and maximum amount of earnest money should be Rs. 50.00 lakhs.
- B. The EMD up to Rs. 5 lakhs be payable in the form of digital mode of payment. EMD beyond Rs.5 lakhs be payable in the form of Bank Guarantee for the entire amount from any Nationalized Bank, Scheduled Bank (except Co-operative banks) only having its branch at Gandhidham. Bank Guarantees submitted as Earnest Money shall be valid for 28 days beyond the validity of the bid. Bank Guarantee shall be verified independently by the Port with the bank before finalization of technical offer. In the event of lack of confirmation of issue of the Bank Guarantee by the Bank, the bid shall stands disqualified.
- C. Insurance Surety Bond shall also be acceptable for EMD, to be submitted as per format attached as Form-23 A

- D. EMD of unsuccessful bidders other than L1 and L2 be refunded immediately after ranking of price bids. Earnest Money of L2 be refunded immediately after entering in to agreement with L1 and acceptance of performance Guarantee from L1.
- E. EMD shall be refunded suo-motto without any application from the bidders.
- F. The Bid Security of the successful bidder will be discharged after he has signed the Agreement and furnished the required Performance Security.
- G. Forfeiture of earnest money.**
Bid security (Earnest Money) shall be forfeited, if
- (a) The bidder withdraws the bid after bid opening during the period of bid validity.
 - (b) The bidder does not accept the correction of the Bid price, if any.
 - (c) The successful bidder fails within the specified time limit to
 - (i) Sign the Agreement or
 - (ii) Furnish the required Performance security.
 - (iii) In case the contractor fails to commence the work within stipulated time.

In case of forfeiture of earnest money as prescribed above, the tenderer shall not be allowed to participate in the retendering process of the work.

Tenders with any condition, including conditional rebates, shall be rejected. However, tenders with unconditional rebate will be acceptable.

- H. In case of Micro and Small Enterprise (MSEs) holding valid certificate issued by any agencies/organization under The Ministry of Micro, Small and Medium Enterprises indicating the list of activity related to the subject as per National Industrial Classification – 2008 mentioned in the **table below only shall become eligible for exemption** from payment of Tender fee/EMD such bidder shall upload the scanned copy of valid certificate in preliminary bid tender shall become eligible for exemption from payment of Tender fee/EMD. Such bidder shall upload in preliminary bid *as well as duly filled in and signed "Bid Securing Declaration" as per format provided in the tender document failing which the bid shall be treated as non-responsive. Bid securing declaration form is attached:*

SECTION F	CONSTRUCTION
Division 41	Construction of buildings
Group 410	Construction of buildings
Class 4100	Construction of buildings
Sub-Class 41001	Construction of buildings carried out on own-account basis or on a fee or contract Basis
Division 43	Specialized construction activities
Group 433	Building completion and finishing
Class 4330	Building completion and finishing

17. Alternative Proposals by Bidders

Conditional offer or Alternative offers will not be considered further in the process of tender evaluation.

18. Format and Signing of Bid

- 18.1 The Price Bid to be submitted on-line shall be signed digitally by a person or persons duly authorized to sign on behalf the Bidders.
- 18.2 The Bid shall contain no alterations or additions, except those to comply with instructions issued by the Employer, or as necessary to correct errors made by the bidder in which case such corrections shall be initiated by the person or persons signing the bid.

D Submission of bids

19. Sealing and marking of bids

- 19.1 The bidder shall put Bid security document as per clause No.16, hereof in one envelope and properly seal and mark as "Bid Security". The bidder shall put documents mentioned in clause No.12.1.A (ii) in separate envelope and properly seal and mark as "Technical Bid". Then put both these envelopes into separate envelope, properly seal and mark as "Technical Bid". **(Refer Section-5)**. These envelopes than be put inside one outer envelope and sealed, duly marking the outer envelope as "Technical Bid and Bid Security".

The bidder shall submit "Financial Bid" as per Clause No.12.1. (B) online only, no hard copy shall be submitted by bidder in separate.

19.2 The envelopes shall

- (a) Be addressed to Nodal Officer/Employer at the following address.

(insert address of office for bid submission), and

(b) bear the following identification:

Bid for(name of contract)

Bid reference no.....(Insert number)

DO NOT OPEN BEFORE (time and date for opening, per

Clause 23)

Name and address of the bidder.

The tender complete in all respect should be put in the tender box (marked tender No__) in the office of _____

_____ upto - ____p.m. on due date and open at _____ on the same date in presence of such of the tenderers who may wish to be present.

19.3 In addition to the identification required in Sub-Clause 19.2, the inner

envelopes shall indicate the name and address of the bidder of the bidder to enable the bid to be returned unopened in case it is declared late, pursuant to Clause 21, or the bid is declared non responsive. If the outer envelopes are not sealed and marked as above, the Employer will assume no responsibility for the misplacement or premature opening of the Technical bid and financial bid.

20 Deadline for submission of the Bids

- 20.1 Bids must be received by the Employer in On-Line System at website <https://tender.nprocure.com> not later than 16:00 hrs. on 02/09/2025 in the event of the specified date for the submission of bids being declared a holiday by the Employer, the Bids will be received up to the appointed time on the next working day.

- 20.2 The Employer may extend the deadline for submission of bids by issuing an amendment in accordance with Clause 10, in which case all rights and obligations of the Employer and the bidders previously subject to the original deadline will then be subject to the new deadline.
- 20.3.1 The bidder shall give an undertaking that no change has been made in the hard copy of tender documents he has downloaded from the web site. Discrepancy, if any is noticed at any stage between the Port's tender document and the hard copy submitted by the bidder conditions mentioned in online tender unloaded by Port shall prevail beside the bidder shall be liable for legal action for the lapses.

21 Late Bids

- 21.1 Any bid received by the Employer after the deadline prescribed in Clause 20 will be considered as non-responsive.

22. Modification and Withdrawal of Bids

- 22.1 Bidders may modify or withdraw their bids before the deadline prescribed in Clause 20.
- 22.2 The bidder may finally submit the modified copy to the employer within 07 days of opening of the online tender. **(Refer Section-5)**
- 22.3 No bid may be modified after the deadline for submission of bids.
- 22.4 Withdrawal or modification of a Bid between the deadline for submission of bids and the expiration of the original period of bid validity in Clause 15.1 above or as extended pursuant to Clause 15.2 may result in the forfeiture of the Bid security pursuant to Clause 16.
- 22.5 Bidders may only offer discounts to, or otherwise modify the prices of their bids by submitting bid modifications in accordance with this clause or included in the original bid submission. **(Refer Section-5).**

E. BID OPENING AND EVALUATION

23. Bid opening

- 23.1 On the due date and appointed time as specified in clause 20, the Employer will first open Technical bids of all bids received (except those received late) including modifications made pursuant to clause 22 in presence of the bidders or their representative who choose to attend. In the event of the specified date for Bid opening being declared a holiday by the Employer, the bids will be opened at the appointed time and location on the next working day.
- 23.2. Envelopes marked "WITHDRAWAL" shall be opened and read out first. Bids for which an acceptable notice of withdrawal has been submitted pursuant to Clause 22 shall not be opened.

Bidder's name, withdrawals, modifications of technical bid, the presence of bid security and such other details, as the Employer may consider appropriate will be announced by the Employer at the opening. **(Refer Section-5).**

23.3 If all Bidders have submitted unconditional Bids together with requisite bid security, then all bidders will be so informed then and there. If any Bid contains any deviation from the Bids documents and/or if the same does not contain Bid security in the manner prescribed in the Bid documents, then that Bid will be rejected and the Bidder informed accordingly. The sealed financial bid containing priced BOQ will be returned to him without opening. All valid financial bids whose technical bids have been determined to be substantially responsive in accordance with Clause 26 hereof, shall be opened on the specified date from declaring the results of the Technical Bid, in presence of the bidders or their representatives who choose to attend. The Bidder's name, the Bid prices, the total amount of each Bid and of any alternative Bid (if alternatives have been requested or permitted), any discounts, Bid modifications and withdrawals, and such other details as the Employer at the opening. Any bid price, discount, or alternative Bid price which is not read out and recorded at Bid opening, will not be taken into account in Bid evaluation. **(Refer Section-5).**

23.4 The Employer shall prepare minutes of the Bid opening, including the information disclosed to those present and the minutes shall form part of the contract.

24 Process to be confidential.

Information relating to the examination, clarification, evaluation and comparison of the bids and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process until the award to the successful bidder has been announced.

25. Clarification of Bids

To assist in the examination and comparison of Bids, the Employer may, at his discretion, ask any Bidder for clarification of his Bid, including breakdown of unit rates. The request for clarification and the response shall be writing or by cable, but no change in the price or substance of the Bid shall be sought, offered, or permitted except as required to conform the correction of arithmetic errors discovered

by the Employer in the evaluation of the Bids in accordance with Clause 27.

Subject to above Para, no Bidder shall contact the Employer on any matter relating to his bid from the time of the bid opening to the time the contract is awarded. If the Bidder wishes to bring additional information to the notice of the Employer, he should do so in writing. Any effort by the Bidder to influence the Employer's bid evaluation, bid comparison or contract award decisions, may result in the rejection of his bid. No bid may be modified after the deadline for submission of bids.

26. Examination of Bids and Determination of Responsiveness

26.1.1 Prior to detailed evaluation of Bids, the Employer will determine whether each Bid :

- (a) meets the eligibility criteria defined in Clause 4
- (b) has been properly signed by an authorized signatory (accredited representative) holding power of Attorney in his favor. The Power of Attorney shall inter alia include a provision to bind the Bidder to settlement of disputes clause;
- (c) is accompanied by the required Bid security and;
- (d) is responsive to the requirements of the Bidding documents.

26.1.2 A substantially responsive Technical and Financial Bid is one which conforms to all the terms, conditions and specification of the Bidding documents, without material deviation or reservation. A material deviation or reservation is one (a) which effects in any substantial way the scope, quality or performance of the Works; (b) which limits in any substantial way, the Employer's rights or the Bidder's obligations under the contract; or (c) whose rectification would affect unfairly the competitive position of other Bidders presenting responsive Bids.

26.1.3 If a Technical Bid is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the non-confirming deviation or reservation.

27 Correction of Errors

27.1 Bids determined to be responsive will be checked by the Employer for any arithmetic errors. Errors will be corrected by the Employer as follows.

- (a) Where there is a discrepancy between the rates in figures and in words, the rate in words will govern;

(b) Where there is discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern. **(Refer Section-5).**

27.2 The amount stated in the Bid will be adjusted by the Employer in accordance with the above procedure for the correction of errors and, with the concurrence of the Bidder, shall be considered as binding upon the bidder. If the Bidder does not accept the corrected amount the Bid will be rejected, and the Bid security may be forfeited in accordance with sub-Clause.16. F.

(b). **(Refer Section-5).**

28 Blank.

29 Evaluation and Comparison of Bids

29.1 The Employer will evaluate and compare only the Bids determined to be responsive in accordance with Clause 26.

29.2 In evaluating the Bids, the Employer will determine for each Bid the evaluated Bid Price by adjusting the Bid Price as follows:

(a) Making any correction for errors pursuant to Clause 27;

(b) Making appropriate adjustments to reflect discounts or other price modification offered in accordance with Sub Clause 22.5

29.3 The estimated effect of the price adjustment conditions under Clause 47 of the conditions of contract, during the period of implementation of the Contract, will not be taken into account in Bid evaluation.

29.4 IF the Bid of the successful Bidder is seriously unbalanced in relation to the Nodal Officer or his nominee's estimate of the cost of work to be performed under the contract, the Employer may require the Bidder to produce detailed price analyses for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the implementation/construction methods and schedule proposed.

30 NIL.

F. AWARD OF CONTRACT

31 Award Criteria

31.1 The Employer will award the Contract to the Bidder whose Bid has been determined to be responsive to the Bidding documents and who

has offered the lowest evaluated Bid Price, provided that such Bidder has been determined to be (a) eligible in accordance with the provisions of Clause 3 and (b) qualified in accordance with the provisions of Clause 4. The second bidder (i.e. L2) shall be kept in reserve and may be invited to match the bid submitted by the (L 1) bidder in case such bidder withdraws or is not selected for any reason.

32 Employer's Right to accept any Bid and to reject any or all.

Notwithstanding clause 31, the Employer reserve the right to accept or reject any bid and to cancel the bidding process and reject all bids, at any time prior to the award of contract, without thereby incurring and liability to the affected bidder or bidders of the grounds for Employer's action.

33 Notification of Award and Signing of Agreement.

- 33.1 The Bidder whose Bid has been accepted will be notified of the award by the Employer prior to expiration of the Bid validity period by cable, telex or facsimile confirmed by registered letter. This letter (hereinafter and in the Conditions of Contract called the "letter of Acceptance") will state the sum that the Employer will pay the Contractor in consideration of the execution, completion and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price").
- 33.2 The notification of award will constitute the formation of the Contract subject to the furnishing of a performance security in accordance with the provisions of Clause 34.
- 33.3 The Agreement will incorporate all correspondence between the Employer and the successful bidder. It will be signed by the employer and sent to the successful Bidder within (28 days of award of work for global tender and Within 14 days for domestic tender) following the notification of award along with the Letter of Acceptance. Within (28 days for global tender and within 21 days for domestic tender) of receipt, the successful Bidder will furnish the performance security and sign the Agreement with the Employer.
- 33.4 Upon the furnishing by the successful Bidder of the Performance Security, the Employer will promptly notify the other Bidder that his Bid have been successful and release the Bid security (EMD).

34 Performance Security

Security Deposit shall consist of two parts; a) Performance Guarantee to be submitted at award of work, and b) Retention money to be recovered from Running Bills.

34.1 Security Deposit shall be 10% of Contract price of which 5% of contract price should be submitted as FDR or Bank Guarantee of Nationalized/scheduled bank (except Co-operative banks) having its branch at Gandhidham, or Insurance surety bond as per format and terms and condition at 8-A or Digital transfer in DPA Account within 21 days of receipt of Letter of Acceptance and balance 5% recovered as Retention Money from Running Bills. Recovery of 5% of Retention Money to commence from the first bill onwards @ 5% of bill value from each bill. Retention Money be refunded within 14 days from the date of payment of final bill. Balance SD to be refunded immediately not later than 14 days from completion of defect liability period, NOC from Geology (Clause 35, Section V) & Payment of welfare cess of final bill.

34.2 Failure of the successful Bidder to comply with the requirements of Sub-Clause 34.1 above shall constitute sufficient grounds for cancellation of the award of work and forfeiture of the Bid security

34.3 The documentary evidence (copy of paid challan in government treasury) of the welfare cess @1% of the work done or as mandated by security authority from time to time, paid on final bill shall be submitted before releasing the performance guarantee if applicable.

34.4 The performance guarantee submitted in form Bank Guarantee/FDR/Insurance Surety bond should be valid for period of 60 days beyond the date of completion of all contractual obligations of the contractor, including Defect Liability Period.

34.5 Insurance Surety Bond shall also be acceptable for Performance security, to be submitted as per format attached as Form-8 A.

35 Advance Payment (Refer Section-5).

35.1 The Employer will provide an Advance Payment on the Contract Price as stipulated in the conditions of Contract, subject to maximum amount, as stated in the Contract Data. clause 51 (Section 3)

36 Conciliator (Refer Section-5).

The employer proposes that CIDC – SIAC Arbitration Centre be appointed as Conciliator under the contract as provided in sub-clause 24.4 of condition of contract. If the bidder disagrees with this proposal, the bidder should so state in bid.

37 Corrupt or Fraudulent Practices

37.1 The Employer requires that Bidders/Suppliers/Contractors under this contract observe the highest standard of ethics during the procurement and execution of this contract. In pursuance of this policy, the Employer:

- (a) defines, for the purpose of these provisions, the terms set forth below as follows:
 - (i) “Corrupt practice” means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution; and
 - (ii) “fraudulent practice” means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Employer, and includes collusive practice among Bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Employer of the benefits of free and open competition.
- (b) Will reject a proposal for award of work, if he determines that the bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question.
- (c) Will declare a Bidder ineligible, either indefinitely for a stated period of time, to be awarded a contract/contracts, if he at any time determines that the Bidder has engaged in corrupt or fraudulent practices in competing for or in executing, the contract.

SECTION 2

FORMS OF BID, QUALIFICATION INFORMATION AND LETTER OF ACCEPTANCE

TABLE OF FORMS

- 1. FORM OF BID**
- 2. CONTRACTOR'S BID**
- 3. PRE-QUALIFICATION OF BIDDERS**
- 4. LETTER OF ACCEPTANCE**
- 5. NOTICE TO PROCEED WITH THE WORK**
- 6. AGREEMENT FORM**

SPECIMEN FOR FORM OF BID
(To be executed on bidder's letter head)

Date- Tender No. P-05/2025

Name of Work: Construction of Administrative office building at Kandla

To

The Executive Engineer (P),
Project Division, Deendayal
Port Authority
2nd Floor, Nirman Bhawan,
Kandla -370210
Kutch District Gujarat-State, INDIA

We, the undersigned, declare that:

- (a) we have examined and have no reservations to the tender documents, including addenda and clarifications issued vide
- (b) we offer to execute the work in conformity with the tendering documents and in accordance with the delivery schedules specified in the schedule of requirements in accordance with the tender document bearing no____-
- (c) The total price of our tender, excluding any discounts offered in item(d) below, is [insert the total tender price in words and figures, indicating the various amounts and the respective currencies];[in case of techno-commercial offer it shall be mentioned that 'as filled in the price bid'] **(Refer Section 5)**
- (d) The discounts offered and the methodology for their application are:
Discounts. if our tender is accepted, the following discounts shall apply.
Methodology of application of the discounts. The discounts shall be applied using the following method: **(Refer Section 5).**
- (e) our tender shall be valid for the period of time specified in **[ITB Sub-clause 15.1]**, from the date fixed for the tender submission deadline in accordance with **[ITB Sub-clause 20.1]** and it shall remain binding upon us and may be accepted at any time before the expiration of that period or any extended period accordance with **[ITB Sub-clause 15.2]**;
- (f) If our tender is accepted, we commit to submit a performance guarantee in accordance with [insert relevant clause no., ITB Sub-clause 34] for the due performance of the contract, as specified in specimen form for the purpose.

- (g) We, including any subcontractors or contractors for any part of the contract,{Insert the nationality of the Tenderer, including that of all parties that comprise the Tenderer, if the tenderer is a JV. And the nationality each subcontractor and Contractor}
- (h) We have no conflict of interest in accordance with **[ITB Sub-clause no 5]**.
- (i) Our firm, its affiliates or subsidiaries- including any subcontractors or contractors for any part of the contract – has not been declared ineligible by the port, under laws of India or official regulations in accordance with**[ITB Sub- clause no.3]**
- (j) We understand that this tender, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract agreement is prepared and executed in accordance with**[ITB Sub-clause 33]** and as per specimen from the purpose;
- (k) We understand that you are not bound to accept the lowest evaluated tender or any other tender that you may receive.
- (l) We also make specific note clauses of [ITB, NIT] under which the contract is governed.
- (m) In case of out station firms, having a branch in India for liaison purposes, please mention the name of the contact person and Tel. no., Fax. no., and mail-Id and also the complete postal address of the firm.
- (n) We understand that the communication made with the firm at (m), by the port shall be deemed to have been done with us.

Signed: [insert signature of person whose name and capacity are shown]
In the capacity of [insert legal capacity of person signing the form of tender]

Name:[insert complete name of person signing the form of tender]

Duly authorized to sign the tender for and on behalf of: [insert complete name of tenderer]

Dated on_____day of_____,_____(insert date of signing)

CONTRACTOR'S BID

**Description of the works: Construction of Administrative office building at
Kandla**

TO,

----- (The employer)

Address

GENTLEMEN,

We offer to execute the works described above in accordance above with the conditions of Contract accompanying this bid for the contract price of _____ (in figures)
_____ (in letters)

The advance payment required / not required as per rule.

We accept the appointment of _____ as the conciliator.

(OR)

We do not accept the appointment of _____ as the conciliator and propose instead that
_____ be appointed as Conciliator whose daily fees and biographical data are attached.

This bid and your written acceptance of it shall constitute a binding contract between us. We understand that you are not bound to accept the lowest or any Bid you receive.

We undertake that, in competing for (and, if the award is made to us, in executing) the above contract, we will strictly observe the laws against fraud and corruption in force In India namely "prevention of corruption act 1988"

We hereby confirm that this bid complies with the bid validity and security required by the bidding documents.

We attach herewith our copy of permanent account number (PAN)

Yours faithfully,

Authorized Signature:

Name & title of signatory

Name of Bidder

Address

PRE-QUALIFICATION OF BIDDERS

The information to be filled in by the bidder in the following pages will be used for purposes of pre-qualification as provided for in the instructions to tenderers.

1. Only for individual bidders:

1.1 Constitution or legal status of bidder (attach copy)

- Place of registration
- Principal place of business
- Power of attorney of signatory of bid(Attach)

2. Turnover of the firm

YEAR	TURN OVER
2022-23	
2023-24	
2024-25	
Average	

Attachments: Financial reports for the last three years; balance sheets, profit and loss statement, auditor's reports (in case of companies/ corporation) etc., list them below and attach copies.

NOTE: - If value of turnover for FY 2023-24 (audited) is available, same is to be considered while evaluating.

3. Similar works

Particulars	Year	No. of works	Value
Total value of completed similar work as defined in the tender document during last 7 years.	2018-19		
	2019-20		
	2020-21		
	2021-22		
	2022-23		
	2023-24		
	2024-25		

Attachments: Supporting documents, viz., successful completion certificates from clients, other documentations to substantiate the similarity of work as per definition of “similar work” employers reserves the right to verify the information;

4. Information on bid capacity (works for which bids have been submitted and works which are yet to be completed) as on the date of this bid.

(A) Existing commitments and on-going works.

Description of work	Place & state	Contract no.& date	Name & address Port or Dept.	Value of contract Rs	Stipulated Period of completion	Value of remaining to be completed	Anticipated date of completion
1	2	3	4	5	6	7	8

(B) Works for which bids already submitted

Description of work	Place & state	Name& address of port or Dept.	Value of contract Rs	Stipulated Period of completion	Date when decision is expected	Remarks if any
1	2	3	4	5	6	7

Attach certificates from the nodal officer or his nominee(s)-in-charge.

5. The following contractor’s Equipment are essential for carrying out the works.
The bidder should list all information requested below.

Item of equipment	Requirement no. capacity	Owned/leased /to be procured	Nos./ capacity	Age/ condition	Remarks (from whom to be purchased)

Contractor shall own/lease/hire the following tools/plants/equipment to deploy at site of work as per the requirement of the job of work. However, the engineer in charge may ask to deploy more equipment as per the requirement of the job and time schedule. The decision of the Engineer in charge in this regard shall remain final and binding to the contractor.

Sr.no.	Tools/Plants/Machineries/transport.	Nos.
1.	Concrete Vibrators	25mm -02 40mm-02
2.	Plate vibrators	1 no.
3.	Steel shuttering with spans, props, etc.	2700 sqm.
4.	Concrete mixer-for nominal concreting work only.	1 no
5.	Weigh batcher	1 no.
6.	Excavator/JCB	2 no.
7.	Truck/Tipper/tractor	4 no.
8.	Bar bending machine	1 no
9.	Cutting machine	1 no.
10.	Welding machine	4 no.
11.	Water tanker-Minimum 10000 ltr. Capacity.	2 no.
12.	Dewatering pumps	4 no.
13.	Construction Material lifts	2 no.
14.	DG set- 10KVA	1 no.
15.	Concrete breaker machine	4 no.

6. Qualification and experience of key personnel proposed for administration and execution of the contract. Attach biographical data. Refer also to sub. clause 4.3(e) of instructions to bidders and sub. clause 9.1 of the conditions of contract.

Position	Name	Qualification	Years of experience (general)	Years of experience in the proposed position
Project manager				
Discipline specialist etc.,				

7. Proposed sub-contracts and firms involved

Sections of the works	Value of sub-contract	Sub-contractor (name and address)	Experience in similar work

8. Information on litigation history in which the bidder is involved.

Other party(ies)	Port/Dept.	Cause of dispute	amount	Remarks involved showing present status

9. Additional information bidder may like to submit

Duly authorized to sign this authorization on behalf of (insert complete name of tenderer)

Dated on _____ day of _____
 _____ [insert date of signing]

LETTER OF ACCEPTANCE
(on letter paper of the port)

_____(date)

To: _____
(Name and address of the contractor)

Dear Sirs,

Sub: Tender no: P-05/2025

Construction of Administrative office building at Kandla .

Ref: Your bid dated _____
And [list the correspondence with the bidder]

This is to notify you that your bid dated _____ for execution of the _____ (name of the contract and identification number, as given in the instructions to bidders) for the contract price of rupees _____ (amount in words and figures as corrected and modified in accordance with the tender document is hereby accepted by the employer/Board).

You are hereby requested to furnish performance security, in the form detailed in tender document for an amount of Rs. _____ within {_____} days of the receipt of this letter of acceptance valid upto 28 days from the date of completion obligations expiry of taking over certificate subject to removal of defects period i.e. upto _____ and also sign the contract agreement within {_____} days of the receipt of this letter of acceptance , failing which action as stated in the tender document will be taken.

Detailed letter of acceptance will follow.

Please acknowledge receipt.

Yours faithfully,

Authorized signature

DEENDAYAL PORT AUTHORITY

ISSUE OF NOTICE TO PROCEED WITH THE WORKS

_____dated

To
(Name and address of the contractors)

Dear Sirs,

Sub: Tender no. P-05/2025

“Construction of Administrative office building at Kandla .”

Ref: Letter of acceptance no. dated

Pursuant to your furnishing the requisite security as stipulated in [clause 21 of general conditions of contract] and signing of the contract for execution of the _____you are hereby instructed to proceed with the execution of the said works in accordance with the contract documents. It is hereby notified that the [site] is being handed over to you for execution of work in accordance with the contract documents.

Yours faithfully,

**EXECUTIVE ENGINEER (P)
DEENDAYAL PORT AUTHORITY**

SPECIMEN CONTRACT AGREEMENT

(to be executed on Rs.500/-non-judicial stamp paper)

[the successful tenders shall fill in this form in Accordance with the instructions indicated]

THIS CONTRACT AGREEMENT is made

The [insert: number] day of [insert: month], [insert: year]

Between

1. The Board of Deendayal Port Authority, an autonomous body of the Ministry of PORT, SHIPPING & Waterways of the Government of INDIA, incorporated under the MAJOR PORT AUTHORITIES ACT, 2021 as amended thereafter, under the laws of India and having its principal place of business at [insert address of port](hereinafter called "the "Bord"/port"), and
2. [insert name of the contractor], [incorporated under] the laws of [country of contractor] and having its place of business at [insert: address of contractor] (hereafter called "the contractor")

WHEREAS the employer board invited tenders against tender no.[number] for execution of work of Providing Paver Block Paving near Oil Pipelines Outside Tank Terminal (Phase-I) and has accepted a tender by the contractor in accordance with the supply/delivery schedules, in the sum of[insert contract price in words and figures, expressed in the contract currency (ies)] (hereafter called "contract price")

AND WHEREAS the contractor agreed to deposit the Security Deposit as follows for the due fulfillment of all the conditions of the contract.

1.Rs. _____paid in the form of Bank Guarantee/Fixed Deposit Receipt/Digital Transfer/Insurance Surety Bond towards 5% of Contract value as Performance Guarantee

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. In this agreement words and expressions shall have the same meanings as per respectively assigned to them in the conditions of contract refer to.
2. the following documents shall constitute the contract between the employer/ board and the contractor, and each shall be read and construed as an integral part of the contract:
 - a) This contract agreement;
 - b) Special conditions of contract;
 - c) General conditions of contract;
 - d) Technical requirements (including schedule of requirements and technical specifications, drawings);
 - e) Notice inviting tender;
 - f) Replies issued to the pre-bid queries, addenda is any issued [numbers and date];
 - g) The contractor's bid and original price and delivery schedules;
 - h) The employer/ board's notification of award;
 - i) [correspondence the employer/board has exchanged with the bidder till and after award of contract [specific letters and dates]]
 - j) And [add here any other documents]

AND WHEREAS

EMPLOYER/BOARD accepted the bid of CONTRACTOR for the provision and the execution of WORK at the CONTRACT PRICE as indicated in CONTRACT upon the terms and subject to the conditions of contract. Now this CONTRACT AGREEMENT witnesseth and it is hereby agreed and declared as follows:

All the disputes related to the subject contract shall be resolved through a conciliation committee / councils comprising of independent subject experts

- 3 In consideration of the payment to be made to CONTRACTOR for work to be executed by him. CONTRACTOR hereby covenants with EMPLOYER/ BOARD what CONTRACTOR shall and will duly provide, execute and complete work and things in CONTRACT, mentioned or described or which are to be implied there from or may be reasonably necessary for completion of work and the times and in the manner and subject to the terms and conditions or stipulations mentioned in CONTRACT.
- 4 In consideration of the due provision, execution and completion of work by the contractor in accordance with the terms of the contract, the employer / board does hereby agree with contractor that employer /board will pay to contractor the respective amounts for the work actually done by him ad approved by employer/board as per payment terms accepted in contract and payable to contractor under provision of contract at such manner as provided for in the contract.
- 5 in consideration of the due provision, execution and completion of work, contractor done hereby agree to pay such sums as may be due to employer/ board for the services rendered by employer/ board to contractor as set forth in contract and such other sums as may become payable to employer/ board towards loss, damage to the employer/ board's equipment, materials etc. and such payments to be made at such time and in such manner as is provided in the contract.

IN WITNESS where of the parties hereto have caused this agreement to be executed in accordance with the laws of [insert name of the contract governing law country] on the day, month and year indicated above.

For and behalf of the employer/ board

Signed: [insert signature]

In the capacity of [insert title or other appropriate designation]

In the presence of [insert identification of official witness]

For any behalf of the contractor

Signed: [insert signature of authorized representatives of the contractor]

In the capacity of [insert title or other appropriate designation]

In the presence of [insert identification of official witness]

SECTION 3

CONDITIONS OF CONTRACT AND SPECIAL CONDITIONS

CONDITIONS OF CONTRACT

A. General

1. Definitions

- 1.1 Terms which are defined in the Contract Data are not also defined in the Conditions Contract but keep their defined meanings Capital initials are used to identify defined terms.

The Conciliator is the person appointed jointly by the Employer and the contractor to resolve disputes in the first instance as provided for in Clauses 24 and 25. The name of the Adjudicator is defined in the Contract Data. (Refer Section 5)

Bill of Quantities means the priced and completed Bill of Quantities forming part of the Bid.

Compensation Events are those defined in Clause 44

The **Completion Date** is the date of Completion of the Works as certified by the Nodal Officer or his nominee in accordance with Sub Clause 55.1

The **Contract** is the contract between the Employer and the Contractor to execute, complete and maintain the Works. It consists of the documents listed in Clause 2.3 below.

The **Contract Data** defines the documents and other information which comprise the Contract.

The **Contractor** is a person or corporate body whose Bid to carry out the Works has been accepted by Employer.

The **Contractor's** Bid is the completed Bidding documents submitted by the Contractor to the Employer.

The **Contract Price** is the price stated in the letter of acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

Days are calendar days, **months** are calendar months.

A **Defect** is any part of the Works not completed in accordance with the Contract.

The **Defects Liability Period** is the Period named in the Contract Data and calculated from the Completion Date.

The **Employer** is the party who will employ the contractor to carry out the Works.

The **Nodal Officer** or his nominee is the person named in the Contract Data (or any other Competent person appointed and notified to the contractor to act in replacement of the Nodal Officer or his nominee) who is responsible for supervising the Contractor, Administering the Contract, certifying payments due to the Contractor, issuing and valuing Variations to the contract, awarding extensions of time and valuing the Compensation Events.

Chief Engineer is the Engineer-in-charge of the work.

Equipment is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.

The **Initial Contract Price** is the Contract Price listed in the employer's Letter of Acceptance.

The **Intended completion Date** is the date on which it is intended that the Contractor shall complete the works. The Intended Completion Date is specified in the Contract Data. The Intended Completion Date may be revised only by the Nodal Officer or his nominee by issuing an extension of time.

Materials are all supplies, including consumables, used by the contractor for incorporation in the Works.

Plant is any integral part of the Works which is to have mechanical, electrical, electronic or chemical or biological function.

The **Site** is the area defined as such in the Contract Data.

Site Investigation Reports are those which were included in the Bidding documents and are factual interpretative reports about the surface and subsurface conditions at the site.

Specification means the Specification of the Works included in the Contract and any modification or addition made or approved by the Nodal Officer or his nominee.

The **Start Date** is given in the Contract Data. It is the date when the Contractor shall commence execution of the works. It does not necessarily coincide with any of the Site Possession Date.

A **Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract which includes work on the site.

Temporary Works are works designed, constructed, installed and removed by the Contractor which are needed for construction or installation of the Works.

A **Variation** is an instruction given by the Nodal Officer or his nominee which varies the Works. The **Works** are what the Contract requires the Contractor to construct, install and turn over to the Employer as defined in the Contract Data.

The **Trained Work Person** are those employed/proposed to be employed by the Contractor at the Project Site, who have participated and are in possession of a valid Competency Certificate through a programme run under the auspices of a University, State Technical Board, Ministry of Government of India.

2. Interpretation

- 2.1 In interpreting these Condition of Contract, singular also means plural, male also means female or neuter and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Nodal Officer or his nominee will provide instructions clarifying queries about the Conditions of Contract.
- 2.2 If sectional completion is specified in the Contract Data, references in the Conditions of Contract to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion date for the whole of the Works).

2.3 The documents forming the Contract shall be interpreted in the following order of priority:

- (1) Agreement
- (2) Letter of Acceptance and notice to proceed with Works Contractor's Bid.
- (3) Contract Data
- (4) Conditions of Contract including Special Conditions of Contract
- (5) Specifications
- (6) Drawings
- (7) any other documents listed in the Contract Data as forming part of the Contract and
- (8) Bill of quantities

3. Language and Law

3.1 The language of the Contract and the law governing the Contract are stated in the Contract Data.

4. Nodal Officer or his nominee's Decisions

4.1 Except where otherwise specifically stated, the nodal officer or his nominee will decide contractual matters between the Employer and the Contractor in the role representing the Employer.

5. Delegation

5.1 The Nodal officer or his nominee may delegate any of the duties and responsibilities to other people after notifying the Contractor and may cancel any delegation after notifying the Contractor.

6. Communications

6.1 Communications between parties which are referred to in the conditions are effective only when in writing. A notice shall be effective only when it is delivered (in terms of Indian Contract Act 1872).

7. Joint venture:

Companies/Contractors may jointly undertake contract/contracts. Each only would be jointly and severely responsible for completing the task as per the contract, however declaration of the Lead member to be indicated by bidders, however JV has to designate in their MOU. The firms with at least 26% equity holding each are allowed to jointly meet the eligibility criteria.

8. Subcontracting

- 8.1 The Contractor may subcontract with the approval of the Nodal Officer or his nominee but may not assign the Contract without the approval of the Employer in writing. Subcontracting does not alter the Contractor's obligations.

Other Contractor

- 8.2 The Contractor shall co-operate and share the Site with other contractors, public authorities, utilities, and the Employer between the dates given in the Schedule of other contractors. The Contractor shall as refer to in the Contract Data, also provide facilities and services for them as described in the Schedule. The employer may modify the schedule of other contractors and shall notify the contractor of any such modification.

9. Personnel

- 9.1 The Contractor shall employ the key personnel named in the Schedule of Key Personnel as referred to in the Contract Data to carry out the functions stated in the Schedule or other personnel approved by the Nodal Officer or his nominee. The Nodal Officer or his nominee will approve any proposed replacement of Key personnel only if their qualifications, abilities, and relevant experience are substantially equal or better than those of the personnel listed in the Schedule.
- 9.2 If the Nodal Officer or his nominee asks the Contractor to remove a person who is a member of the Contractor's staff of his work force stating the reasons, the Contractor shall ensure that the person leaves the Site within seven days and has no further connections with the work in the Contract.

10. Employer's and Contractor's Risks

- 10.1 The Employer carries the risks which this contract states are Employer's risks and the Contractor carries the risks which this Contract states are Contractor's risks.

11. Employer's Risks

- 11.1 The Employers risks are;
- (a) In so far as they directly affect the execution of the Works in the country where the Permanent works are to be executed:
 - (i) War and hostilities (whether war be declared or not), invasion, act of foreign enemies:

- (ii) Rebellion, revolution, insurrection, or military or usurped power, or civil war,
- (iii) Ionizing radiations, or contamination by radioactivity from any nuclear fuel, or from any nuclear waste, from the combustion of nuclear fuel, radioactive toxic explosive or other hazardous properties of any explosive nuclear assembly or nuclear component thereof:
- (iv) Pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds; and
- (v) riot, commotion or disorder, unless solely restricted to the employees of the Contractor or of his Subcontractors and arising from the conduct of the Works;
- (vi) floods, tornadoes, earthquakes and landslides
- (vii) loss or damage due to the use or occupation by the Employer of any Section or part of the Permanent Works, except as may be provided for in the Contract;
- (viii) loss or damage to the extent that it is due to the design of the Works, other than any part of the design provided by the Contractor or for which the Contractor is responsible; and
- (ix) any operation of the forces of nature (in so far as it occurs on the Site) which an experienced contractor:
 - (i) could not have reasonably foreseen, or
 - (ii) could reasonably have foreseen, but against which he could not reasonably have taken at least one of the following measures.
 - A. prevent loss or damage to physical property from occurring by taking appropriate measures, or
 - B. insure against.

12. Contractor's risks

- 12.1 All risks of loss of or damage to physical property and of personal injury and death which arise during and in consequence of the performance of the Contract other than the excepted risks are the responsibility of the Contractor.

13. Insurance

13.1 The Contractor shall provide in the joint names of the employer and the Contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles state in the Contract Data for the following events which are due to the Contractors risks.

- a) Loss of or damage to the works plant and materials.
- b) Loss of or damage to Equipment;
- c) Loss of or damage property (except the Works, Plant, Materials and Equipment in connection with the Contract, and
- d) Personal injury of death.

13.2 Policies and certificates for insurance shall be delivered by the Contractor to the Nodal Officer or his nominee for the Nodal Officer or his nominee's approval before Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.

13.3 If the Contractor does not provide any of the policies and certificates required, the Employer may effect the insurance which the Contractor should have provided and recover the premiums the Employer has paid from payments otherwise due to the Contractor or, if no payment of the premiums shall be a debt due.

13.4 Alternate to the terms of insurance shall not be made without the approval of the Nodal Officer or his nominee.

13.5 Both parties shall comply with all conditions of the insurance policies.

14. Site Investigation Reports

14.1 The Contractor, in preparing the Bid, shall rely on the Investigation Report referred to in the Contract Data, supplemented by any information available to the Bidder.

15. Queries about the Contract Data

15.1 The Nodal Officer or his nominee will clarify queries on the Contract Data.

16. Contractor to Construct the Works.

16.1 The Contractor shall construct and install the Works in accordance with the Specification and Drawings.

17. The Works to Be Completed by the Intended Completion Date.

17.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the program submitted by the Contractor as updated with the approval of the Nodal Officer or his nominee, and complete them by the Intended Completion Date.

18. Approval by the Nodal Officer or his nominee.

18.1 The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Nodal Officer or his nominee, who is to approve them if they comply with the specifications and Drawings.

18.2 The Contractor shall be responsible for design of Temporary Works.

18.3 The Nodal Officer or his nominee's approval shall not alter the Contractor's responsibility for design of the Temporary Works.

18.4 NIL.

18.5 All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Nodal Officer or his nominee before their use.

19. Safety

19.1 The Contractor shall be responsible for the safety of all activities on the Site.

20. Discoveries.

20.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site is the property of the Employer. The contractor is to notify the Nodal Officer or his nominee of such discoveries and carry out the Nodal Officer or his nominee's instructions for dealing with them.

21. Possession of the Site.

21.1 The Employer shall give possession of all parts of the Site to the Contractor, free from encumbrances. If possession of a part is not given by the date stated in the Contract Data the Employer is deemed to have delayed the start of the relevant activities and this will be a Compensation Event.

22. Access to the Site

22.1 The Contractor shall allow the Nodal Officer or his nominee and any person authorized by the Nodal Officer or his nominee access to the Site to any place where work in connection with the Contract is being carried out or is intended to be carried out and to any place where materials or plant are being manufactured, fabricated and/or assembled for the works.

23. Instructions

23.1 The Contractor shall carry out all instructions of the Nodal Officer or his nominee which comply with the applicable laws where the Site is located.

24. Disputes (Refer Section 5)

24.1 If the Contractor believes that a decision taken by the Nodal Officer or his nominee was either outside the authority given to the Nodal Officer or his nominee by the Contract or that the decision was wrongly taken, the decision shall be referred to the conciliator within 28 days of the notification of the Nodal Officer or his nominee's decision.

25. Settlement of Disputes (Refer Section 5)

25.1 If a dispute of any kind whatsoever arises between the Employer and the Contractor in connection with, or arising out of the Contract or the execution of the Works, whether during the execution of the Works or after their completion and whether before or after repudiation or after termination of the Contract, including any disagreement by either party with any action, inaction, opinion, instruction, determination, certificate or valuation of the Nodal Officer or his nominee, the matter in dispute shall, in the first place be referred to the Disputes Review Board [DRD] in case of contracts valuing more than Rs.5 crores and above, and for contracts valuing less than Rs. 5 crores, the disputes will firstly be settled by the Conciliator, failing which any party may invoke arbitration clause.

Unless the Contract has already been repudiated or terminated or frustrated the Contractor shall in every case, continue to proceed with the Works with all due diligence and the Contractor and the Employer shall give effect forthwith to every decision of the Nodal Officer or his nominee unless and until the same shall be revised, as hereinafter provided, by the conciliator or in a Dispute Review Board recommendation / Arbitral Award.

25.2 Decision by Conciliator

- (i) The Conciliator shall give a decision in writing within 28 days of receipt of a notification of a dispute.
- (ii) Conciliator shall be paid daily at the rate specified in the contract Data together with reimbursable expenses of the types specified in the contract data and the cost shall be divided equally between the Employer and the contractor, whatever decision is reached by the conciliator, either party may refer a decision of the conciliator within 28 days of the conciliator's written decision. If neither party refers the disputes to arbitration within 28 days, the conciliators decision will be final and binding.

25.3 **Arbitration clause:**

Any dispute in respect of in contracts where party is dissatisfied by the Conciliators decision, shall be decided by arbitration as set forth below: A dispute with Dispute review expert shall be finally settled by arbitration in accordance with the Indian Arbitration and Conciliation Act, 1996, or any statutory amendment thereof. The arbitral tribunal shall consist of 3 arbitrators, one each to be appointed by the Employer and the Contractor, and the third to be appointed by the mutual consent of both the arbitrators, falling which by making a reference to CIDC-SIAC Arbitration Centre from their panel.

- (i) Neither party shall be limited in the proceeding before such arbitrations to the evidence or arguments already put before the Nodal Officer or his nominee or the Board, as the case may ne, for the purpose of obtaining said recommendations/decision. No such recommendations/decision shall disqualify the Nodal Officer or his nominee or any of the members of the Board, as the case may be, from being called as a witness and giving evidence before the arbitrators or any matter whatsoever relevant to the dispute.
- (ii) The reference to arbitration shall proceed notwithstanding that the works shall not then be or be alleged to be complete , provided always that the obligations of the Employer, the Nodal Officer or his nominee and the Contractor shall not be altered by reason of the arbitration being conducted during the progress of the works. Neither party shall be entitled to suspend the works to which the dispute relates, and payment to the contractor shall be continued to be made as provided by the contract.

- (iii) If one of the parties fail to appoint its arbitrators in pursuance of sub-clause [i], within 14 days after receipt of the notice of the appointment of its arbitrator by the other party, then chairman of the nominated Institution shall appoint arbitrator within 14 days of the receipt of the request by the nominated institution. A certified copy of the chairman's order, making such an appointment shall be furnished to both the parties.
- (iv) Arbitration proceedings shall be held at, and the language of the arbitration proceeding and that of all documents and communications between the parties shall be 'English'
- (v) The decision of the majority of arbitrators shall be final and binding upon both parties. The expenses of the arbitrators as determined by the arbitrators shall be shared equally by the Employer and the Contractor. However, the expenses incurred by each party in connection with the preparation, presentation, etc. of its case prior to, during and after the arbitration proceedings shall be borne by each party itself.
- (vi) All arbitration awards shall be in writing and shall state the reasons for the award.
- (vii) Performance under the contract shall continue during the arbitration proceedings and payments due to the contractor by the employer shall not be withheld, unless they are subject matter of the arbitration proceedings.

26. Replacement of Conciliator (Refer Section 5)

26.1 Should the Conciliator resign or die, or should the Employer and the Contractor agree that the conciliator is not fulfilling his functions in accordance with the provisions of the Contract; a new Conciliator will be jointly appointed by the Employer and the Contractor. In case of disagreement between the Employer and the Contractor, within 30 days the Conciliator shall be appointed by the Appointing Authorities designated in the Contract Data at the request of either party within 14 days of receipt of such request.

1. TIME CONTROL

27. Program

- 27.1 Within the time stated in the contract data the contractor shall submit to the Nodal officer or his nominee for approval a program showing the general methods arrangements, order, and timing for all the activities in the works along with monthly cash flow forecast.
- 27.2 An updates of the program shall be a program showing the actual progress achieved on each activity and the effect of the timing of the progress achieved on the timing of the remaining work including any changes to the sequence of the activities.
- 27.3 The contractor shall submit to the Nodal Officer or his nominee, for approval an updated program at intervals no longer than the period stated in the contract data. If the contractor does not submit an updates program within this period, the Nodal Officer or his nominee may withhold the amount stated in the contract data from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue program has been submitted.
- 27.4 The nodal officer or his nominee's approval of the program shall not alter the contractor's obligations. The contractor may revise the program and submit it to the nodal officer or his nominee again at any time. A revise program is to show the effect of variations and compensation events.

28. Extension of the intended completion date.

- 28.1 The nodal officer or his nominee shall extend the intended completion date if a compensation event occurs or a variation is issued which makes it impossible for completion to be achieved by the intended completion date without the contractor taking steps to accelerate the remaining work and which would cause the contractor to incur additional cost.
- 28.2 The nodal officer or his nominee shall decide whether and by how much to extend the intended completion Date within 21 days of the contractor asking the Nodal Officer or his nominee for a decision upon the effect of a compensation event or variation and submitting full supporting information. If the contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new intended completion date.

29. The Early Warning Provisions shall be as per clause 32.

30. Delays Ordered by the Nodal Officer or his nominee

30.1 The Nodal Officer or his nominee may instruct the contractor to delay the start or Progress of any activity within the works.

31. Management Meeting.

31.1 Either the Nodal Officer or his nominee or the contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.

31.2 The Nodal Officer or his nominee shall record the business of management meetings and is to provide copies of his record to those attending the meeting and to the employer. The responsibility of the parties for actions to be taken is to be decided by the Nodal Officer or his nominee either at the management meeting or after the management meeting and stated in writing to all attended the meeting.

32. Early warning

32.1 The contractor is to warn the Nodal Officer or his nominee at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the contract price or delay the execution of works. The Nodal Officer or his nominee may require the contractor to provide an estimate of the expected effect of the event or circumstances on the contract price and completion Date. The estimate is to be provided by the contractor as soon as reasonably possible.

32.2 The contractor shall co-operate with the Nodal Officer or his nominee in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Nodal Officer or his nominee.

32.3 The Defect Liability period for the contract shall be 24 months from the date issue of completion certificate.

2. QUALITY CONTROL

33. Identity Defects

33.1 The Nodal Officer or his nominee shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Nodal Officer or his nominee may instruct the Contractor to search for a Defect and to uncover and test any work that the Nodal Officer or his nominee considers may have a Defect.

34. Tests

34.1 If the Nodal Officer or his nominee instructs the Contractor to carry out a test not specified in the specification to check whether any work has a Defect and the test shows that it does the Contractor shall pay for the test and any samples. If there is no Defect the test shall be a Compensation Event.

35. Correction of Defects

35.1 The Nodal Officer or his nominee shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion and is defined in the Contract Data. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.

35.2 Every time notice of a Defect is given the Contractor shall correct the notified Defect within the length of time specified by the Nodal Officer or his nominee's notice.

36. Uncorrected Defects

36.1 If the Contractor has not corrected a within the time specified in the Nodal Officer or his nominee's notice the Nodal Officer or his nominee will assess the cost of having the Defect corrected, and the Contractor will pay this amount.

3. COST CONTROL

37. Bill of Quantities

37.1 The Bill of Quantities shall contain items for the construction, supply, installation, testing and commissioning work to be done by the Contractor.

- 37.2 The bill of quantities is used to calculate the Contract Price. The Contractor is paid for the quantity of the work done at the rate in the Bill of Quantities for each item.

38. Changes in the Quantities

- 38.1 If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than + 25 percent provided the change exceeds + 10% of initial Contract Price, the Nodal Officer or his nominee shall adjust the rate (S), to allow for the change.
- 38.2 The Nodal Officer or his nominee shall not adjust rates from changes in quantities if thereby the initial Contract Price is exceeded by more than 15 percent except with prior approval of the Employer.
- 38.3 If requested by the Nodal Officer or his nominee where the quoted rate (s) of any item(s) is abnormally high, the Contractor shall provide the Nodal Officer or his nominee with a detailed cost breakdown of such rate in the Bill of Quantities.

39. Variations.

- 39.1 All Variations shall be included in updated programs produced by the Contractor.

40. Payment for Variations.

- 40.1 Variation permitted shall not exceed +25% in quantity of each individual item, and +10% of the total contract price. With 14 days of the date of instruction for executing varied work, extra work or substitution, and before the commencement of such work, notice shall be given either (a) by the contractor to the Employer of his intention to claim the extra payment or a varied rate or price, or (b) by the Employer to the contractor of his intention to vary rate or price.
- 40.2 For items not existing in the Bill of Quantities or substitution to items in the Bill of Quantities, rate payable should be determined by methods given below and in the order given below:

- i) Rates and prices in Contract, if applicable plus escalation as per contract.
- ii) Rates and prices in the schedule of rates applicable to the contract plus ruling percentage.
- iii) Market rates of materials and labour, hire charges of plant and machinery used, plus 10% for overheads and profits of Contractors.

40.3 For items in the Bill of quantities but where quantities have increased beyond the variation limits, the rate payable for quantity in excess of the quantity in the Bill of Quantity plus the permissible variation should be:

- i) Rates and prices in contract, if reasonable plus escalation, failing which (ii) and (iii) below will apply
- ii) Rates and prices in the schedule of Rates applicable to the contract plus ruling percentage,
- iii) Market rates of material and labour, hire charges of plant and machinery used plus 15% for overheads and profits of contractor.

40.4 If there is delay in the Employer and the contractor coming to an agreement on the rate of an extra item, rates as proposed by the employer shall be payable provisionally till such time as the rates are finally determined or till date mutually agreed.

40.5 If the Nodal officer or his nominee decides that the urgency of varying the work prevent a quotation being given and considers not delaying the work, no quotation shall be given and the variation shall be treated as a Compensation Event.

41. Cash flow forecasts.

41.1 When the program is updated, the contractor is to provide the Nodal Officer or his nominee with an updated cash flow forecast.

42. Payment Certificates.

42.1 The contractors shall submit to the Nodal Officer or his nominee monthly statements of the estimated value of the work completed less the cumulative amount certified previously.

- 42.2 The Nodal Officer or his nominee shall check the Contractors' monthly statement within 14 days and certify the amount to be paid to the Contractor after taking into account any credit or debit for the month in question in respect of materials for the works in the relevant amount and under conditions set forth in sub clause 51(3) of the Contract Data (Secure Advance).
- 42.3 The value of work executed shall be determined by the Nodal Officer or his nominee.
- 42.4 The value of work executed shall comprise the value of quantities of the items in the Bill of quantities completed.
- 42.5 The value of work executed shall include the valuation of variations and Compensation Events.
- 42.6 The Nodal Officer or his nominee may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.

43. Payments (Refer Section 5)

- 43.1 Bills shall be prepared and submitted by the Contractor, joint measurements shall be taken continuously and need to be connected with billing stage. System of 4 copies of measurements, one each for Contractor, Employer and Nodal Officer or his nominee, and signed by both Contractor and Employer shall be followed.
- 43.2 75% of bill amount shall be paid within 14days of submission of the bill. Balance amount of the verified bill should be paid within 28 days of the submission of the bill. **(Refer Section 5)**
- 43.3 For delay in payment beyond the periods specified in 43.2 above, interest at a pre-specified rate (suggested rate **SBI PLR + 2%**) p.a as on due date of payment) should be paid. **(Refer Section 5)**
- 43.4 Contractor shall submit final Bill within 60 days of issue of defects liability certificate. Client's Nodal Officer or his nominee shall check the bill within 60days after its receipt and return the bill to Contractor for corrections, if any 50% of undisputed amount shall be paid to the contractor at the stage of returning the bill. **(Refer Section 5)**

- 43.5 The Contractor should re-submit the bill, with corrections within 30 days of its return by the Nodal Officer or his nominee. The re-submitted bill shall be checked and paid within 60 days of its receipt. **(Refer Section 5)**
- 43.6 Interest at a pre-specified rate (suggested rate SBI PLR+ 2% p.a. as on due date of payment) shall be paid if the bills is not paid within the time limit specified above. **(Refer Section 5)**
- 43.7 If an amount certified is increased in later certificates as a result of an award by the Conciliator or an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculated from the date upon which the increased amount would have been certified in the absence of dispute. **(Refer Section 5)**
- 43.8 Items of the Works for which no rate or price has been entered in will not be paid for by the employer and shall be deemed covered by other rates and prices in the Contract.

44. Compensation Events (Refer Section 5)

- 44.1 The following mutually agreed Compensation Events unless they are caused by the Contractor would be applicable.
- (a) The Employer does not give access to a part of the Site by the Site. Possession Date stated in the Contract Data.
 - (b) The Employer modifies the schedule of other contractors in a way which affects the work of the contractor under the contract.
 - (c) The Nodal Officer or his nominee orders a delay or does not issue drawings, specifications or instructions required for execution of works on time.
 - (d) The Nodal Officer or his nominee instructs the Contractor to uncover to carry out additional tests upon work which is then found to have no Defects.
 - (e) The Nodal Officer or his nominee unreasonably does not approve for a subcontract to be let.
 - (f) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of letter of Acceptance from the information issued to Bidders

(including the Site Investigation Reports) from information available publicly and form a visual inspection of the site.

- (g) The Nodal Officer or his nominee gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons.
- (h) Other contractors, public authorities, utilities or the Employer does not work within the dates and other constraints stated in the Contract that cause delay or extra cost to the Contractor.
- (i) The advance payment is delayed.
- (j) The effect on the Contractor of any of the Employer's Risks.
- (k) The Nodal Officer or his nominee unreasonably delays issuing a Certificate of Completion.
- (l) Other Compensation Events listed in the Contract Data or mentioned in the contract.

Whenever any compensation event occurs, the contractor will notify the employer, within 14 days and provide a forecast cost of the compensation event.

44.2 If a Compensation Event would cause additional cost or would prevent the work being completed before the intended Completion Date, the Contract Price shall be increased and/or the intended Completion Date shall be extended. The Nodal Officer or his nominee shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.

44.3 As soon as information demonstrating the effect of each Compensation Event upon the Contractor's forecast has been provided by Contractor, it is to be assessed by the Nodal Officer or his nominee and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable the Nodal officer or his nominee shall adjust the Contract Price based on Nodal Officer or his nominee's own forecast. The Nodal Officer or his nominee will assume that the Contractor will react competently and promptly to the event.

45. Tax (Refer Section 5)

45.1 The rates quoted by the Contractor shall be deemed to be inclusive of the sales and other taxes that the Contractor will have to pay for the performance of this Contract. The Employer will perform such duties in regard to the deduction of such taxes at sources as per applicable law. The rates to be quoted are exclusive of Service Tax. Contractor claims for reimbursement of service tax, as applicable on the contract on question as per provisions of service tax laws and amendments thereon from time to time, will be made on submission of the documentary evidence. Service tax element will not be considered for the purpose of evaluation of bid price.

46. Currencies

46.1 All payments shall be made in Indian Rupees unless specifically mentioned.

47. Price Adjustment

47.1 Contract price shall be adjusted for increase or decrease in rates and prices of labour, materials, fuels and lubricants in accordance with the following principles and procedures and as per formula given in the contract data. This clause is applicable for all the civil works having tender cost more than Rs. 5Crore and duration is more than 12 months.

The price adjustment shall apply for the work done from the start date given in the Contract data upto end of the initial intended completion date or extensions granted by the Nodal Officer or his nominee and shall not apply to the work carried beyond the stipulated time for reason attributable to the contractor.

(I) The Price adjustment for increase or decrease in the cost shall be paid in accordance with the following formula:

$$V = 0.85 \times Q \times R \times [(P - P_o)/P_o]$$

Where,

V = Variation in price on account of Labour / Diesel /
Cement / Steel /All Commodities during the month
under consideration.

Po = Market rate of Diesel / Cement / Steel / All Commodities on the date of opening of Technical bid. (Consumer Price Index for Labour).

P = Market rate of Diesel / Cement / Steel / All Commodities during the month under consideration. (Consumer Price Index for Labour).

Q = Percentage of Labour / Diesel / Cement / Steel / All Commodities component.

R = Value of work done during the month under consideration.

Note : i) Escalation to be computed for relevant items. Percentage that shall govern the escalation under Q shall be predetermined and indicated in tender document for each component i.e. Labour, Fuel, Cement, Steel, All Commodities etc.

	Labour	Diesel	Cement	Steel	All Commodities
Q(%)	30%	2%	4%	11%	53%
P	All India Consumer Price Index for Industrial Workers for the month under consideration as published in the RBI Bulletin / Indian Labour Journal Base 2016 = 100 or Latest available base)	Retail Price of HSD received at Deendayal by M/s. IOCL for the month under consideration	Wholesale Price Index for Cement for the month under consideration as published by MINISTRY OF COMMERCE & INDUSTRY (Base 2011-12=100 or Latest available base)	Wholesale Price Index for Steel for the month under consideration as published by MINISTRY OF COMMERCE & INDUSTRY (Base 2011-12=100 or Latest available base)	Wholesale Price Index for All Commodities for the month under consideration as published by MINISTRY OF COMMERCE & INDUSTRY (Base 2011-12=100 or Latest available base)

Po	All India Consumer Price Index for Industrial Workers as prevalent in the month in which bids are opened & as published in the RBI Bulletin/ Indian Labour Journal Base 2016 = 100 or Latest available base)	Retail Price of HSD received at Deendayal by M/s. IOCL as on the date of opening of Bids.	Wholesale Price Index for Cement ruling in the month in which the Bids are opened and as published by MINISTRY OF COMMERCE & INDUSTRY (Base 2011-12=100 or Latest available base)	Wholesale Price Index for Steel ruling in the month in which the Bids are opened and as published by MINISTRY OF COMMERCE & INDUSTRY (Base 2011-12=100 or Latest available base)	Wholesale Price Index for All Commodities ruling in the month in which the Bids are opened and as published by MINISTRY OF COMMERCE & INDUSTRY (Base 2011-12=100 or Latest available base)
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47.2 NIL.

47.3 To the extent that full compensation for any rise or fall in costs to the contractor is not covered by the provisions of this or other clauses in the contract, the unit rates and prices included in the contract shall be deemed to include amount to cover the contingency of such other rise or fall in costs.

47.4 SUBSEQUENT LEGISLATION

If , after the date 28(Twenty eight)prior to the date for submission of tenders for the contract there occur changes to any National or Statute Stature, Ordinance or Decree or other law or any regulation or bye law of any local or other duly constituted authority or introduction of any such statute, ordinance, decree, law, regulation or bye law which causes additional or reduced cost to the contractor in execution of the contract, such additional or reduced cost shall, after due consultation with the employer and the contractor be determined by the nodal officer or his nominee and shall be added to or deducted from the contract price and the nodal officer or his

nominee shall notify the contractor accordingly with a copy to the employer.

48. Retention

48.1 The employer shall retain from each payment due to the contractor the proportion stated in the contract data until completion of the whole of the works.

48.2 Retention money shall be deducted at 5% from each running bill, subject to a maximum of 5 percent of the contract price. Retention money shall be refunded within 14 days from the date of payment of final bill.

49. Liquidated damages

49A. In case of delay in completion of the contract, liquidated damages (L.D) may be levied at the rate of 1/2% of the contract value per week of delay or part thereof, subject to a maximum of 10 per cent of the contract price.

(i) The owner, if satisfied, that the works can be completed by the contractor within a reasonable time after the specified time for completion, may allow further extension of time at its discretion with or without the levy of L.D. In the event of extension of time at its discretion with L.D, the owner will be entitled without prejudice to any other right or remedy available in that behalf per cent (1/2%) of the contract value of the works for each week or part of the week subject to the ceiling defined in sub- clause 49A.

(ii) The owner if 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 work with in further extension of time allowed as aforesaid, shall be entitled, without prejudice to any other right, or remedy available in that behalf, to rescind the contract.

(iii) The owner, if not satisfied with the progress of the contract and in the event of failure of the contractor to recoup the delays in

the mutually agreed timeframe, shall be entitled to terminate the contract.

(iv) In the event of such termination of the contract as described in clauses 49A(ii) or 49A(iii) or both the owner shall be entitled to recover L.D. up to ten per cent (10%) of the contract value and forfeit the security deposit made by the contractor besides getting the work completed by other means at the risk and cost of the contractor.

(v) The ceiling of LD shall be 10% of the cost of work.

(vi) In case part / portions of the work can be commissioned and port operates the portion for commercial purpose, the rate of LD will be restricted to the uncompleted value of work, the maximum LD being on the entire contract value. (Refer Section 5).

Note: Contract price for LD shall be inclusive of tender price (Excluding GST) plus taxes and duties.

50. Incentives or Bonus

For early completion of the contract before the stipulated date of completion of work, an incentive amount @ 0.25% of the contract price may be paid to the Contractor for every fortnight of early completion, subject to a maximum cap of 5% of the contract price.

The Port, if satisfied, that the works can be completed by the contractor within a reasonable time after the specified time for completion, may allow extension of time at its discretion, by virtue of which the contractor make himself eligible for incentive, the extension shall be considered only till the actual date of completion and no incentive shall be payable. For calculation of incentive payment, contract price shall be exclusive of tender price plus taxes and duties.

51. Advance payment

The Employer shall make the following advance payments

: Mobilization Advance:

- i. Mobilization advance shall be paid upto 10% of Contract Price, payable in two equal instalments. The first instalment shall be paid

after mobilization has started and the next instalment shall be paid after satisfactory utilisation of earlier advance.

- ii. Construction / installation equipment advance shall be paid upto 5% of Contract Price.
- iii. Mobilisation advance and Construction Equipment Advance shall be paid at SBI PLR + 2% P.A. (as on date of payment) interest at the discretion of the employer and against Bank Guarantee for such advance and against hypothecation of Construction equipment to the employer. However, availing of advance payment to be optional with the bidder exercising the option along with the tender.
- iv. Equipment advance shall be paid in two or more equal instalments. First instalment shall be paid after Construction Equipment has arrived at the site and next instalment shall be paid after satisfactory utilisation of earlier advance(s).
- v. Recovery of Mobilisation and Construction Equipment advance will start when 15% of work is executed and recovery of total advance should be completed by the time 80% of the original contract work is executed.
- vi. The nodal officer or his nominee shall make advance payment in respect of materials and plant brought to site for but not yet incorporated installed in the Works in accordance with conditions stipulated in the Contract Data.
- vii. 75% of cost of materials and plant brought to site for incorporation into the works only shall be paid as Secured Advance. Materials which are of perishable nature shall be adequately insured.

52. Performance Securities

52.1 Security deposit shall consist of two parts:

- (1) Performance security to be submitted at award of the work.
- (2) Retention money to be recovered from Running Bills.

Security Deposit should be 10% of Contract price of which 5% of contract price should be submitted as FDR/ through Digital mode of Payment. / Bank Guarantee of Nationalized/Scheduled bank (except Co-operative) Banks / Insurance Surety Bond as per terms and conditions and format at 8-A having its branch at Gandhidham,

Account No. : 2177002100004628

IFSC Code : PUNB0217700

Punjab National Bank, Kandla Branch

Within 21 days of receipt of letter of acceptance and balance 5% recovered as Retention Money from Running Bills. Recovery of 5% of Retention Money to commence from the first bill onwards @ 5% for each bill. Retention Money be refunded within 14 days from the date of payment of final bill. Balance SD to be refunded immediately not later than 14 days from completion of defect liability period, NOC from Geology Department & Payment of welfare cess of final bill.

The documentary evidence (copy of paid Challan in Govt. Treasury) of Welfare cess @1% of work done or as amended By Statutory Authority from time to time, paid on final bill shall be submitted before releasing the Performance Guarantee if applicable.

The performance guarantee submitted in form Bank Guarantee/FDR/Insurance Surety bond should be valid for period of 60 days beyond the date of completion of all contractual obligations of the contractor, including Defect Liability Period.

Insurance Surety Bond shall also be acceptable for Performance security, to be submitted as per format attached as Form-8 A.

- 52.2 Failure of the successful Bidder to comply with the requirements of Sub-Clause 52.1 above shall constitute sufficient grounds for cancellation of the award of work and forfeiture of the Bid security.

53. Nil

54. Cost of Repairs.

54.1 Loss or damage to the works or materials to be incorporated in the works between the start date and the end of the defects correction period shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

4. FINISHING THE CONTRACT.

55. Completion

55.1 After completion of the work, as a whole the contractor will serve a written notice to the Nodal Officer or his nominee/Employer to this effect. The Nodal Officer or his Nominee/Employer upon receipt of this notice shall conduct a complete joint survey of the work within

7 days and prepare a defects list jointly. The defects pointed out by the Nodal Officer or his nominee/Employer would be rectified by the contractor within 14 days and thereafter acceptance report be signed jointly by the contractor and the employer. This joint acceptance report shall be treated as “completion Certificate”.

56. Taking over

- 56.1 The employer shall take over the site and the works within seven days of the Nodal Officer or his nominee issuing a certificate of completion.

57. Final Account

57.1 The Contractor shall supply to the Nodal Officer or his nominee a detailed account of the total amount that the Contractor considers payable under the contract before the end of the Defects Liability period. The Nodal Officer or his nominee shall issue a defects liability certificate and certify any final payment that is due to the contractor within 60 days of receiving the contractor’s account if it is correct and complete. If it is not, the Nodal Officer or his nominee shall issue within 15 days a schedule that states the scope of the corrections or additions that are necessary for the correction and certify payment of 50% of the undisputed amount to the contractor. If the final account is still unsatisfactory after it has been resubmitted the Nodal Officer or his nominees shall decide on the amount payable to the contractor and issue a payment certificate, within 60 days of receiving the contractor’s revised account.

58. Operating and Maintenance Manuals

- 58.1 If “as built” Drawings and /or operating and maintenance manuals are required, the contractor shall supply them by the dates stated in the Contract Data.
- 58.2 If the contractor does not supply the drawings and /or manuals by the dates stated in the contract data, or they do not receive the Nodal Officer or his nominee’s approval, the Nodal Officer or his nominee shall withhold the amount stated in the contract data from payments due to the contractor.

59. Termination

59.1 The employer or the Contractor may terminate the contract if the other party causes a fundamental breach of the contract.

59.2 Fundamental breaches of contract include, but shall not be limited to the following:

- (a) the contractor stops work for 28 days when no stoppage of work is shown on the current program and the stoppage has not been authorized by the Nodal Officer or his nominee.
- (b) The Nodal Officer or his nominee instructs the contractor to delay the progress of the work and the instruction is not withdrawn within 28 days.
- (c) The employer or the contractor becomes bankrupt or goes into liquidation other than for a reconstruction restructure or amalgamation.
- (d) A payment certified by the Nodal Officer or his nominee is not paid by the employer to the contractor within 50 days of the date of the Nodal Officer or his nominee's certificate.
- (e) The Nodal Officer or his nominee gives Notice the failure to correct a particular defect is a fundamental breach of contract and the contractor fails to correct it within a reasonable period of time determined by the Nodal Officer or his nominee.
- (f) The contractor does not maintain a security which is required.
- (g) The contractor has delayed the completion of works by the number days for which the maximum amount of liquidated damages can be paid as defined in the contract data and
- (h) If the contractor, in the judgment of the employer has engaged in corrupt or fraudulent practices in competing for or in the executing the contract.
- (i) If the contractor has contravened clause 9.00

For the purpose of this paragraph: "corrupt practice" means the offering, giving receiving or soliciting of anything of value to influence the action or a public officials in the procurement process or in contract execution. "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the employer, and includes collusive practice. Bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the employer of the benefits of free and open competition".

59.3 When either party to the contract gives notice of a breach of contract to the Nodal Officer or his nominee for a cause other than those listed under sub clause above, the Nodal Officer or his nominee shall decide whether the breach is fundamental or not.

59.4 Notwithstanding the above, the employer may terminate the contract for convenience subject to payment of compensation to the contractor including loss of profit on uncompleted works. Loss of profit shall be calculated on the same basis as adopted for calculation of extra/additional items.

59.5 If the contract is terminated the Contractor shall stop work immediately, make the site safe and secure and leave the site as soon as reasonably possible.

60. Payment upon Termination.

60.1 If the contract is terminated because of a fundamental breach of contract by the contractor, the Nodal Officer or his nominee shall issue a certificate for the value of the work done less advance payments received upto the date of the issue of the certificate, less other recoveries due in terms of the contract, less taxes due to be deducted at source as per applicable law and less the percentage to apply to the work not completed as indicated in the contract data.

Additional liquidity damages shall not apply, if the total amount due to the employer exceed any payment due to the contractor, the difference shall be a debt payable to the employer.

60.2 If the contract is terminated at the employer's convenience or because of a fundamental breach of contract by the employer, the Nodal Officer or his nominee shall issue a certificate for the value of the work done, the reasonable cost of removal of equipment, repatriation of the contractors personnel employed solely on the works, and the contractor's costs of protecting and securing the works and loss of profit on uncompleted works less advance payments received up to the date of the certificate, less other recoveries due in terms of the contract and less taxes due to be deducted at source as per applicable law.

61. Property

61.1 All materials on the Site, Plant, Equipment, Temporary Works and Works for which payment has been made to the contractor by the Employer, are deemed to be the property of the Employer, if the Contract is terminated because of a Contractor's default.

62. Release from Performance.

62.1 If the Contract is frustrated by the outbreak of war or by other event entirely outside the control of either the Employer or the Contractor, the Nodal Officer or his nominee shall certify that Contract has been frustrated. The Contractor shall leave the Site and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which commitment was made.

63. SPECIAL CONDITIONS OF CONTRACT

63.1 LABOUR

The contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport.

The Contractor shall, if required by the Nodal Officer or his nominee, deliver to the Nodal Officer or his nominee a return in detail, in such form and at such intervals as the Nodal Officer or his nominee may prescribe, showing the staff and numbers of the several classes of labour from time to time employed by the Contractor on the Site and such other information as the Nodal Officer or his nominee may require.

63.2 COMPLIANCE WITH LABOUR REGULATIONS:

During continuance of the contract, the Contractor and his sub contractors shall abide at all times by all existing labour enactment and rules made thereunder, regulations, notifications and by laws of the State or Central Government or local authority and any other labour law (including rules) regulations, bye laws that may be passed or notification that may be issued under any labour law in future either by the State or Central Government or

the local authority. Salient features of some of the major labour laws that are applicable to construction industry are given below. The Contractor shall keep the Employer indemnified in case any action is taken against the employer by competent authority on account of contravention of any of the provisions of any Act or rules made there under, regulations or notifications including amendments. If the Employer is caused to pay or reimburse such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the Contractor the Nodal Officer or his nominee/Employer shall have the right to deduct any money due to the Contractor including his amount of performance security. The Employer/Nodal Officer or his nominee shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

The employees of the Contractor and the Sub-Contractor in no case shall be treated as the employees of the Employer at any point of time.

- **SALIENT FEATURES OF SOME MAJOR LAWS APPLICABLE TO ESTABLISHMENTS ENGAGED IN BUILDING AND OTHER CONSTRUCTION WORK.**
 - (a) Workmen Compensation Act 1923:- The act provides for compensation in case of injury by accident arising out of and during the course of employment.
 - (b) Payment of Gratuity Act 1972:- Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years service or more on death at the rate of 15 days wages for every completed year of service. Act is applicable to all establishments employing 10 or more employees.
 - (c) Employees P.F and Miscellaneous Provision Act 1952:- The Act Provides for monthly contribution by the employer plus workers @ 12%/8.33%. the benefits payable under the Act are:
 - (i) Pension to family pension retirement or death, as the case may be.

- (ii) Deposit linked insurance on the death in harness of the worker,
- (iii) payment of P.F accumulation on retirement/death etc.
- (d) Maternity Benefit Act 1951:- The Act provides for leave and some other benefits to workmen/ employees in case of confinement or miscarriage etc.
- (e) Contract Labour (Regulation & Abolition) Act 1970:- The Act provides for certain welfare measures to be provided by the Contractor to contract labour and in case the Contractor fails to provide, the same are required to be provided, by the Principal Employer by Law. The Principal Employer is required to take Certificate of Registration and the Contractor is required to take license from the designated Officer. The Act is applicable to the establishments or Contractor of Principal Employer if they employ 20 or more contract labour.
- (f) Minimum Wages Act 1948:- The Employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment Construction of Buildings, Roads, Runways are scheduled employment.
- (g) Payment of Wages Act 1936:- It lays down as to by what date the wages are to be paid when it will be paid and what deductions can be made from the wages of the workers.
- (h) Equal Remuneration Act 1979:- The Act provides for payment of equal wages for work of equal nature to Male and Female workers and for not making discrimination against Female employees in the matters of transfers, training and promotions etc.
- (i) Payment of Bonus Act 1965:- The Act is applicable to all establishments employing 20 or more employees. The Act provides for payments of annual bonus subject to a minimum of 8.33% of wages and maximum of 20% of wages to employees drawing Rs.3500/- per month or less. The bonus to be paid to employees getting Rs.2500/- per month or above upto 3500/- per month shall be worked out by taking wages as Rs.2500/- per month only. The Act does not apply to certain establishments. The newly set-up establishments are exempted for five years in certain circumstances. Some of the State Governments have

reduced the employment size from 20 to 10 for the purpose of applicability of this Act.

- (j) Industrial Disputes Act 1947:- The Act lays down the machinery and procedure for resolution of industrial disputes, in what situations a strike or lockout becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.
- (k) Industrial Employment's (Standing Orders) Act 1946:- It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the States and Central Government to 50). The provides for laying down rules governing the conditions of employment by the Employer on matters provided in the Act and get same certified by the designated Authority.
- (l) Trade Unions Act 1926:- The Act lays down the procedure for registration of trade union of workmen and employers. The Trade Union registered under the Act have been certain immunities from civil and criminal liabilities.
- (m) Child Labour (Prohibition & Regulation) Act 1986:- The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of Children in all other occupations and processes. Employment of Child Labour is prohibited in Building and Construction Industry.
- (n) Inter-State Migrant workmen's (Regulation of Employment & Conditions of Service) Act 1979:-

The Act is applicable to an establishment which employs 5 or more inter- state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The Inter-State migrant workmen, in establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, travelling expenses from home upon the establishment and back, etc.

- (o) The Building and Other Construction workers (Regulation of Employment and Conditions of Service Act 1996 and the Cess Act of 1996:- All the establishments who carry on any building or other construction work and employs 10 or more workers are covered under this Act. All such establishments are required to

pay cess at the rate not exceeding 2% of the cost of construction as may be modified by the Government. The Employer of the establishment is required to provide safety measures at the Building or Construction work and other welfare measures, such as Canteens, First-Aid facilities. Ambulance, Housing accommodations for workers near the work place etc. The Employer to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the Government.

- (p) Factories Act 1948:- The Act lays down the procedure for approval at plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrence to designated authorities. It is applicable to premises employing 10 persons or more with aid of power or 20 more persons without the aid of power engaged in manufacturing process.

SECTION 4

CONTRACT DATA

Items marked “N/A” do not apply in this contract.

The following documents are also part of the contract

clause reference

The schedule of other contracts

[8 (Section -3)]

The schedule of key personnel

[9 (Section -3)]

The above insertions should correspond to the information provided in the invitation of bids.

The employer is

Name :- Deendayal Port Authority,

Address: A.O building, PO Box No-50, Gandhidham, (Gujarat)

Name of authorized representative is: Chief Engineer

Address: A.O building, PO Box No-50, Gandhidham, (Gujarat)

The nodal officer or his nominee is:

Name: Executive Engineer (P)

Address 2nd floor, Nirman Bhavan, DPA, Kandla – 370210.

Name of authorized representative is: SDO (B&R)/Asst. Engr. / J.E.

The name and identification number of the contract is “Construction of Administrative office building at Kandla ” The work consist of “Construction of Administrative office building at Kandla ”

The start date shall be _____

The intended completion date for the whole

Of the work is **24 months** with the following indicative milestones: [17 & 28(section 3)]

Indicatives Milestone Dates:

CIVIL WORKS		
Milestone 1	Plinth Level	3 months from start
Milestone 2	Civil Structure	7 months from start
Milestone 2	Masonry work	10 months from start
Milestone 3	Internal external plaster	13 months from start
Milestone 4	Flooring	16 months from start
Milestone 5	Doors windows	17 months from start
Milestone 6	Interior finishes	19 months from start

Milestone 7	Furniture	22 months from start
Milestone 8	Final Painting	23 months from start

ELECTRICAL WORKS		
Milestone 9	Internal	14 months from start
Milestone 10	External	15 months from start
Milestone 11	Final Completion of work	24 months from start

The site possession dates shall be Section 1
 Section 2 } The site possession dates shall be given after the award of work.
 Section 3 }

The site is located at Kandla and is defined in drawing (1)
 The defect liability period is 24months from the date of completion.

The minimum insurance cover for physical property, injury and death is Rs. 10.00 Lacs (Rs. Ten Lacs) per occurrence with the number of occurrences limited to four. After each occurrence, contractor will pay additional premium necessary to make insurance valid for four occurrences always.

The following event shall also be compensation events:

The employer terminates the contract for his convenience

1. _____.
2. _____.
3. _____.

The period between programme updates shall be **15** days

The amount to be withheld for late submission of an updated programme shall be **Rs. 5,000/-**.

The language of the contract documents is English.

The law, which applies to the contract, is law of union of India.

The currency of the contract is Indian rupees.

Fees and types of reimbursable expenses to be paid to the Dispute Review Expert

Appointing authority for the Arbitrator is Chairman DPA.

The Formula (e) for adjustment of price are as per Section-3 Clause no. 47

SECTION 5

SPECIAL CONDITION AND SPECIFICATIONS

Name of work: **Construction of Administrative office building at Kandla**

SITE CONDITIONS AND SPECIFICATIONS

(1) The provision in special condition which form a part of the contract shall have precedence over those specified in Section 1, 2, 3, 4 and 8 of Contract in case of diversity if any.

(2) The following clauses will **not applicable**.

(a) Section 1

1. Clause No. 4.1c, 4.1d, 4.1e, 4.1 f, 4.1 h
2. Clause No. 4.2 j, 4.3(v), 4.4, 4.5
3. Clause No. 8.2, 9.2
4. Clause No. 19.1, 19.2, 19.3
5. Clause No. 22.2, 22.5
6. Clause No. 23.2, 23.3 23.4
7. Clause No. 27.1, 27.2
8. Clause No. 35, 36

(b) Section 2

1. The clauses (c), (d) & (g) of the SPECIMEN FOR FORM OF BID will not be applicable
2. In Contractor's Bid advance payment & appointment of conciliator is not applicable.
3. In Pre-qualification of the Bidders Table No 5,6,7 are not applicable.

(c) Section 3

1. Para 2 of Clause 1.1
 - The Conciliator is the person appointed jointly by the Employer and the contractor to resolve disputes in the first instance as provided for in Clauses 24 and 25. The name of the Adjudicator is defined in the Contract Data.
2. Clause 8.1 , 9.1,
3. Clause 24, 25 ,26 , 21.1
4. Clause 43.2 to 43.7
5. Clause 44
6. Clause 45, 50,51

7. Clause 49(vi)

(d) **Section 4**

1. Schedule of other contract & Schedule of key Personnel
2. Conciliators not applicable under Contract Data
3. Compensation event
 - The Conciliator is the person appointed jointly by the Employer and the contractor to resolve disputes in the first instance as provided for in Clauses 24 and 25. The name of the Adjudicator is defined in the Contract Data.

(e) **Section 8**

- FORMS FOR DISPUTE REVIEW BOARD AGREEMENT.
- Exception and Deviation
- Specimen for Bank Guarantee for advance payment.

(3) The following existing clauses are Modified as under:

- Section – 1: Clause No. 4.1 d; Details of equipment available with the Bidder.
- Section-1: Clause No. 4.1 e; Managerial/ Manpower Available with the Bidder.
- Section-1: Clause No. 4.2 d; Major items of construction equipment available with the Bidder.
- Section-1: Clause No. 4.2 e; Qualification and experience of Key Management & Technical Personnel available with the Bidder.
- Section-2: Table: 6 – Qualification and experience of Key personnel available with the Bidder. Attach biographical data.
- Joint Venture Section – 3, Clause NO. 7.

Companies/Contractors may jointly undertake contract/contracts. The number of partners in JV/Consortium shall be limited to maximum of three. Each entity would be jointly and severally responsible for completing the task as per the contract, however declaration of the Lead member (JV has to designate one partner as Lead Member in their MOU) to be indicated by bidders. The firms with at least 26% equity holding each are allowed to jointly meet the eligibility criteria.

1. A legally binding Joint venture / Consortium Agreement signed by authorized signatories of all the partners of the JV/Consortium, as per the proforma at section-VI shall be enclosed with the bid.

2. Power of attorney duly executed and signed by legally authorized signatories of all the partners, authorizing the Lead Partner (a) to submit bid, negotiate and conclude contract and incur all liabilities therewith on behalf of the partner(s) of the JV/Consortium during the bidding process; and (b) in the event of a successful bid, to incur liabilities and receive instructions for and on behalf of the partner(s) of the JV /Consortium and to carry out the entire execution of the contract including payment, exclusively through Lead Partner, as per the proforma at section-VI which shall be duly authenticated by a notary public or equivalent certifying authority, shall be enclosed with the bid.
3. The bid and in the case of the successful bidder, the Agreement, shall be signed and / or executed in such a manner for making it legally binding on all partners (including operative parts of the ensuing Contract in respect of Agreement of Arbitration, etc.). The Contract shall be signed by legally authorized signatories of all partners.
4. The Lead Partner shall be authorized to receive instructions for and on behalf of the partners of the Joint venture and entire execution of the Contract including payment shall be carried out exclusively through the Lead Partner. A Statement to this effect should be included in the Joint Venture Agreement.
5. All partners of the Joint Venture shall be liable jointly and severally for the execution of the Contract in accordance with the Contract terms, and a Statement to this effect should be included in the Joint Venture Agreement.
6. Bid Security as required shall be furnished by Lead Member of Joint venture.
7. Performance Guarantee, as required, will be furnished by Lead Member of Joint venture.
8. Participation by a firm in more than one JV /Consortium is not permissible. A firm who submits bid on individual capacity is not eligible to be a partner of a JV /Consortium. In case a firm's name appears in more than one bid then both application may be rejected.
9. Each partner must submit the complete documentation, or portions applicable thereto, required qualifying the firm for bidding.
10. All the partners of the JV/Consortium shall be jointly and severally liable for due performance, recourse/sanctions within the joint venture in the event of default of any partner and arrangements for providing the required indemnities.

11. Notwithstanding demarcation or allotment of work among the partners, each partner shall be liable for non-performance of the whole contract irrespective of their demarcation or share of work.
12. The Lead Partner shall be authorized to act on behalf of the JV/Consortium.
13. All the correspondences between the Employer and the contractor shall be routed through the Lead Partner.
14. In the event of default by the Lead Partner, it shall be construed as default of the Contractor; and Employer will take action under relevant clause(s) of the Bid Document and/or General Terms and Conditions of Contract.
15. An undertaking that all the partners are jointly and severally liable to the Employer for the performance of the contract shall be enclosed with the bid.
16. In the event of any partner leaving the JV, it shall be intimated to the Employer within 30 days by other partner(s). Failure to do so shall be construed as default of the contractor and the Employer may take action under relevant clause(s) of the Bid Document and/or General Terms and Conditions of Contract.
17. The contractor shall not alter its composition or legal status without the prior written permission of the Employer. Failure to do so shall be construed as default of the contractor and the Employer may take action under relevant clause(s) of the Bid Document and/or General Terms and Conditions of Contract.
18. One of the partners of JV/Consortium should have downloaded the bid documents.
19. Bid security as required shall be furnished by lead member of JV

(4) Arbitration

The existing arbitration clause (Clause No. 25 of settlement of disputes by arbitration) of the General Conditions of contract for works may be replaced by the following:

Except where otherwise provided in the contract all questions and disputes relating to the meaning of the specifications, designs, drawings and instructions here in before mentioned and as to the quality of workmanship or materials used on the work or as to any other question, claim, right, matter or any other thing what so ever, in any way arising out of or relating to the contract, design, drawings, specifications, estimates, instructions, orders or to the conditions or otherwise concerning the works or regarding the execution or failure to execute the same whether arising during the progress of work or after the completion thereof as described

here in after shall be referred to the Chairman for sole arbitration by himself or by any officer appointed by him.

- (i) It will be no objection to any such appointment that the arbitrator is an employee of the Board or the Government, that he had to deal with the matter to which the contract relates and that in course of his duties as an employee of the Board or the Government, he had expressed views on all or any of the matters in dispute or of different. The arbitrator, who has been dealing with the arbitration case, being transferred or vacating his office or in the event of his death or being unable to act for any reason, the Chairman then holding the office shall arbitrate himself or appoint any officer to act as arbitrator.
- (ii) It is also a term of the contract that no person other than the Chairman himself or any officer appointed by him shall act as arbitrator.
- (iii) It is a term of the contract that only such question and disputes as were raised during progress of work till its completion and not thereafter shall be referred to arbitration. However, this would not apply to the questions and disputes relating to liabilities of parties during the guarantee period after completion of the work.
- (iv) It is a term of the contract that the party invoking arbitration shall give a list of disputes with amounts of claim in respect of each said disputes along with the notice seeking appointment of arbitrator.
- (v) It is also a term of the contract that if the contractor does not make any demand for appointment of arbitrator in respect of any claims/disputes in writing, as aforesaid, within 120 days of receiving the intimation from the Engineer-in-Charge that the final bill is ready for payment, the claim of the contractor shall be deemed to have been waived and absolutely barred and the Port Trust shall be discharged and released of all liabilities under the contract in respect of these claims.
- (vi) It is also a term of the contract that the arbitrator shall adjudicate only such disputes/claims as referred to him by the appointing authority and give separate award against each dispute/claim referred to him. The arbitrator will be bound to give claim wise detail and speaking award and it should be supported by reasoning.

- (vii) The award of the arbitrator shall be final, conclusive and binding on all the parties to the contract.
 - (viii) The arbitrator from time to time, with the consent of both the parties, enlarge the time for making and publishing the award.
 - (ix) Arbitration shall be conducted in accordance with the provision of Indian Arbitration Act, 1996 or any statutory modifications or re-enactment thereof and rules made there under and for the time being in force shall apply to the arbitration proceedings under this clause.
 - (x) It is also a term of the contract that if any fees are payable to the arbitrator, this shall be paid equally by both the parties.
 - (xi) It is also a term of the contract that the arbitration shall be deemed to have been entered on the reference on the date he issued the first notice to both the parties calling them to submit their statement of claims and counter statement of claims.
 - (xii) Venue of the arbitration shall be such place as may be fixed by the arbitrator at his sole discretion”.
- (5)** The tenderers are expected to have full knowledge of the site of work and local working conditions in the site/colony area before submitting the tenders. The Engineer-in-Charge will after issue of work order will give to the contractor possession of so much of the site as in the opinion of Engineer-in-Charge may be required to enable the contractor to commence and proceed with the construction of work and will from time to time as the works proceed give to the contractor possession of such portion of the site as may in the opinion of Engineer-in-Charge be required to enable the contractor to proceed with construction works without interruption of the work in accordance with the requirement. However, all efforts will be made to handover entire clear site at the time of starting of work. No claims/disputes about idling of power machineries and hot mix plant etc. what-so-ever for handing over the site of work late for starting the work shall be entertained.
- (6)** If the contractor suffers any delay the Engineer-in-Charge may grant at his discretion an extension of time for completion of work. However, no claims/disputes etc. arising out of extension of time so granted shall be entertained. The contractor while filling up their rates in the tender should consider the above aspects.
- (7)** The layout and levels of all structures etc. shall be made by the Contractor at his own cost from the nearby existing structures/facilities and bench mark reference pillar, as directed by the Engineer-in-Charge. He shall give all help with instruments,

materials, and men to the engineer-in-Charge for checking the detailed layout and correctness of the layout and level. The approval of the Engineer-in-Charge shall not be deemed to imply any warranty and shall not relieve the contractor of his sole responsibility in carrying out the work correctly.

- (8)** Workmanship shall be the best possible quality and all work shall be carried out by skilled workmen except for those which normally require unskilled persons. If the laws of the local Government/Municipal of other authority require the employment of licensed or registered workmen for various trades, the contractor shall arrange to have the work done by such licensed/registered personnel.
- (9)** If required before commencement of work the Engineer and the Contractor shall jointly survey and record all required ground levels on the site. The Contractor shall supply all necessary equipment and attendance for carrying out such surveys. The contractor shall prepare record drawings showing the agreed levels which shall be signed by the Engineer and the Contractor.
- (10)** All materials to be used in the works shall be subjected to inspection and test as per approved make list. Samples of all materials, proposed to be used, and in the permanent works shall be submitted to the Engineer-in-Charge for approval before those are brought to site. Samples required for approval and testing must be supplied allowing sufficient time for testing and approval, due allowance being made for the fact that if the first samples are rejected further samples shall be required. Delay in the execution of work due to late submission of samples will not be acceptable as -a reason for delay in the completion of the works.
- (11)** Materials shall be tested before dispatching to the site, where possible. Materials shall also be tested on the site and those may be rejected if found not suitable or not in accordance with the specifications notwithstanding the results of tests at the contractor's work or elsewhere or of test certificates or of any approval given earlier. Approved make list attached.
- (12)** The work shall be carried out in accordance with the best standards of workmanship and to entire satisfaction of Engineer-in-Charge.
- (13)** An order book is to be maintained by the contractor at the site of work and orders and instruction written in the order book shall be deemed to have been legally issued to the contractor and the contractor shall sign each entry in the order book as a token of having the seen the same. The order book shall be property of the Board and shall be handed over to the Engineer-in-Charge of the work in good condition after the completion of the work or whenever required by the Engineer-in-Charge.

- (14)** The contractor shall be required to execute the work in such a way so as not to cause any damage, hindrance or interference with port activities going on in the area or nearby. He should not also deposit the materials at such places which may cause inconvenience to the public and the work going on in the nearby area.
- (15)** The contractor shall have to make good all damages done by him to the structures nearby while executing the work and no extra payment shall be made to him on that account.
- (16)** All the materials required to be used in the work shall have to be got approved from the Engineer-in-Charge before use, before stacking at the site of work.
- (17)** For the purpose of measurements, the method prescribed in the 'Indian Standard' specifications shall be applicable in addition to those prescribed in Boards Schedule of Rates unless stated otherwise stated in contract. In case of any ambiguity the decision of the Engineer-in-charge shall be final.
- (18)** The notes and data furnished in Deendayal Port Authority, Schedule of Rates in force will be considered for measurement purpose in the case of lead, weight, allowance for voids etc. of the materials.
- (19)** All the labour acts, rules and regulations in force from time to time are to be followed by the contractor.
- (20)** The contractor shall have to obtain necessary license from the Assistant Labour Commissioner (Central) Gopalpuri in case he has to engage 10 or more workers on any day during the execution of work.
- (21)** Barricading, including proper lighting arrangement in the night at the required places shall have to be provided by the contractor at his own cost, including necessary arrangements for proper movement of traffic by carefully maintained approaches and road diversions with suitable sign boards for indications of road signs etc. as directed by the Engineer-in-Charge.
- (22)** Income tax deduction at applicable rates and surcharge as applicable there on shall be made while making the payment to the contractor for carrying out the work and only net amount shall paid as directed by the Central Board of the direct taxes, Ministry of Finance, Government of India.
- (23)** GST Registration should be invariably mentioned in the bid / tender, failing which the bid / tender will be treated as non-responsive and liable to be discharged.
- (24)** GST & PAN No. may be furnished with documentary evidence along with the Tender Documents.

- (25)** The rates quoted by the Contractor shall be exclusive of GST. The contractor shall quote prevailing GST rate separately which shall be reimbursed by DPA after ascertaining necessary compliance as per Goods & Service Tax – 2017. The contractor shall have valid GST registration number to be become eligible for participating in the bid. All other duties, taxes, cesses applicable if any, shall be borne by Contractor.
- (26)** All the work until handed over to the Engineer-in-Charge shall stand at the risk of the contractor who shall be responsible to make good at his own cost. All the losses and damage caused by or due to fires, weather, tides or any other reasons. Contractor shall hand over the work in good order and conditions and in conformity in every respect with the requirements of the contract. Each concrete road will be taken over for use on completion as per decision of Engineer-in-charge.
- (27)** All the grass, shrubs, plants and foreign matter etc. in the alignment of the site and within the site of work shall have to be cleared, if required without any extra cost.
- (28)** During the execution of work the contractor shall employ only such persons who are careful, perfectly skilled and experienced in his field of work. The Engineer- in-Charge shall be at liberty to object and ask the contractor to remove from the work any person employed by the contractor for execution of work, in the opinion of Engineer-in-Charge, misconducts or he is found negligence in the proper performance of his duties as such persons shall not be again employed on the work without permission of Engineer-in-Charge.
- (29)** All the precautions regarding the safety of the work shall have to be taken and the instruction of Engineer-in-charge in this respect shall have to be followed strictly.
- (30)** The Engineer-in-charge may delete any number of items included in his tender (contract) without assigning any reasons and without any financial liability.
- (31)** All the tools, plants, scaffolding, ladder etc. and other machinery etc. required temporary for the purpose of execution of work will have to be arranged by the contractor at his own cost, and storing of such tools, plants etc. will have to be made by him.
- (32)** The contractor has to make his own arrangement for the storage of materials at site or work.
- (33)** Unless otherwise specifically mentioned the rates quoted for all items includes for all lead and lift and no extra claims shall be entertained on this account.
- (34)** For execution of work, contractor has to construct temporary offices, store, labour room toilet etc. at his own cost. Nothing will be paid for these purpose and on completion of the work, before handing over the site contractor has to dismantle all

- these temporary structure erected by him. Completion certificate will be issued only after compliance of above aspect.
- (35)** The contractor shall have to obtain quarry permits from the office of the Geologist, Department of Geology and Mines, Bhuj-Kutch before quarrying any secondary materials like Quarry spall, crushed metal, sand, earth, murrum, rubble etc.
 - (36)** All the royalties of materials, quarry fees, octroi, wharfage charges, any taxes etc. are payable by the contractor directly to the authority concerned and the rates quoted shall be deemed to be inclusive of all such charges. Before claiming refund of Security Deposit, the contractor shall produce "No Dues Certificate" from the Geologist, Geology and Mining Department, Bhuj.
 - (37)** The working drawings of the proposed works shall be supplied to the contractor during the progress of works as and when found necessary by Engineer-in-charge and decision of Engineer-in-charge regarding requirement of detailed drawings shall be final and binding to the contractor and no claims/disputes what-so-ever regarding non-availability of drawings shall be entertained.
 - (38)** The contractor shall not deposit and store any materials in such a way so as not to cause inconvenience to the Port users and hindrance in the port activities.
 - (39)** Nothing extra shall be paid for change of quarry against lead etc.
 - (40)** Though the drawings to be supplied will be exhaustive the decision of the Engineer-in-charge regarding any change in the drawings shall be final and binding to contractor and no dispute / claim regarding extra payment shall be allowed on account of such changes.
 - (41)** The tenderer shall examine carefully the condition of contract, specifications and drawings etc. before submitting the tender. He shall also visit and inspect site of work and acquaint himself with all local condition in the cargo jetty of port, availability of construction materials and labourers nature of soil and working condition at and around the site before submitting the tender. No dispute/claims what-so-ever shall be entertained for the work of any nature arising out of local conditions.
 - (42)** If available, electric supply will be given by D.P.A., otherwise the contractor has to make his own arrangement for electric supply. The charges for electric supply consumption will be borne by contractor as per prevailing rates.
 - (43)** FORCE MAJURE: This will be restricted to acts of God only.

- (44) During the execution of works dewatering manually or by pumping is to be done by the contractor at his own cost, if found necessary and no claim on this account shall be entertained.
- (45) As per site condition the approach etc. will be required which the contractor shall provide & maintain at his own cost. Contractor shall consider these aspects while quoting the rates in tender. Nothing extra will be paid for the same.
- (46) NIL
- (47) FREE MAINTENANCE GUARANTEE PERIOD including defect works The scope of works also includes 24 months maintenance/guarantee period from the certified date of completion of works during this period the contractor shall be responsible to make good and remedy at his own expense any defect which may develop or may be notice for the work carried out by him or due to the reason attribute to him. The Engineer in charge shall give to contractor a notice in writing about the defect with remedial measure and the contractor shall make good the same within period specified in the notice. In case of failure on the part of contractor to carry out the instruction of Engineer in charge the Engineer may rectify, remove and re-execute the work at the risk and cost of the contractor. The Engineer in charge shall be entitled to appropriate the whole or any part of the amount of security deposit towards the expenses if any incurred by him in rectification, removal or re-execution. The contractor shall immediately recoup the amount so spend that any given time the security deposit shall be maintained as in the clause of contract. If the contractor fails to recoup the amount of security deposit than Engineer in charge shall be entitled to recover the amount spent over the amount security deposit.
- (48) All works within the scope of this Tender must be completed within a period of 24 months from the date of written order of the Engineer-in-charge to commence the work.
- (49) Deendayal Port reserves the right to accept or reject any or all the tender without assigning any reason what so ever.
- (50) SECURED ADVANCE:
- (a) Secured Advances on the security of materials brought to site and to be consumed within a period of 3 months may be made to the contractors for items which are to be used on work.
 - (b) Secured advance shall be granted only for non-perishable/ non- breakable items like steel, aluminium or steel frame works / doors /windows etc.
 - (c) The Executive Engineer can sanction the secured advance up to an amount not exceeding 75% of the value of the materials as assessed by the Engineer-in-

charge considering the bill invoice, or an amount not exceeding 75% of the material element cost in the tendered rate of the finished item of work, whichever is lower.

- (d) A formal agreement should be drawn up with the contractor under which Port Authority secures a lien on the materials and is safeguarded against losses due to the contractor postponing the execution of the work or due to shortage or misuse of the materials, and against the expense entailed for their proper watch and safe custody.
- (e) Payment of such advances should be made only on the certificate of an officer not below the rank of Assistant Engineer that; The quantities of materials for which the advances are made have actually been brought to site and stacked in proper and safe custody and measured.
- (f) Full quantities of the materials, for which advance is to be made, are required by the contractor for use on items of work for which rates for finished work have been agreed upon.
- (g) The quality of materials is as per the specifications.
- (h) Recovery of advances so made should not be postponed until the whole of the work entrusted to the contractor is completed. They should be made from his bills for work done as the materials are used. The necessary deductions being made whenever the items of work in which they are used are billed for.

- (51)** The contractor shall arrange to supply samples of coarse aggregate and fine aggregate etc. to the Port Laboratory for mix design for concreting works. Mixing of cement concrete works shall be on weigh batching basis as per approved design. For better workability contractor is free to use Plasticizers/Super plasticizer without any extra cost. Maximum free water cement ratio shall be 0.45 for M 30 grade, slump shall be as per the table below. The minimum cement content shall be as per IS 456-2000.

SR.NO.	TYPE OF STRUCTURE	SLUMP REQUIRED as per IS 456
1	Footing foundation	50
2	Columns, pillars, post etc.	75
3	Beams, lintel, plinth band etc.	75
4	Slab	50
5	Piles	--
6	Chajjas	75

7	Walls, pilasters, buttresses, railing, Balustrades	75
8	Stair	75
9	Domes	-
10	Fins	75
11	RCC Pavements	-

- (52)** It must be clearly understood that the rates quoted in the tender are to include for everything required to be done as per instructions for tendering, conditions of contract, specifications and drawings referred to therein and also for all such work as is necessary for the proper completion of the works although specifically mention thereof may not have been made in the tender schedule, specification or drawings, the rates are for works in-situ should be inclusive off all incidentals necessary for carrying out the “Works”.
- (53)** The Contract is liable to be cancelled in case either contractor himself or any of his employees if found to be Engineer of Gazetted rank of Government Officer, employee an Engineering Department of Government of India or Deendayal Port AUTHORITY within two years of retirement and do not process the permission from the concerned authority for working as contractor or his employee or his employee.
- (54)** The tenderers are not expected to make any post tender modifications. Hence, the tenderer should not make any correspondence regarding the tenders after submission of the same of due date and time. No cognizance of any correspondence shall be taken and if any tenderer persists with the same, necessary action will be initiated against him. All the tenders received on or before the due date & time shall be opened, if otherwise found in order.
- (55)** In the case of discrepancy between the schedule of quantities, the specification and / or the drawings, the following order of preference shall be observed: -
- i) Description of schedule of quantities.
 - ii) Particular specification and special condition, if any.
 - iii) Drawings.
 - iv) C.P.W.D. specifications.
 - v) Indian standard specifications of B.I.S.
- (56)** While evaluating the tender, due regard will be paid to national defence.

- (57) The cubes casted at site shall be brought to Port Laboratory, Deendayal for testing by the contractor at his own cost and test results shall conform to IS 456 (latest edition). Testing charges of the cubes for 28 days test only shall be borne by the contractor. If the result is not satisfactory the concrete work will have to be dismantled and redone by the contractor at his own cost.
- (58) The Engineer-in-charge reserves the right to ask the contractor to cast additional c.c. cubes at the different stages of works for testing, if required at 3/7 days period. No separate payment shall be made to the contractor on account of the cost of the labour and materials required for casting of the cubes required for 3/7 days testing. The testing charges for these cubes shall be borne by Department.
- (59) The Engineer-in-charge reserves the right to make necessary changes in the diameter of bars provided in the drawings and no claims what-so-ever on account of change in diameter of bars will be entertained.
- (60) The concrete work to be used for RCC works shall be made of the graded machine crushed trap stone metal, and it should be from approved quarry. Mechanical appliances such as concrete mixer, vibrator etc. shall be used for mixing, consolidation etc. of the concrete. The grade of concrete shall be as shown in respective drawings. Minimum Cement content for M30 shall be 360 kg/cum (Separate specifications for piling items are specified under pt. no. 159).
- (61) Concrete cover block with binding wire shall be used in all RCC works of standard size as directed by the Engineer-in-charge, c.c. Cover block should be well cured for at least seven days before use- No extra cement, labors, binding wire will be paid for casting of c.c. Cover block – No stones or kapchi has to be used instead of cover blocks.
- (62) Though the drawings to be supplied will be exhaustive the decision of the Engineer-in-charge regarding any change in the drawings shall be final and binding to contractor and no dispute / claim regarding extra payment shall be allowed on account of such changes.
- (63) The contractor has to provide sufficient barricades to site of work so that traffic plying nearby should not damage the recently concreted work. In case of any damage on account of above, the entire responsibility will remain with contractor and nothing extra will be paid on this account.
- (64) The stone metal 20 to 40 mm, 40 to 60mm, crush metal and sand shall be from approved quarries.

- (65) The mixing of concrete shall be done in a mixer of approved type which will ensure a uniform distribution of material throughout the mass so that mix is uniform in colour and homogenous.
- (66) Batching of all aggregates shall be done as per IS -383. All batching material such as coarse aggregates, sand etc. shall be weighed in weigh batchers conforming to I.S.2722 as per approved mix design.
- (67) In case of Nominal Mix of concrete volumetric batching can be adopted and only steel/wooden forms as of appropriate size shall be used for concreting.
- (68) The grading of sand shall be as per IS-2386 (Part-II) for concrete works, as per IS-2116-1980 for masonry works and as per IS-1542-1977 for plastering works.
- (69) The mixer shall be equipped with approved water measuring device capable of accurate measurement of water required per batch. The mixer shall preferably be equipped with a mechanically operated pump for filling the mixer tank or suitable arrangement as approved by Engineer-in-Charge.
- (70) The strength of concrete shall be determined by compressive strength test. For this purpose, during the progress of the work cube samples shall be cast for testing at 7 days and 28 days.
- (71) Stripping of Form work shall be done as per relevant clause in IS 456-2000. No dispute/claims shall be entertained on account of this.
- (72) On completion of RCC works, no persons shall be allowed to move on green concrete surface. As such contractor shall have to make a special arrangement for finishing the concrete in such a way so as not to disturb the green concrete.
- (73) The form work shall be jointed neatly and shall be set exactly to the required grade and alignment.
- (74) The form work shall be made up from either MS plate or water proof plywood of good quality. The rate shall include the cost of materials and labour for the operations involved such as:
- a. Splayed edges, notching allowances for over laps and passing at angles, battens, centering, shuttering, strutting, propping, bolting, nailing, wedging, easing, striking and stripping of the same.

- b. Filletting to form stop-chamfered edges or splayed external angles not exceeding 20 mm. width.
 - c. Dressing with oil to prevent adhesion of concrete with shuttering.
 - d. Raking or circular cutting.
- (75) All the form work shall be inspected by the Engineer-in-charge and their suitability ascertained the form shall be thoroughly scraped, cleaned before reusing the same.
- (76) Water used for mixing and curing shall be clear and free from injurious amount of oil, acids, alkalies, salts sugar, organic materials or other substances that maybe deleterious for concrete and steel shall be brought by the contractor. Nothing extra shall be paid on this account.
- (77) Unpurified potable water is generally considered suitable for mixing and curing. Mixing and curing with sea water shall not be permitted in any cost.
- (78) Periodically samples of water shall be tested as per IS-3025.
- (79) The Batching Plant shall comply the requirements laid down in the IS-4925 and its latest amendments.
- (80) The fly ash shall comply as per IS-3812(Part I,II,III) and its latest revision. In case of Volumetric batching if aggregates are moist then allowance shall be made for bulking of fine aggregates. Allowance for bulking shall be made as per IS-2386(part-3).
- (81) The Mixer Machine shall be as per IS 1791 and IS 12119.
- (82) The admixtures used in the concrete shall comply the requirements laid down in IS 9103 and its latest revision.
- (83) The mechanical Vibrator shall be as per IS 2505 for immersion vibrator, as per IS 2506 if Screed Board Vibrator and as per IS 4656 if Form Vibrator and its latest revision.
- (84) The welding of reinforcement shall be done as per Is 2751 and its latest revision.
- (85) The reinforcement bending and laying shall be done as per the requirements laid down in IS 2502 and its latest revision.

- (86) The joints in concrete should comply with IS 11817 and IS CODE: 3414 - 1968
- (87) The reinforcement in the RCC pipes shall be as per IS 548. The same shall be verified by breaking one pipe and collar from each lot of 100 pipes and collars or part thereof. The cost of same shall have to be borne by the contractor for the above inspection and clearance. The pipe shall be transported by the contractor at the site of work at his own cost. No cement and steel shall be supplied by Port Authority for casting of pipes.
- (88) Jungle cutting shall comprise uprooting of rank vegetation, grass, brushwood, shrubs, stumps, trees and spalings of girth up to 30 cm measured at a height of one meter above ground level. Where only clearance of grass is involved it shall be measured and paid for separately.
- (89) Pre-construction chemical treatments for the protection of building from attack of subterranean termites shall be done as per IS-6313(Part-II). Chemical treatment for the eradication and control of sub-terranean termites in existing buildings shall be done as per IS-6313(Part- III).(Guarantee period 10 years)
- (90) The Header Stone having length at about 3 times its height shall be used. This stone shall have star mark for easy identification and at least one bond stone or set of bond stones shall be provided for every 0.5 m² of the area of wall surface.
- (91) In all type of Stone masonry works face joints shall not be more than 20 mm in thick.
- (92) Compressive Strength of bricks for masonry work shall not be less then 7.5 N/mm² and Compressive Strength of stones for masonry work shall not be less than 400 Kg/cm².
- (93) Bricks shall be soaked in water before put into use for a period for the water to just penetrate the whole depth of the bricks.
- (94) Bricks shall be laid with frog up.
- (95) The average water absorption for the bricks shall not be more than 20% by weight of bricks and also the rating of efflorescence of bricks shall not more than moderate.
- (96) The thickness of all types of joints including brick wall joints and cross joints shall be such that four course and three joints taken consecutively shall measure as follows:
- (i) In case of modular bricks confirming to IS 1077-1986 equal to 39 cm.

- (ii) In case of non-modular bricks, it shall be equal to 31 cm.
- (97)** The cement concrete solid blocks, machine made required for the work, shall be got tested from the port laboratory as directed. The contractor shall make available the number of blocks so required for testing of solid blocks and the strength shall not be less than 40 kg/cm²
- (98)** Collapsible gates shall be of approved manufacturer and shall be fabricated from the mild steel sections.
- (99)** A.C. sheets shall be as per IS-459-1992 corrugated and semi corrugated asbestos cement sheets and G.I.Sheets shall be as per IS-277-1992 specification for galvanized steel sheets (plain and corrugated).
- (100)** Laying of A.C. sheets shall be as per IS-3007(Part-I&II) and its latest amendments.
- (101)** The self-finished felt used in water proofing treatment shall be for four course treatment (Hessian base felt) as per IS-1322, for five course treatment as per IS-1322(Fiber base felt) and for six course treatment as per IS-1322(hessian base Felt).(Guarantee Period 5 years).
- (102)** Bonding material used in the water proofing treatment shall be as per IS-702(if blown type petroleum bitumen) and as per IS-73 (If residual petroleum bitumen) is used.
- (103)** M.S.grills, gates etc. shall be scraped and cleaned before painting. No extra payments will be made for the same.
- (104)** Synthetic enamel paint of approved colour and shade shall be of Asian Paints Ltd., Berger paint, Nerolac or equivalent make, as approved by Engineer in charge.
- (105)** The leakage if any after the testing of joints of pipeline and fittings shall be made good by the contractor at his own cost. The contractor shall not refill the trenches before carrying out the testing of pipelines.
- (106)** The rates for laying and fixing of the pipelines, valves and other specials etc. Should include additional cuttings, threading of pipes etc. If required and no claim on this account will be entertained.

- (107)** If any road is required to be cut for laying water supply or drainage line that will be done by the Contractor at no extra cost and road should be restored to its original conditions after laying and testing of pipelines at no extra cost.
- (108)** The GI pipes wherever required to be used shall be of “B” class (medium) quality with ISI mark and approved by Engineer In charge.
- (109)** CI soil waste and vent pipes with ISI marks shall be used for work. Pipes should confirm to IS 1729.
- (110)** Unless otherwise specified rates quoted shall be for the work upto height 20 Mtrs. from ground level and nothing extra shall be payable on this account.
- (111)** The Kota stone required for flooring shall be of superior quality and shall have to be got approved from the Engineer In charge before stacking.
- (112)** Ceramic tiles shall be of first quality and in strict conformance to the relevant standards formulated by BIS with ISI marked.
- (113)** All CC flooring works are to be finished with neeru (cement slurry) without any extra cost. However, the bonafide use of cement used for the purpose shall be taken into consideration while calculating theoretical consumption of cement.
- (114)** The marble stone/Granite stone shall be used of approved quality and shade, the same shall be got approved from Engineer In charge before putting to use in work.
- (115)** Whenever the Kota stone/marble stone flooring are to be provided in treads of staircase, it should be provided in one piece with pre finished nosing and pre polished exposed surfaces and edges. Kota stone flooring or granite stone flooring to be provided on top of cooking platform shall be pre polished with pre finished nosing.
- (116)** Two coats of coal tar paint shall be applied on frames surfaces under contact with masonry/concrete before fixing the wooden frame in position without any extra cost.
- (117)** The teak wood to be used shall be of approved quality and shall be free from loose knots, cracks etc.
- (118)** The contractor shall produce for approval the samples of fittings for doors and windows before fixing.

- (119)** If the item specifies then the wood shall be chemically treated for anti-termite and kiln seasoned upto 10 to 12% moisture content. The contractor has to make arrangement for testing and seasoning to be done under the supervision of the Deendayal Port Authority.
- (120)** If Hard wood is to be provided in frames of doors, windows, jaffaries shall be as approved by Engineer In charge.
- (121)** Flush doors shall be of approved make and confirming to relevant IS.
- (122)** Hold fast shall be as per IS-7196.
- (123)** Hydraulic Door Closer shall be as per IS-3564 Specification for door closers(hydraulically regulated).
- (124)** The laminated sheet shall be of approved quality, shade i.e. Royal touch / kit ply or equivalent of 1 mm thick.
- (125)** Acrylic distemper will be of Asian Paint, Nerolac or equivalent make as approved by Engineer In charge.
- (126)** Payment of MS grills shall be made on actual weighment basis or theoretical calculation of sections whichever is less.
- (127)** All aluminum sections required shall be of Jindal,Premani or Equivalent standard make with anodizing thickness of 15 micron and test certificate for the same shall be submitted and shall be got approved from Engineer In charge before putting them into use.
- (128)** The fan hooks shall be bent to required shape and fixed in position before casting RCC work wherever required at no extra cost.
- (129)** All the fittings / fixtures shall be used of approved make and weight confirming to relevant ISI.
- (130)** The CP brass stop / angle cocks, bib cocks, pillar cocks wherever used shall be of approved make and size, shape and confirming to relevant IS Standards
- (131)** Gate / wheel valve shall be of ISI make.
- (132)** Mirror shall be of "Modi guard, Saint gobain or of equivalent make.
- (133)** W.C. seat & wash hand basin shall be of first quality confirming to relevant IS.

- (134) Nahani trap should be of standard brand confirming to relevant and its latest amendment with proper water seal and same shall be got approved by the Engineer In charge.
- (135) Gun metal wheel / gate shall be of approved brand and weight as per relevant IS code and with ISI mark.
- (136) Gully trap shall be confirming to relevant IS and shall have to be got approved by Engineer In charge.
- (137) The tendered rates shall include the cost of cutting holes in walls, floors, RCC slabs etc. wherever required and making good the same for which nothing extra shall be paid.
- (138) Exposed brick work cladding with 10 mm grove shall be carried out with Natural brick (220mm x 70mm x 20mm) ,Product Code REC-711 of Radhe Krishna Brick brand with adhesive for cladding of WEBER brand Grade C2TE or as per direction of Engineer In Charge.
- (139) Brick flooring shall be carried out with brick of Product Code- REB 91 Size 220 x 100x 35 of Radhe Krishna Brick or as per direction of Engineer In Charge.

Note : items and material specification for the above mentioned point no. 56 to 140 may be change/increase/decrease as per the direction of Engineer. If any material and items not mentioned, it may be executed as per direction of Engineer In – Charge.

(140)

Deployment of Key-Personnel

SN	Description	Qty
1	Project Manager(Technical)	1
2	Quality control Engineer	1
3	Execution Engineer/Supervisor(2 civil & 1 electrical)	3
4	Safety Supervisor	1
5	Planning & Billing engineer	1
6	MEP engineer	1

(141) BILLS TO BE SUBMITTED MONTHLY

A Bill shall be submitted by the contractor each month on or before the date fixed by the Engineer-in-charge for all works executed in the previous month, and the Engineer-in-charge shall take or cause to taken the requisite measurement for the purpose of having the same verified, and the claim, as far as admissible, adjusted as far as possible, before the expiry of ten days from the presentation of the bill. If the contractor does not submit the bill within the time fixed as aforesaid, the Engineer-in-charge may depute within seven days of the date fixed as aforesaid, subordinate to measure up the said work in the presence of the contractor whose counter signature to the measurement list will be sufficient warrant, and the Engineer- in-charge may prepare a bill from such list.

(142) Contractor to be given a week to file objections to the measurements recorded by the Department.

Before taking measurement of any work as has referred to in Clause 6,7, and 8 hereof, the Engineer-in-charge or a subordinate deputed by him shall give reasonable notice to the contractor if the contractor fails to attend at the measurements after such notice of fails to countersign or to record the difference within a week from the date of measurement in the manner required by the Engineer-in-charge then in any such event the measurement taken by the Engineer-in-charge or by the subordinate deputed by him as the case maybe shall final and binding on the contractor and the contractor shall have no right to dispute the same

(143) BILLS TO BE ON PRINTED FORMS

The contractor shall submit all bill on the printed forms to be had on application at the office of the Engineer-in-charge and the charges in the bills shall always be entered at the rates specified in the tender or in the case of any extra work ordered in purpose of these conditions and not mentioned or provided for in the tender at the rates hereinafter provided for such work.

(144) PAYMENT OF CONTRACTOR'S BILL TO BANK

Payments due to the contractor may, if so desired by him be made to his bank instead of direct to him, provided that the contractor furnishes to the Engineer- in-charge (1) an authorisation in the form of a legally valid document such as a power of attorney conferring authority on the bank to receive payment and (2) his own acceptance of the correctness of the account made out as being due to him by the Board or his signature on the bill or other claim, preferred against the Board before settlement by the Engineer-in-charge of the account or claim by payment to the bank, while the receipt given by such bank shall constitute a full and sufficient discharge for the payment the contractor should, wherever possible, present his bills duly receipted and discharged through his bankers. Nothing herein contained shall operate to create in favour of the any rights of equities vis-à-vis the Board.

(145) NIL.

(146) Insurance of equipment's

- (1) The contractor shall insure, at his cost, the plant and machinery for which mobilization advance is sought and given, for a sum sufficient to provide for their replacement at site.
- (2) Any amount that is not recovered from the insurers shall be borne by the contractor.

(147) Construction of Site Offices and QA Labs

Site offices shall be constructed by the contractor to facilitate working at site and to provide necessary facilities for maintenance of site records, drawings, plans, approved samples, codes and specifications, copy of agreement and detailed estimate etc.

In some contracts a provision is kept for construction of site office for client and facility of conference room etc to conduct review meetings and coordination meetings etc at site.

Along with site office the QA Lab need to be established for immediate testing of materials and design mix of concrete, soil parameters etc. if required, as directed by the E-I-C. This would depend on the nature of work and should be considered in the tender for works costing more than 2 crores, in which it would be necessary.

The tests should be carried out in the presence of JE & AXEN/AEN and test checked by the E-I-C.

(148) Payment of Final Bill

Final bill of all works shall be paid as per DPA's citizens' charter. In case contractor fails to submit the final bill within 2 months of completion of work, the process of final bill should be initiated by the E-I-C suo-moto to thwart the efforts of contractor to delay the preparation of final bill which in all probability may be in the minus. Similarly, E-I-C should not delay recoveries for any overpayments detected/ the recoveries being disputed by the contractor on the plea that contractor has gone to Arbitration.

(149) NIL

(150) Removal of rejected/sub-standard materials

- (a) Whenever any material brought by the contractor to the site of work is rejected, entry thereof should invariably be made in the Site Order Book under the signature of the Assistant Engineer, giving the approximate quantity of such materials.
- (b) As soon as the material is removed, a certificate to that effect shall be recorded by the JE/AE against the original entry, giving the date of removal and mode of removal, including the registration number of the truck and a copy of gate pass wherever applicable.

(151) Deviation in quantities

Normally deviation means deviation in quantities of agreement items, i.e. where there is increase or decrease in the quantities of items of work specified in the agreement.

Rates for such deviated items shall be calculated strictly as per the provision of agreement clauses.

(152) Deriving the Market rates :

As per provisions of variation clauses sometimes rates are to be determined based on market rates in certain conditions. In such cases the contractor within 14 days of receipt of order for execution of deviated quantities, extra or substituted items beyond permissible

limits and before the commencement of such work shall give notice, for revision of rates, supported by proper analysis, for such quantities. Engineer-in-Charge shall consider the analysis submitted by contractor and determine the rates on basis of market rates.

Further in case market rates are less than the agreement rates then in such a case Engineer-in-Charge should give notice to the contractor within one month of occurrence of the excess and should decide the rates based on market rates considering the reply of contractor.

The analysis of rates on market rates should be on similar lines as adopted in the justification of tender except that market rates of material/ labour, hire charges of plant and machinery intended to be used prevailing at the time of such order or occurrence shall be adopted. Over and above the market rates so arrived 10% would be added for overheads and profit of the contractor.

(153) DPA shall engage the third party Inspection agency for quality assurance separately. The Contractor has to co-operate to the Third Party Inspection agency representative in his duties related to this work. The Execution of the work shall be subject to third party inspection by the agency engaged by DPA. The contractor is required to comply the observations, queries of the agency and any cost incurred from this purpose shall be the responsibility of the contractor.

(154) Prospective bidders may raise query relating to bidding condition, bidding process and / or rejection of its bidding for rejecting a tender or non-issuing a tender to prospective bidder will be disclosed where written enquiries are made by the concerned bidder.

(155) Tenders with any condition, including conditional rebates, shall be rejected. However, tenders with unconditional rebate will be acceptable.

(156) INTEGRITY PACT

“Note : The bidder has to execute Integrity Pact agreement with Deendayal Part Authority (as per Bid Response Sheet No. 10 and Shri Amiya Kumar Mohapara, IFoS, (Retd.) and Dr. Gopal Dhawan, Ex-CMD, MECL have been appointed by DPA as Independent External Monitors and whose address are as under :-

Shri Amiya Kumar Mohapara, IFoS, (Retd.) Qrs. No 5/9, Unit-9, Bhoi Nagar, Bhubaneswar-751 022, Mobile No 9437002530 email: amiyaifs@gmail.com	Dr. Gopal Dhawan, Ex-CMD, MECL House NO 120, Jal Shakti Vihar (NHPC Society) P4, Builders Area, Greate Noida Gutam Budh Nagar, Uttar Pradesh- 201 315 email: gdhawangeologist@gmail.com
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(157) Scanned copy of pre-contract Integrity Agreement (as per Appendix enclosed) is to be uploaded along with the bid. Original hard copy of Pre Contract Integrity Pact Agreement shall be submitted by post or hand immediately after closing date of online E-tender failing which tender shall be considered irrelevant.

(158) While evaluating tenders, regard would be paid to National Defence Security consideration.

(159) SPECIFICATIONS OF NON-SOR ITEMS

Empty boring

Carrying out empty boring from existing ground level till bottom of Pile cap level as specified or as the case may be. The scope also includes filling of soil / sand after completion of the pile concreting from safety point of view. The rate includes deputing all machineries, labour and necessary safety precautions at site. 750mm & 450 mm dia.

BORED PILES

Providing & construction of cast in situ RCC bored piles of specified diameters in M 30 concrete grade as shown in the structural drawings using rotary drilling rigs. Scope includes setting out cardinal points, boring in over burden through all stratas including dewatering, chiselling through obstacles like boulders, weathered rock, soft rock, providing temporary steel casing sunk to the required depth through all strata except hard rock & stabilizing the bore wall portion by using polymer slurry including flushing out the same by pumps of adequate capacity, removing all slush to locations approved, irrespective of lead as directed, lowering the reinforcement cage, welding of new bars of specified dia with stitch weld &/or lap weld in accordance with the structural drawing, as per enclosed technical specification &

directions and concreting with ready mix concrete of using tremie arrangements, compaction of concrete etc. complete. Pile length will be calculated from cut off level upto founding level. Normal concrete overflow (approx. height 600 mm) shall not be paid extra & contractor shall consider it in the concreting rate. Mix design to be submitted to the consultants for approval. Minimum cementitious content shall be as per relevant IS Code including use of plasticizers & other additives at no extra cost. Reinforcement shall be measured & paid separately. For calculation purpose length of concreted pile is considered as including Socketing length. 750mm & 450mm dia.

PILE TESTS

Carrying out static initial Pile load tests by anchor reaction method as per IS : 2911 – Part – 4 with carrying out necessary calibrated measuring devices like load / pressure gauge, hydraulic jack ,dial gauges and magnetic stands submitting of test report with proper presentation. Test Load : 127.75 & 52.5 MT. No extra payment shall be made for the test set up, measuring deflections and submission of report as per specifications and tender drawings. This includes making the pile head ready for testing at the desired level, supporting/reaction arrangement. Pile and the anchor piles shall be paid separately in relevant BOQ item.

- Carrying out static Routine Pile load tests by anchor reaction method as per IS : 2911 – Part – 4 with carrying out necessary calibrated measuring devices like load / pressure gauge, hydraulic jack ,dial gauges and magnetic stands submitting of test report with proper presentation. Test Load: 76.35 MT. No extra payment shall be made for the test set up, measuring deflections and submission of report as per specifications and tender drawings. This includes making the pile head ready for testing at the desired level, supporting/reaction arrangement. Pile and the anchor piles shall be paid separately in relevant BOQ item.
- Carrying out Static initial Pull-out Pile load test for Test Load: 40.25 & 2.2 MT IS 2770 by either cantilever or fulcrum loading as may be approved by the Engineer, applying series of downward loads and incremental loads up to the design load. The quantum and nature of test loading will be as approved by the Engineer. No extra payment shall be made for the test set up and submission of report as per specifications and tender drawings. The rate includes deputed machineries and labour for the tests.
- Carrying out Static Routine Pull-out Pile load test for Test Load: 13.2 & 24.15 MT IS 2770 by either cantilever or fulcrum loading as may be approved by the Engineer, applying series of downward loads and incremental loads up to the design load. The quantum and nature of test loading will be as approved by the Engineer. No extra payment shall be made for the test set up and submission of report as per specifications and tender drawings. The rate includes deputed machineries and labour for the tests.
- Carrying out Static Initial Lateral Pile Load Test for Test Load- 13.6 & 3.75 MT as per IS 2911 with carrying out necessary calibrated measuring devices like load / pressure gauge, hydraulic

jack ,dial gauges and magnetic stands submitting of test report with proper presentation. No extra payment shall be made for the test set up, measuring deflections and submission of report as per specifications and tender drawings. The rates are inclusive of preparation of surface for the test.

- Carrying out Static Routine Lateral Pile Load Test Load: 1.5 & 5.2 MT as per IS 2911 with carrying out necessary calibrated measuring devices like load / pressure gauge, hydraulic jack ,dial gauges and magnetic stands submitting of test report with proper presentation. No extra payment shall be made for the test set up, measuring deflections and submission of report as per specifications and tender drawings. The rates are inclusive of preparation of surface for the test.
- Carrying out Dynamic Load Test on Initial Piles-76.35 & 31.5 MT
Conducting Initial load test on single specified each dia cast-in-situ RCC pile as specified in IS code including cost of all necessary excavation, backfilling, equipment / labour, chipping and pile preparation to the complete satisfaction of the Consultant and in accordance to IS: 2911 1985 Load Test on Piles (First revision) (Part IV)
- Dynamic Load Test on Routine Piles -31.5 MT
Conducting Initial load test on single specified each dia cast-in-situ RCC pile as specified in IS code including cost of all necessary excavation, backfilling, equipment / labour, chipping and pile preparation to the complete satisfaction of the Consultant and in accordance to IS: 2911 1985 Load Test on Piles (First revision) (Part IV)
- Installation of a minimum of three sonic logging tubes into the piles before the concreting process and shall extend 0.5m above the pile head and 0.5m above the pile toe. The test generally uses PVC / steel tubes of diameters ranging 50 mm. The tubes are tied to the inside of the rebar cage. Once they are installed, they are filled with water. After all testing has been completed, and after acceptance of the drilled shaft by the Engineer, remove the water in the tubes, place grout tubes extending to the bottom of the access tube, and fill all access tubes in the drilled shafts with grout.
- Carrying out Integrity testing of Pile using Low Strain/ Sonic Integrity Test/ Sonic Echo Test method in accordance with IS 14893 including surface preparation of pile top by removing soil, mud, dust & chipping lean concrete lumps etc. and use of computerised equipment and high skill trained personal for conducting the test & submission of results, all complete as per direction of Engineer.
Note :- The inclusion of the above item in the schedule of work shall be judiciously decided by the technical sanctioning authority, keeping in view the quality control, type of soil strata & importance of the project. (On 100% pile).

SPECIFICATIONS

(A) BUILDING PILES

1.0 GENERAL

This Specification is to be read in conjunction with the condition of contracts, bills of quantities, structural drawings and relevant I.S. Codes. Where works are ordered to be performed by the Contractor, but or not specified in the Specification, the Contractor, must carry them out with full diligence and expenditure as are expected for works of that nature.

2.0 I.S. Codes.

The Bureau of Indian Standards of the following relevant codes to be referred for various aspects of Pile Foundation Works.

IS: 2911 Code of practice for Design & Construction of Pile Foundations

IS: 2911 Cast-in-situ Concrete piles (Part I /Sect 1)

IS: 2911-1984 Concrete piles Section 4 (Part I /Sect 4) Bored pre-cast concrete piles

IS: 2911:1985 Load Test on Piles (First revision) (Part IV)

IS:1200 Method of measurement of Piling (Part XXIII)

IS: 456:2000 Code of Practice for Plain & reinforced concrete

IS: 269 Specification for Ordinary Portland cement

3.0 SCOPE OF WORKS

3.1 The contract comprises the provision of all labour, materials, tools and plants etc necessary for the following work:

a. Pilling

i) Installation and construction of cast in situ 750mm RCC piles & satisfactory testing of for specified load capacity provided for the proposed project.

ii) Stripping of pile to required cut off level for construction of pile caps.

iii) Conducting Integrity, Initial & Dynamic test on piles and works piles as specified.

b. Provide necessary temporary drains, sumps etc. to keep the site dry.

c. Any other incidental works whether of a temporary or permanent nature for the satisfactory completion of the contract.

3.2 The Contractor shall check the existing site condition including levels, drainage presence of obstacles such as foundation, tree stumps, etc and shall allow in his rate for completing the work as intended, no claims what so ever in respect of any discrepancies shall be entertained.

4.0 SUBSOIL DATA

4.1 A soil investigation report prepared by a soil specialist consultant is included in the tender documents only for information to tenderers. However, the data is supplied only as a guide to the tenderer to show the approximate nature of the ground conditions, as the Engineer knows it. It shall be deemed that the Employer and the Engineer shall not be held liable for the accuracy of the data given.

4.2 The tenderer may, if he wishes, carry out his own soil investigation at his own expense with the Engineer's prior approval in writing.

5.0 SITE ACCESS

5.1 The Contractor shall be responsible for obtaining approvals for the temporary access etc., from the authorities concerned and shall maintain the access and the portion of public road and walkway connected in clean and safe state at all times.

6.0 MATERIALS

6.1 CEMENT

Cement shall be of OPC type 53grade/43grade. The cement used shall be of approved manufacturer and the source of supply shall not be changed without approval of Client.

6.2 FINE AGGREGATE (SAND)

Sand shall be from natural source or crushed stone screenings confirming to the requirements of IS 383 for grading I to III. Sand shall be chemically inert, clean, free of shale, free of pebbles greater than 4.75micron, free of salt organic matter, free of loan mica or other deleterious matter. Some percentages of all deleterious substances shall be to acceptable limits as per IS 383. Silt content of sand should not be more than 7% if tested by volumetric analysis.

The fine aggregates for concrete may be combination of natural and crushed sand. The fineness modulus of fine aggregates shall range between 2.6 to 3.2. The fine aggregate shall be stacked carefully on a clean hard dry surface so that it will not get mixed up with deleterious foreign materials. If such a surface is not available a platform of a plank or corrugated iron sheet or small layer of lean concrete shall be prepared.

6.3 COARSE AGGREGATE

Shall consists of crushed or broken stone of 95% of which shall be retained on 4.75mm IS test sieve. The grading and physical properties of coarse aggregates shall confirm to the IS 383 requirements for single size or graded size. It shall be obtained from crushing Granite, Quartzite, Trap, Basalts, or similar approved stones from approved quarry. Coarse aggregate shall be chemically inert when mixed with cement and shall be cubical in shape and free from soft, friable, thin porous, laminated or flaky piece. It shall be free from dust and any other foreign matter.

Gravel/ shingle of desired grading may be permitted as a substitute in part or full in plain cement concrete if the employer is otherwise satisfied about the quality of aggregate. For all R.C.C. works the size of coarse aggregate shall be 20mm and down grade.

The proportions of fine and coarse aggregates according to their sieve analysis shall be designed such that "All in aggregate curve "plotted, shall meet the grading requirements for 20mm maximum size of aggregates as per IS 383.

6.4 WATER

Water free of dirt, chemicals, organic materials and confirming to the requirement of clause No: 5.4 of IS 456 shall be used for production and curing of the concrete mix.

Sample of water collected from the source shall be tested prior to approval and periodically during usage. Sea water shall not be used for concrete production or in curing.

6.5 REINFORCEMENT

(i) All mild steel bars shall conform to I.S 432 & high yield strength deformed bars shall conform to IS 1786. Reinforcement shall be Fe 500/500D grade. In case of documentary proof of non-availability of 500/550 D in the market, 550 D steel can be used with prior approval of Engineer in charge subject to the condition that it satisfies the design. All finished bar shall be free from cracks, surface flaws, laminations, and jagged and imperfect edges.

Reinforcement shall be cut and fabricated as per the Consulting Engineers drawing using 18G binding wire.

(iii) The main reinforcement bars shall be in one piece but if this length exceeds the commercially available lengths then the overlapping equal to 60 times diameter of the bar shall be provided.

(iv) Providing spiral stirrups to hold the longitudinal reinforcement in the piles. At the end of the spiral the text spiral shall overlap by two rounds and the spirals shall be alternatively, left handed and right handed.

(v) All reinforcement shall be provided with proper specified cover. Providing precast concrete circular disc shaped cover blocks with a hole in the center shall ensure this cover. These shall be threaded on to the spiral stirrups.

(vi) The assembly of the fabricated reinforcement of the piles into a cage shall be carried out on a level platform so as to maintain its linearity in the longitudinal direction. The entire assembly shall be rigid and stable during handling and placing.

(vi) The assembled cage of the reinforcement shall be carefully lowered into the borehole by a crane or a hoist so that no muck or soil or other impurities fall into the borehole.

6.6 USE OF POLYMER SLURRY (IF APPLICABLE).

Polymer Slurry as approved by Engineer In Charge shall only be used. Use of Bentonite Slurry is strictly prohibited. The polymer slurry shall confirm to the following specifications.

Property	In hole at the time of test concreting	Method
Density (Kg per Cum)	1025 (Max)	Density Balance API 13B-1(2), Section 1
Viscosity (Seconds per litre)	34-143	Marsh Funnel AP 13B-1(2), Section 2.2
pH	8-11	pH paper or meter
Sand Content in %	1.0 Max	API 13B-1(2), Section 5

Density value shown in for fresh water. Increase density values by 2 pounds per cu ft (23 kg/CUM) for salt water.

Perform test when slurry temperature is above 40 F (4.5 degree Celsius)

American Petroleum Institute API 13B-1, recommended practice for field testing water based drilling fluids.

7.0 SETTING OUT

The Contractor shall be responsible for setting out the positions and levels of each pile from some give baselines and datum levels on the site agreed by the Engineer, and shall be responsible for the accuracy of the setting out. He shall employ a licensed surveyor or the Engineer to do the work

8.0 SYSTEM OF PILED FOUNDATIONS

8.1 Boring Cast-in –Situ part Pile foundation using rotary drilling method has been recommended for the proposed building. Pile layout, pile size and capacity are shown in the drawing provided.

8.2 EQUIPMENT AND ACCESSORIES

Boring operations shall be undertaken using rotary drillings rigs to bring the cuttings out. The size of the boring / cutting tool should not be less than the diameter of the pile by the more than 75mm.

8.3 CONCRETE

Concrete shall be of M 30 grade. The water cement ratio of concrete shall be as per the approved mix design and the slump of the concrete used shall be 150 mm to 175mm for ensuring easy flow through tremie pipe used in concreting. For desired workability approved super-plasticizer may be used. Field trial should be conducted to determine the optimum dosage rate to achieve the desired results. Admixture shall be confirming to all requirements specified in IS 9103.

All lots of admixture shall be tested for uniformity as per Table 2 of IS 9103 during supply by vendor and the MTC will be reviewed by QA/QC cell before utilization in works. W/C ratio shall be continuously checked during mixing and under no circumstances additional water shall be added at mixer point or during transit.

The minimum cementitious content inclusive of any mineral admixtures for concrete shall not be less than 400 kg/cum.

Concrete mix shall be designed for target strength as prescribed in IS 456. Concrete Mix Design shall be carried out in accordance with IS 456 recommendations. The acceptance criteria of compressive strength of cubes shall be as per IS 456 requirements.

The total chloride content of all constituents of concrete as a percentage of mass of cement in mix shall be limited to value 0.2% maximum. The total sulphuric anhydride (SO₃) content of all the constituents of concrete as a percentage of mass of cement in the mix shall be limited to 4%.

9.0 BRIEF METHODOLOGY (CAST IN SITU BORED PILES BY ROTARY DRILLING METHOD)

1. Setting the rig & carry out initial boring of required depth & of required pile dia using Rotary rig then lower a removable bottom casing.
2. Progress the bore further using rotary rig.

3. Complete the bore (boring in soil or drilling in rock).
4. On completion of the bore to desired depth, withdraw the rig.
5. Lower the steel cage into the bore.
6. Lower the tremie pipe extending up to the bottom of the bore & flush the bore with water.
7. On completion of flushing the bore, concrete may be started by tremie operation & complete the pile up to desired cut off level in one go.

10. TREMIE METHOD OF CONCRETING

In addition to the normal precautions to be taken in tremie concreting, the following requirements are particularly applicable to the use of tremie concrete in pipes.

- The concrete should be coherent, rich in cement and of slump not less than 150mm
- When concreting is carried out under water a temporary casing should be installed to the full depth of the borehole or 2 m into non-collapsible stratum, to avoid ground soil / fragments of rock dropping from the sides into the concrete as it is being placed.
- The temporary casing may not be required except near the top when concreting under drilling mud.
- The hopper and tremie should be a closed system embedded in the placed concrete through which water cannot pass.
- The tremie should be large enough with due regard to the size of aggregate. For the 20mm aggregate the tremie pipe should be of diameter not less than 200mm, aggregate more than 20mm should not be used.
- The first charge of concrete should be placed with a push to prevent mixing of concrete and sub soil water.
- The tremie pipe should always penetrate into the concrete with an adequate margin if safety against accidental withdrawal of the pipe is surged to discharge concrete.
- The pile should be concreted wholly by tremie and the method of deposition should not be changed part way up the pile, to prevent the laitance from being entrapped within the pile.
- All tremie tubes should be scrupulously cleaned after use. Normally concreting of the piles should be uninterrupted. In the exceptional case of interruption of concreting for an hour or so the tremie shall not be taken out of the concrete. Instead, it shall be raised and lowered slowly, from time to time to prevent the concrete around the tremie from settling. Concreting should be resumed by introducing a little richer concrete with a slump of about 20mm for easy displacement of the partly set concrete.
- If the concreting cannot be resumed before final set up concrete already placed, the pile so cast may be rejected or accepted with modification.
- In case of withdrawal of tremie out of the concrete, either accidentally or to remove a choke in the tremie, the tremie may be re-introduced in the following manner to prevent impregnation of laitance or scum laying on the top of the concrete already deposited in the above.
- The tremie shall be gently lowered on to the old concrete with very little penetration initially. A vermiculate plug should be introduced in the tremie. Fresh concrete of slump between 150mm and 175mm should be filled in the tremie, which will push the plug forward and will emerge out of the tremie displacing the laitance/ scum. The

tremie will be pushed further in steps making fresh concrete sweep away laitance/scum in its way.

- When tremie is buried by about 60 to 100cm, concreting may be resumed.
- During installation of bored cast-in-situ piles, the convenience of installation may be taken into account while determining the sequence of piling in a group.
- The top of concrete in a pile shall be brought above cut off level to permit removal of all laitance and weak concrete before capping and to ensure good concrete at the cut off level of proper embedment into the pile cap.
- Where cut off level is less than 1.5meter below the working level, concrete shall be cast to a minimum of 300mm above cut off level. For each additional 300mm increase in cut off level below the working level additional coverage of 50mm minimum shall be allowed.
- Higher allowance may be necessary depending on the length of pile. When concrete is placed by tremie method, concrete shall be cast of the piling platform level to permit overflow of concrete for visual inspection or to minimum of ground water level the need to maintain a pressure on the unset concrete equal to or greater than water pressure should be observed and accordingly length of extra concrete above cut off level shall be determined.

DEFECTIVE PILE

In case of doubt about some specific piles during concreting if actual concrete consumption is less than the theoretical or piles not satisfying the integrity or dynamic pile tests these piles, after consulting with the structural engineer may be discarded (not used for load transfer but left in its place as it is). Additional pile shall be provided (without affecting performance of the adjacent piles or the cap) around the defective piles as per structural engineer's drawings.

Any deviation from the designed location/ alignment or load capacity of any pile shall be noted and adequate measures taken well before the concreting of the pile cap and plinth beam if the deviation are beyond the permissible limit.

During chipping of the pile top manual chipping may be permitted after three days of pile casting; pneumatic tools for chipping shall not be used before seven days after pile casting.

After concreting the actual quantity of concrete shall be compared with the average obtained from observations actually made in the case of a few piles initially cast. If the actual quantity is found to be considerably less, special investigations shall be conducted and appropriate measures taken.

12. UNDERGROUND SERVICES

12.0 The Contractor will be responsible for any claim for damage to all underground services, adjacent property etc. arising from the piling operations.

12.1 The Contractor shall carry out the work so that any adjacent buildings or building foundation are not disturbed or damaged.

13. TOLERANCE

- a. The maximum permissible deviation of the center of each finished pile in a group from the correct center point as approved by the Engineer is 75mm in any direction. Allowable deviation of the center of pile for any single pile or single line of piles carrying structural load shall not be more than 40mm laterally from its correct position.
- b. The verticality of each pile shall not deviate at any point below the ground by more than 1 in 100 from the true vertical position.
- c. The contractor shall bear the cost of any additional work, which in the opinion of the engineer, is necessary due to any pile being installed in a position not within this tolerance.

14. TENDERER TO ACQUAINT HIMSELF WITH THE SITE OF WORK

- a. Before tendering, the tenderers shall be deemed to have visited the site to acquaint themselves with the existing site conditions, means of access, nature and proximity of adjacent properties and other matter liable to affect their tenders. No extra payment will be entertained at a later date due to the tenderer's failure to allow for contingencies arising out of the work and the nature of existing site conditions.
- b. The system of piling as proposed by the tenderer shall be deemed to be suitable and safe for use at the proposed site of work. The successful tenderer shall insure and indemnify the Employer in respect of all claims by third parties, injury to workman of public damage to vehicles or any property real or personal arising out of this contract.

15. ADJACENT PILES

Piles shall be driven in such a manner as to ensure that no damage and minimum disturbance is caused to previously driven piles in adjacent positions.

16.0 CLEANING UP

The contractor shall provide all frames, equipment, lifting devices and labour necessary for the driving of piles.

17.0 EQUIPMENT AND LABOUR

17.1 The Contractor shall provide all frames, equipment, lifting devices and labour necessary for the driving of piles.

17.2 Before the commencement of works, the Contractor shall submit to the Engineer full details of his working programme, including the number and type of frames and hammers, which he intends to use.

17.3 The Engineer shall order the removal or replacement of any equipment or staff whenever he thinks that such equipment and staff are not suitable for the works.

18.0 RECORDING DATA

A competent inspector shall be maintained at site to record necessary information during installation of piles and the data to be recorded shall include:

- ☐ Sequence of installation of piles in a group
- ☐ Dimensions of the piles, including the reinforcement details and mark of the pile
- ☐ Depth bored
- ☐ Time taken for the concreting
- ☐ Cut off level/ working level
- ☐ When drilling mud is used, the specific gravity of the fresh supply and contaminated mud in the hole before concreting is taken up, shall be recorded in case of first ten piles and subsequently at an approximate interval of 10 piles or earlier and
- ☐ Any other important observation.

19.0 LOAD TESTS:

It is important that testing of piles shall be undertaken under the supervision & guidance of an expert agency in the pile load testing field.

DYNAMIC LOAD TEST:

Conducting Initial load test on single specified each dia cast-in-situ RCC pile as specified in IS code including cost of all necessary excavation, backfilling, equipment / labour, chipping and pile preparation to the complete satisfaction of the Consultant and in accordance to IS: 2911 1985 Load Test on Piles (First revision) (Part IV)

19.1 DYNAMIC LOAD TEST:

Dynamic load test shall be carried out for specified no of piles. The applied load shall be 2.5 times the working capacity of a pile as specified by the structural engineer.

19.2.1 METHOD OF LOADING TESTS

(a) The test load may be applied in one of the following ways:

- i. By means of a jack which obtains its reaction from Kentledge heavier than the required test load, placed on a platform supported well clear of the test pile.
- ii. By means of a jack, this obtains its reaction from the piles.

(b) If Method (i) is used, load shall be applied by direct loading on the pile with Kentledge. The Kent ledge may consist of concrete blocks, metal ingots etc, but must be of uniform sizes, So that the weight can be easily calculated. Pile cap or other structural construction for load test if necessitated by the test method proposed by the contractor shall be designed and built by the contractor, and to the approval of the Engineer. The cost of building and demolishing such pile caps and structural constructions shall be borne by the Contractor.

(c) When using method (ii), the center of any tension pile or anchor shall be at a distance of at least 3 test pile diameters from the test pile center and the distance shall be in no case less than 2m. This distance may be varied by the Engineer to suit site condition at no additional cost. Method (i) is preferred. Method (ii) is permitted only when Method (i) proves impractical.

(d) All loading and unloading operation shall take place during the day. During waiting periods at various load stages, all readings shall be recorded at maximum 4- hour interval, except for the first few hours after loading or unloading, when reading shall be taken at closer interval say at 0, 1,2,5,10,15 and 30 minutes after increment is applied.

(e) Pressure gauge reading shall be recorded at each increment.

(f) If large discrepancies occur between different measurements systems, the test shall be halted and the cause for the discrepancy corrected. The test shall be restarted in such an instance.

(g) The entire test area must be sheltered from direct sunlight, wind rain and sufficiently lighted during the night to facilitate the pile testing & for recording of the result.

19.2.2 MEASUREMENTS OF SETTLEMENT

(a) The method of measurement of settlement shall be a primary system of 3 or 4 dial gauges equally spaced around the pile and a secondary system using level and staff. Reading shall be taken with both systems at appropriate interval. Dial gauges should have a 50 mm travel and be accurate to 0.025 mm. Before carrying out the load test, the Contractor should submit to the engineer the calibration certificates of pressure gauges and dial gauges from approved testing laboratory.

(b) The level and the scale of the staff should be chosen to enable readings to be made to an accuracy of 0.5 mm. A scale attached to the pile or pile caps may be used instead of a levelling staff. A datum should be established on a permanent object of other well- founded structure and should be situated so that only one setting of the level is needed. The datum marker should be duplicated so it can be re-established in case it is inadvertently demolished. The datum must not be affected by the load test or other operations on the site.

19.2.3 FAILURE OF DYNAMIC LOAD TESTS

(a) The ultimate load shall be the load at which the pile under test continues to settle or sink without any increase in the test load applied thereon. For the practical purpose it shall be taken as the load, which causes the pile to settle to an amount equal to 10% of the effective pile diameter unless the ultimate bearing capacity of the pile is well defined in the load versus settlement curve, the ultimate load shall be taken as equal to the abscissa of the point at which the load versus settlement becomes steep and straight.

(b) The effective pile diameter shall be considered as the diameter of the circle inscribed in the section of pile.

(c) A pile or pile group shall be considered to have failed on the basis of one of the following criteria:

i The maximum settlement under test load maintained for a period of 48 hours exceeded 0.05 mm for every tonne of load applied (example: settlement under a load of 200 tonnes shall not exceed 10 mm). However, maximum settlement under load shall not exceed 25 mm.

ii The permanent (residual) settlement exceeds fifty percent (50%) of allowable maximum settlement under full test load.

iii The test could not be carried out or completed due to faulty construction of test pile, faulty arrangement for the test etc.

iv The test could not be carried out due to failure of pile cap or due to any other cause.

v The scales and / or measuring instrument used are found to have been tampered with by anyone.

(d) The test shall be abandoned and the Contractor shall not be paid for the failure, the discarded piles, replaced piles, nor the redesign and enlargement of the pile cap necessary for replacement piles. Successful test will be paid for according to BOQ Rates.

19.2.4 TEST REPORT

The report shall contain the following:

- a. Pile designation, date completed, weather condition, pile length, pile size, reduced level of the toe of the pile.
- b. Description of the apparatus used for testing, loading system and procedure for measuring settlement.
- c. Field data.
- d. Time /settlement curve.
- e. Load / settlement curve.
- f. Remarks explaining unusual events or data and movement of piles.
- g. Calibration certificates of dial gauges and pressure gauges.
- h. Ultimate and safe load capacity of pile/piles tested.

19.2 INTEGRITY TEST

19.3.1 Integrity tests shall be conducted on 100% of the piles under each cluster by an approved agency after completion of piles under each cluster.

19.3.2 This system of testing is used to evaluate the pile health. Potential defects like working honey combing out growth & cracks, voids, etc., can be investigated by this method. The strength of concrete as well as the length of pile can be verified.

20.0 GUARANTEE OF PILE CAPACITY

The piling contractor shall be responsible for the satisfactory construction & performance of each & every pile installed by him, under the specified conditions.

21.0 PROGRAMME

The Contractor shall submit a programme for the work together with his tender. Within 7 days of acceptance of tender, the Contractor shall if necessary, submit a revised programme after discussing with the Engineer. He shall not deviate from the agreed programme without the written approval of the Engineer.

23.0 PAY LENGTH

For all proposed piles, the Contractor shall be paid as per relevant IS code for mode of measurements.

24.0 PILE GROUP

Spacing of piles for cast in situ piles shall in no case be less than 3 times the pile dia. The contractor is solely responsible for satisfactory construction of the pile foundation. It would be the contractor's responsibility that the piles satisfy specified load tests or else the contractor at his own cost shall provide additional piles as specified by the structural engineer for compensating the deficiency.

25 PILING RECORDS

25.0 Complete piling records shall be kept by the Contractor during pile driving / installation. The contractor shall submit the following in duplicate to the Engineer.

- a. Records of all piles as the work proceeds
- b. Upon completion, a record of the work as carried out and as-built drawing

25.1 The format of the record shall be approved by the Engineer and shall contain relevant information such as pile designation, pile location, date completed, weather condition, pile size used, cut-off level and penetration or and any other information as the Engineer requires.

26 AS-BUILT DRAWINGS

26.0 After the completion of the piling, the Contractor shall submit as-built drawing prepared and certified by approved licensed surveyor under the employment of the Contractor. It should include the following: -

- a. Size and type of piles
- b. Eccentricities of piles in two predetermined perpendicular directions.
- c. Depth of penetration, reduced level of the toe and cut-off level of each pile.
- d. Set to which the pile is driven.
- e. All these records/documents should also be uploaded/incorporated in BIM.

WATER PROOFING BELOW RCC FOUNDATION

Water proofing for foundation

Horizontal application - the membrane must be applied to smooth, prepared substrate, concrete binding is preferred. substrate shall be free from loose aggregate or other sharp protrusions. Standing water must be removed to prevent contamination of overlaps and subsequent compromise of waterproof properties.

Supply and laying of 1.2 mm Thick (Based on manufacturer specifications) HDPE 80 membrane (below Raft) which is pressure sensitive, Fully bonded and foot trafficable, weather resistant, which bonds with poured concrete so that prevents water ingress or migration. The membrane will have following properties

- (i) puncture resistance of > 900 N per ASTM E154,
- (ii) tensile strength \geq 21MPa as per ASTM D412 , and
- (iii)Hydrostatic head resistance >70m as per ASTM D 5385 and resist lateral migration of water
- (iv) Peel Strength to Poured-in-Place Concrete after 7 days of water immersion should be >880N/m as per ASTM D 903.
- v) Lap peel adhesion of >400 N/m at 22°C as per ASTM D1876.
- vi) Elongation of at least 500 % as per ASTM D412.

All systems to be installed as per manufacturer's specification and executed by manufacturer's certified applicators. Rates includes all lead and lift, for all materials, labours as directed by Engineer-in-Charge. The membrane shall be capable of UV exposure without additional protection for a maximum of 45 days prior to concrete pouring. Also Providing Joint treatment to earthing rods complete as per approved Specification and drawings Complete including cost of all labour, material, T & P, lead, lift,taxes etc. as per instruction & satisfaction of EIC.

Make :Soprema / BASF / Vandex Tremco /Isoltema / Ardex / Asian Paint /Pidilite/MYK Arment/Kerakoll

GRC JALI.

Providing & fixing of GRC jali as per designs and drawings given or as approved by engineer in charge, thickness shall be between 30 to 50mm having glass reinforcement content of 3% to 5%,having tensile strength of 6 to 11 Mpa,to be fixed with mortar and fixtures as required. Finished as mentioned in drawings. The rate includes all materials and labours required at all heights. Framing if required shall be measured and paid separately under relevant item.

Item shall be measured in Sqm for payment purpose

Make : 'Unistone', 'Sanderson' or 'Birla white'

FALSE CEILING

Perforated panels

Providing and fixing Perforated panels of width 128mm, thickness of 15mm and length of 2440mm or as required by the Architect / approving engineer, made of a HDMR board substrate with laminated facing as per the approved shade / species and finish and a melamine balancing layer over the reverse side. . The board shall have a special perforated pattern where the visible surface has a “Helmholtz” fluted perforation of 2mm width and 30mm each. The Back side of each panel is being perforated with 8mm round hole for superior acoustic performance. Installed on specially extruded aluminum sections of 25 mm duly fixed using screws and plugs spacing at 600mm c/c. Place the clip to install the first set of wooden panels by inserting the clips for border and insert the groove of panel into projecting flange of aluminum clip. Continue installing rows of panels by inserting the tongue into the groove of earlier inserted panel and progressively installing clips for inside into the next keel till the actual height is achieved. Use clips for the border to finish off the installation. Edges should be finished using wooden moulding of matching colour. The system shall give NRC of 0.62 with as per ASTM C 423, The color and design shall be approved by architect & Engineer In-charge.

Make: Gyproc, Hilux, Knauf Danoline, Anutone

Wood Fibre Panel

Providing and Fixing 15mm thick Magnesium Bonded (MgO) Wood fiber panel having min density of 400 kgs with wood strands of having width of 1 mm. The panel shall hNRC 1.0 ASTM C 423 moisture content less than 5 percent and shall pass fire test as per UL94. Boarding:

INSTALLATION: -To comprise main runner spaced at 1200mm centres securely fixed to the structural soffit using suspension system at 1200mm maximum centre. The First/Last suspension system at the end of each main runner should not be greater than 450mm from the adjacent wall. Flush fitting 1200mm long cross tees to be interlocked between main runners at 600mm centre to form 1200 x 600 mm module. Cut cross tees longer than 600mm require independent support. 600 x 600mm module to be formed by fitting 600mm long flush fitting cross tees centrally between the 1200 mm cross tees. Perimeter trim to be wall angles of size 3000 x 19 x 19 mm, secured to walls at 450 mm maximum centres and as per the drawing and the work complete in all respects to the satisfaction of Engineer in-charge.

Make: Geenlam, Century or equivalent.

Wooden Veneer Wall Paneling

Providing and fixing GROOWOOD Linear Grooved Panel (30/2, 15/2) panels of width 128mm, thickness of 15mm and length of 2440mm or as required by the Architect / approving engineer, made of a fibre board substrate with laminated/Melamine facing as per the approved shade / species and finish and a melamine balancing layer over the reverse side. The board shall have a special perforated pattern where the visible surface has a "Helmholtz" fluted perforation of 2mm width and 30mm each. The Back side of each panel is being perforated with 8mm round hole for superior acoustic performance. Installed on specially extruded aluminum sections of 25 mm duly fixed using screws and plugs spacing at 600mm c/c. Place the Pax -GROOWOOD clip to install the first set of wooden panels by inserting the clips for border and insert the groove of panel into projecting flange of aluminum clip. Continue installing rows of panels by inserting the tongue into the groove of earlier inserted panel and progressively installing clips for inside into the next keel till the actual height is achieved. Use clips for the border to finish off the installation. Edges should be finished using wooden moulding of matching colour. The system shall give NRC of 0.62 with as per ASTM C 423, The color and design shall be approved by architect & Engineer In-charge.

GYPTECH Fabric Phonetic Acoustical Wall Paneling

Providing and fixing of GYPTECH Fabric Phonetic Acoustical Wall Paneling with square edges made of fibre glass substrate 25mm thick and wrapped on the front side with an acoustically transparent and fire-resistant fabric with an option of colors as per the choice of the Architect/ Engineering- in charge of size 2400x600, 1800x600, 600x1200 or 600x600 mm providing a minimum sound absorption level of 0.90 NRC to be affixed to wall using Wall panel hooks and construction adhesives supplied by Gyptech Systems Pvt. Ltd. as per the instructions laid down by the manufacturer. Wall panel hooks of adequate quantity as specified by the manufacturer shall be fixed to the wall surface using self-tapping screws. Silica based construction adhesive shall be dabbed on to the projecting elements (spikes) of the hooks. Gyptech Fabric wall panels shall be pierced through the spikes of the hooks ensuring the line and level of the panels are maintained

FHC Door

Fire Hose cabinet complying to fire rating 3 hr, made of steel material 1.09mm thick sheet, surface mounted type of size 600 x 1200 mm, single door leaf type, with necessary locking arrangements, painted with required shed accessories required etc. complete rate includes all material and labour .

Item shall be measured in Sqm for payment purpose.

SANITARY FIXTURES**Bib cock**

S&F two way bib cock with wall flange quarter turn (Low-flow) 16 mm dia. Make - Jaquar Model No KUP-35041PMGE or equivalent in Crab Tree/Kohler brand complete all as specified and directed by Engineer-in-Charge

Make : Jaquar / Hindware / Kohler, Sloan or Equivalent

Health faucet

S & F Hand shower (Health faucet) with 1 meter long easy flex tube in chrome finish and wall hook with NRV (Back flow preventer) Make - Jaquar Model No ALD-579 complete all as specified and directed by Engineer-in-Charge

Concealed Stop Cock

Providing and fixing concealed Stop Cock

20 mm dia bore of pipe

32 mm dia bore of pipe

Make : Jaquar / Hindware / Kohler, Sloan or Equivalent

FACADE WORK

Dholpur stone dry cladding

Dholpur stone dry cladding with 28-32 mm thick gang saw cut stone of min 600mm x 900mm size with (machine cut edges) of uniform color and approved size fixed to structural steel frame work and/ or with the help of cramps, pins etc. and sealing the joints with approved weather sealant as per Architectural drawing structural steel frame (for dry cladding with 30 mm thick gang saw cut with machine cut edges sand stone) on walls at all heights using M,S. square/ rectangular tube in the required pattern as per architectural drawing, including cost of cutting, bending, welding etc. The frame work shall be fixed to the wall with the help of M.S. brackets/ lugs of angle iron/flats etc. which shall be welded to the frame and embedded in brick wall with cement concrete block 1:2:4 (1 cement :2 coarse sand :4 graded stone aggregate 20 mm nominal size) of size 300x230x300 mm, including cost of necessary centring and shuttering and with approved expansion hold fasteners on CC/RCC surface, including drilling necessary holes. Approved cramps/ pins etc. shall be welded to the frame work to support stone cladding, the steel work will be given a priming coat of Zinc primer as approved by Engineer in-charge and painted with two or more coats of epoxy paint (Shop drawings shall be submitted by the contractor to the Engineer-in-charge for approval before execution). The frame work shall be fixed in true horizontal & vertical lines/planes adjustable stainless steel cramps of approved quality, required shape and size, adjustable with stainless steel nuts, bolts and washer (total weight not less than 260 gms), for dry stone cladding fixed on frame work at suitable location, including making necessary recesses in stone slab, drilling required holes etc.

Gwalior Mint stone dry cladding

Gwalior Mint stone dry cladding with 25-30 mm thick gang saw cut stone of min 600mm x 900mm size with (machine cut edges) of uniform color and approved size fixed to structural steel frame work and/ or with the help of cramps, pins etc. and sealing the joints with approved weather sealant as per Architectural drawing structural steel frame (for dry cladding with 30 mm thick gang saw cut with machine cut edges sand stone) on walls at all heights using M,S. square/ rectangular tube in the required pattern as per architectural drawing, including cost of cutting, bending, welding etc. The frame work shall be fixed to the wall with the help of M.S. brackets/ lugs of angle iron/flats etc. which shall be welded to the frame and embedded in brick wall with cement concrete block 1:2:4 (1 cement :2 coarse sand :4 graded stone aggregate 20 mm nominal size) of size 300x230x300 mm, including cost of necessary

centring and shuttering and with approved expansion hold fasteners on CC/RCC surface, including drilling necessary holes. Approved cramps/ pins etc. shall be welded to the frame work to support stone cladding, the steel work will be given a priming coat of Zinc primer as approved by Engineer in-charge and painted with two or more coats of epoxy paint (Shop drawings shall be submitted by the contractor to the Engineer-in-charge for approval before execution). The frame work shall be fixed in true horizontal & vertical lines/planes adjustable stainless steel cramps of approved quality, required shape and size, adjustable with stainless steel nuts, bolts and washer (total weight not less than 260 gms), for dry stone cladding fixed on frame work at suitable location, including making necessary recesses in stone slab, drilling required holes etc.

CNC cut Designer LOGO

Supply and fixing of Min 3 mm thick CNC cut Corton / weathering steel sheet fixed with MS bolting and plats as per manufacturer's instructions and design as per architectural drawings

Furniture

- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Table of Size: 2500 mm Width * 750 mm Depth * 750 mm Height. Table made with superior quality BWP grade plywood duly finished with polished veneer on Front and Top. Table Shall be Provided with 2 Drower and One Filling Mobile Pedestal. Design as per Architect / Engineer in charge.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Table of Size: 2300 mm Width * 750 mm Depth * 750 mm Height. Table made with superior quality BWP grade plywood duly finished with polished veneer on Front and Top. Table Shall be Provided with 2 Drower and One Filling Mobile Pedestal. Design as per Architect / Engineer in charge.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Table of Size: 2000 mm Width * 750 mm Depth * 750 mm Height. Table made with superior quality BWP grade plywood duly finished with polished veneer on Front and Top. Table Shall be Provided with 2 Drower and One Filling Mobile Pedestal. Design as per Architect / Engineer in charge.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Side Table of Size: 900 mm Width * 450 mm Depth * 750 mm Height. Table made with superior quality BWP grade plywood duly finished with polished veneer on Front and Top. Design as per Architect / Engineer in charge.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Back Storage Cabinet of Size : 2050 mm Width * 450 mm Depth * 2100 mm Height, Cabinet Made with superior quality BWP grade plywood duly finished with veneer on Front and

Top. Cabinet Shall be made with Shelves and Lock of Doors. Design as per Architect / Engineer in charge.

- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Back Storage Cabinet of Size : 2000 mm Width * 450 mm Depth * 2100 mm Height, Cabinet Made with superior quality BWP grade plywood duly finished with veneer on Front and Top. Cabinet Shall be made with Shelves and Lock of Doors. Design as per Architect / Engineer in charge
- .
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make 3 SEATER SOFA. Model-EDF-1137 -. Color as per Approvals.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make 2 SEATER SOFA. Model-EDF-1137 -. Color as per Approvals.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make SINGLE SEATER SOFA. Model-EDF-1137 -. Color as per Approvals
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- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Storage Cabinet Made with superior quality BWP grade plywood/HDF duly finished with 4 mm Thick Curian Top. Powder Coated IRON Pipe Framework. Corner Table Size: 500 mm Dia * 450 mm Height.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Coffee Table Made with superior quality BWP grade plywood/HDF duly finished with Polished Veneer. All Hardware of Hettich/Ebco. Design as per Architect / Engineer in charge. Coffee Table 1100 mm Width * 500 mm Depth * 450 mm Height.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Storage Cabinet Made with superior quality BWP grade plywood/HDF duly finished with Polished Veneer. All Hardware of Hettich/Ebco. Powder Coated IRON Pipe Framework. Coffee Table Size: 500 mm Width * 500 mm Depth * 450 mm Height.
- Manufacturing and Supplying Evershine Designs & Furnishers Make High Back revolving Bucket Chair with Synchro Torchan Bar Mechanism. EDF-A814-A.
- Manufacturing and Supplying Evershine Designs & Furnishers Make Low Back revolving Bucket Chair with Synchro Tilt Mechanism. EDF-A814-B.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make TV Unit/Cabinet of Size : 2100 mm Width * 450 mm Depth * 2100 mm Height, TV Unit made with superior quality BWP grade plywood duly finished with veneer on Front and Top. Cabinet Shall be made with Shelves and Lock of Doors. Design as per Architect / Engineer in charge.

- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Dinning Table 4 Seater of Size : 1500 mm Width * 1000 mm Depth * 750 mm Height, Dinning Table made with superior quality BWP grade plywood duly finished with veneer and Polish on Front and Top. Design as per Architect / Engineer in charge.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Dinning Chair made with Solid Wood and Cushion on Seat and Polish on Visible Wooden Parts. Design as per Architect / Engineer in charge.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Table, Made with superior quality BWP grade plywood/HDF duly finished with Lamination Sunmica on both sides. Table top 25 mm Thick Under Structure made of 18 mm Thick. Table shall be provided with on Mobile Pedestal of 2 Drawers and One filling Cabinet. All Hardware of Hettich/Ebco. Design as per Architect / Engineer in charge. Table Size: 1500 mm Width * 750 mm Depth * 750 mm Height.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Table, Made with superior quality BWP grade plywood/HDF duly finished with Lamination Sunmica on both sides. Table top 25 mm Thick Under Structure made of 18 mm Thick. Table shall be provided with on Mobile Pedestal of 2 Drawers and One filling Cabinet. All Hardware of Hettich/Ebco. Design as per Architect / Engineer in charge. Table Size: 1300 mm Width * 750 mm Depth * 750 mm Height.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Side Table, Made with superior quality BWP grade plywood/HDF duly finished with Lamination Sunmica on both sides. Table top 25 mm Thick Under Structure made of 18 mm Thick. All Hardware of Hettich/Ebco. Design as per Architect / Engineer in charge. Side Table Size: 900 mm Width * 450 mm Depth * 750 mm Height.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Back Storage Cabinet Made with superior quality BWP grade plywood/HDF duly finished with Lamination Sunmica on both sides along with Shelves and Locks. All Hardware of Hettich/Ebco. Design as per Architect / Engineer in charge. Back Storage Cabinet Size: 1500 mm Width * 450 mm Depth * 750 mm Height.
- Manufacturing and Supplying Evershine Designs & Furnishers Make High Back revolving Chair with Push Back Synchro Tilt Mechanism Chair-EDF-A538-A
- Manufacturing and Supplying Evershine Designs & Furnishers Make Medium Back revolving Chair with Push Back Synchro Tilt Mechanism Chair-EDF-A538-B
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make 3 SEATER SOFA. Model-EDF-A930-A. Color as per Approvals.

- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make 2Seater SEATER SOFA. Model-EDF-A930-B. Color as per Approvals.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Corner Table Made with superior quality BWP grade plywood/HDF duly finished with 4 mm Thick Curian Top. Powder Coated IRON Pipe Framework. Corner Table Size: 500 mm Dia * 450 mm Height.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Coffee Table Made with superior quality BWP grade plywood/HDF duly finished with 4 mm Thick Curian Top. Powder Coated IRON Pipe Framework. Corner Table Size: 500 mm Width * 500 mm Depth * 450 mm Height.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Conference Table of Size: 4800 mm Width * 1500 mm Depth * 750 mm Height, Table Made with superior quality BWP grade plywood duly finished with veneer on both sides along with Provision of audio visual & cable management tray & ports (Flip Top Box with Sockets & Ports) Design as per Architect / Engineer in charge.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Conference Table of Size: 2500 mm Width * 1500 mm Depth * 750 mm Height, Table Made with superior quality BWP grade plywood duly finished with veneer on both sides along with Provision of audio visual & cable management tray & ports (Flip Top Box with Sockets & Ports) Design as per Architect / Engineer in charge.
- Manufacturing and Supplying Evershine Designs & Furnishers Make High Back revolving Chair with Push Back Synchro Tilt Mechanism Chair-EDF-A535-A.
- Manufacturing and Supplying Evershine Designs & Furnishers Make High Back revolving Chair with Push Back Synchro Tilt Mechanism Chair-EDF-A535-B.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Storage Cabinet of Size : 3850 mm Width * 600 mm Depth * 750 mm Height, Cabinet Made with superior quality BWP grade plywood duly finished with veneer on Front and Top. Cabinet Shall be made with Shelves and Lock of Doors. Design as per Architect / Engineer in charge.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Storage Cabinet of Size : 7400 mm Width * 500 mm Depth * 750 mm Height, Cabinet Made with superior quality BWP grade plywood duly finished with veneer on Front and Top. Cabinet Shall be made with Shelves and Lock of Doors. Design as per Architect / Engineer in charge.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Storage Cabinet of Size : 4100 mm Width * 600 mm Depth * 750 mm Height, Cabinet Made

with superior quality BWP grade plywood duly finished with veneer on Front and Top. Cabinet Shall be made with Shelves and Lock of Doors. Design as per Architect / Engineer in charge.

- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make 3 SEATER SOFA. Model-EDF-1185 -. Color as per Approvals.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make 2 SEATER SOFA. Model-EDF-1185 -. Color as per Approvals.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Coffee Table, made with superior quality BWP grade plywood/HDF duly finished with Lamination Sunmica on both sides. Table top 18 mm Thick Under Structure made of Powder Coated MS Angle/25 * 25 mm MS Square pipe. All Hardware of Hettich/Ebco. Design as per Architect / Engineer in charge. Coffee Table Size: 500 mm Width * 500 mm Depth * 450 mm Height.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Corner Table, made with superior quality BWP grade plywood/HDF duly finished with Lamination Sunmica on both sides. Table top 18 mm Thick Under Structure made of Powder Coated MS Pipe /12 mm Thick Iron Rode. All Hardware of Hettich/Ebco. Design as per Architect / Engineer in charge. Corner Table Size: 500 mm Dia * 450 mm Height.
- Manufacturing, Supplying & Installation of Evershine Designs & Furnishers Make MS Sheet Metal Locker Module Each Module having two Lockers with Locks. Over All Size: 1825 mm H * 450 mm W * 500 mm D (900 H * 450 W * 500 D Each). Model No.-EDF-CB-07. Each Two Lockers Size: 450 mm Width * 600 mm Depth * 2000 mm Height.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Storage Cabinet Made with superior quality BWP grade plywood/HDF duly finished with Lamination Sunmica on both sides along with Shelves and Locks. All Hardware of Hettich/Ebco. Design as per Architect / Engineer in charge. Storage Cabinet Size: 900 mm Width * 600 mm Depth * 2100 mm Height.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Wardrobe Made with superior quality BWP grade plywood/HDF duly finished with Lamination Sunmica on both sides along with Shelves and Locks. All Hardware of Hettich/Ebco. Design as per Architect / Engineer in charge. Wardrobe Size: 900 mm Width * 600 mm Depth * 2100 mm Height.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Wall Facing Workstations: Table Top Made of 25mm thick superior quality BWP grade plywood/HDF duly finished with Lamination Sunmica on both sides with 2mm thick PVC edge banding Tape. Main Beam of Size 40mm x 40mm CRC square pipe with powder coated finish with die casted brackets to support top. Legs 60X30 / 50X50 CRC Pipe Leg

with Metal Powder coated finish with Wire Manager with Wire Snaker / Wire CARRIER : 0.8 - 01mm thick Powder coated wire carrier for arranging wires for electricity & data. MODESTY PANEL BELOW THE TOP : 01 - 1.2mm thick Powder coated as preapproved shade 300H From Floor. FRONT / DIVIDER SCREEN : 18MM Thick Sleek Fabric Screen with Nylon Beading as per approved shade Mounted on Table Top with Brackets 300H MM Wall Facing : 1200 * 600 * 750/1200. Workstation shall be Provided with 2+1 Mobile Pedestal.

- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Back to Back Workstations: Table Top Made of 25mm thick superior quality BWP grade plywood/HDF duly finished with Lamination Sunmica on both sides with 2mm thick PVC edge banding Tape. Main Beam of Size 40mm x 40mm CRC square pipe with powder coated finish with die casted brackets to support top. Legs 60X30 / 50X50 CRC Pipe Leg with Metal Powder coated finish with Wire Manager with Wire Snaker / Wire CARRIER : 0.8 - 01mm thick Powder coated wire carrier for arranging wires for electricity & data. MODESTY PANEL BELOW THE TOP : 01 - 1.2mm thick Powder coated as per approved shade 300H From Floor. FRONT / DIVIDER SCREEN : 18MM Thick Sleek Fabric Screen with Nylon Beading as per approved shade Mounted on Table Top with Brackets 300H MM Wall Facing : 1200 * 600 * 750/1200. Workstation shall be Provided with 2+1 Mobile Pedestal.
- Manufacturing, Supplying and Installation of EVERSHINE DESIGNS & FURNISHERS MAKE Revolving STAFF CHAIR for visitors, Tilting Mechanism, Chrome Base with nylon twin wheels castors, nylon Fixed arms, Gas lift for up and down movement for seat. Green Mesh back and Red fabric upholstered PU cushion. COLOR as per Architect / Engineer in charge. Model: EDF-A404
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Storage Cabinet Made with superior quality BWP grade plywood/HDF duly finished with Lamination Sunmica on both sides along with Shelves and Locks. All Hardware of Hettich/Ebco. Design as per Architect / Engineer in charge.

Storage Cabinet: 1200 * 600 * 1200

Storage Cabinet: 1200 * 450 * 1200

Storage : 900 * 600 * 2100

Storage : 900 * 600 * 1200

Storage : 1000 * 600 * 2100

Storage : 1000 * 600 * 1200

Storage : 1050 * 600 * 1200

Storage : 1100 * 600 * 2100

Storage : 1100 * 600 * 1200

Storage : 1100 * 450 * 1200

Storage : 600 * 600 * 2100

Storage : 3900 * 600 * 2100

Storage : 1600 * 600 * 1200

Storage : 2000 * 450 * 1200

- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Storage Racks Made with superior quality BWP grade plywood/HDF duly finished with Lamination Sunmica on both sides along with Shelves and Locks. All Hardware of Hettich/Ebco. Design as per Architect / Engineer in charge.
Racks : 600 * 600 * 2400
Racks : 700 * 600 * 2400
Racks : 800 * 600 * 2400
Racks : 900 * 600 * 2400
Racks : 1000 * 600 * 2400
Racks : 1100 * 600 * 2400
Racks : 1200 * 600 * 2400
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Lab Modules. Made of Powder Coated MS CRC SHEET METAL CAR CASE with HDF Shutters. Without GRANITE STONE TOP. Color as per Approvals.
Lab Module: 500 * 600 * 900
Lab Module: 700 * 600 * 900
Lab Module: 800 * 600 * 900
Lab Module: 900 * 600 * 900
Lab Module: 1100 * 600 * 900
Lab Module: 1250 * 600 * 900
- Manufacturing, Supplying & Installation of Evershine Designs & Furnishers Make Square Table for Cafeteria with 28 MM thick Made with superior quality BWP grade plywood/HDF duly finished with Lamination Sunmica on both sides with two mm thick pvc edge banding tape on exposed edges and SS-304 Grade Stainless Steel Base, Size: Table 1000 D * 1000 W * 750 Ht. Model No-EDF-A-421.
- Manufacturing, Supplying and Installation of EVERSHINE DESIGNS & FURNISHERS MAKE CAFETERIA CHAIR Made of MS inserted PU Foam Frame with Legs and Gaslift for revolving. Color as per Approval. with MS Powder Coated Base. Model No-EDF-A885
- Manufacturing, Supplying & Installation of Evershine Designs & Furnishers Make Rectangular Table with SS 304 grade Stainless steel sheet metal Top. Frame made of 40* 40 MM SS 304 Grade stainless steel Square Pipe with PVC Boots in legs. Model No.-EDF-A-419 Rectangular Canteen Table : 1900 * 900 * 800
- Manufacturing, Supplying & Installation of Evershine Designs & Furnishers Make SS-304 Cafeteria Chairs Frame made of SS-304 Grade Stainless Steel Frame with SS 304 Grade perforated Sheet Metal seat. Chair Having PVC Boots in Legs. Model No.-EDF-A-422 Chairs
- Manufacturing, Supplying & Installation of Evershine Designs & Furnishers Make Service Counter : Under Structure made of SS304 grade square pipe with SS 304 Grade Sheet Metal. Size: 1200 W * 750 D * 1000 Ht Pantry Table with Burners : 3400 * 600 * 800

- Manufacturing, Supplying & Installation of Evershine Designs & Furnishers Make Table with Rack made of SS 304 Grade Stainless Steel square pipe and Shelves made of SS 304 grade sheet metal. Shelves dually welded with SS 304 MIG welding. Racks/table having PVS Boots in legs. Model No.-EDF-A-424 Pantry Table with Burners : 3000 mm Width * 600 mm Depth * 800 mm Height.
- Manufacturing, Supplying & Installation of Evershine Designs & Furnishers Make Main Table for Pantry made of 16 Gauge 40 mm * 40 MM SS Square Pipe table With 40 * 40 mm 16 gauge extra support below Table Top With Hard Rubber Boots in Legs. Model No.-EDF-A425 Size: 3400 mm Width * 1000 mm Depth * 800 mm Height.
- Manufacturing, Supplying & Installation of Evershine Designs & Furnishers Make Service Counter : Under Structure made of SS304 grade square pipe with SS 304 Grade Sheet Metal. Size: 1200 W * 750 D * 1000 Ht Pantry Serving Counter : 4150 mm Width * 600 mm Depth * 800 / 1800 mm Height.
- Manufacturing, Supplying & Installation of EVERSHINE DESIGNS & FURNISHERS make Modular Kitchen Made with superior quality BWP grade plywood/HDF duly finished with Lamination Sunmica on both sides along with Shelves and Cutlery Baskets. All Hardware of Hettich/Ebco. Design as per Architect / Engineer in charge.

Pantry Counter with Sink Unit & Over Head Units : 4100 * 600 * 800

Pantry Counter with Burner Provision Over Head Units : 1900 * 600 * 800

INFRASTRUCTURE

- Providing and fixing factory made precast RCC perforated drain covers, having concrete of strength not less than M-25, of size 1000 x 600x50 mm, reinforced with 8 mm dia four nos longitudinal & 9 nos cross sectional T.M.T. hoop bars, including providing 50 mm dia perforations @ 100 to 125 mm c/c, including providing edge binding with M.S. flats of size 50 mm x 1.6 mm complete, all as per direction of Engineer in-charge.
- Providing, Fixing and installation of 20 KLD STP of MBR Technology as per the specifications.

Design Parameters

The plant is designed to treat sewage generated having following characteristics

Design Consideration	
Nature of waste water	Sewage
Flow	20 m3/day
Operating hours	24 Hours

Characteristics of the Raw and Treated sewage water		
	Raw Sewage Water (At inlet of MBR System)	Treated Water (At outlet of MBR System)
pH	6.5 – 8.5	6.5 -7.5
COD	≤ 1000 ppm	≤ 50 ppm
BOD	≤ 600 ppm	≤ 10 ppm
TSS	≤ 300 ppm	≤ 10 ppm
Oil & Grease	≤ 50 ppm	≤ 5 ppm
N-NH3	≤ 50 ppm	≤ 10 ppm

Sr. No	Equipment Description	Quantity
1.	BAR SCREEN MOC: SS 304 Fine screen mesh size: 6 mm Type: Manual	1 No
2.	OIL & GREASE TRAP MOC: RCC Type: baffle Type	1 No
3.	RAW SEWAGE PUMP Type: Non clog Submersible Cutter Type Make: Kirloskar/ KDS Pump/ V-Guard/ equivalent Head: 10 m Flow: 1 m ³ /hr HP: 1 HP Phase: Single / Three Phase	1W+1S
4.	FLOW METER Type: Online float type Rota meter Capacity: 0-1600 LPH Make: CWC/Flowtus	2
5.	MBR MODULE Type of membrane: Submerged Hollow fiber membrane Pore size: 0.02 to 0.04 micron MOC of fiber: Reinforced PVDF MOC of membrane stand: SS – 304	1 Set

	Make: Suez(GE)/ MOWS/Mitsubishi/Blufox	
6.	MEMBRANE FILTRATION PUMP Type: Centrifugal pump Make: Kirloskar/ KDS Pump/ V-Guard/ equivalent Head: 15 - 18 m Flow: 1 m ³ /hr HP: 0.5 to 1 HP Phase: Three Phase/Single Phase	1W+1S
7.	MEMBRANE BACKWASH PUMP Type: Centrifugal pump Make: Kirloskar/ KDS Pump/ V-Guard/ equivalent Head: 15 - 18 m Flow: 1m ³ /hr (As per Recommended by MBR OEM) HP: 0.5 to 1 HP Phase: Three Phase/Single Phase	1W+1S
8.	Air Blower Type: Twin Lobe Root Make: Airvak/Everest Capacity: As per Final MBR OEM Pressure: 0.45 kg/cm ² Note: Flow & Pressure can be change based upon final height of tank and MBR OEM Recommendation.	1W+1S
9.	ANOXIC MIXER Type: Motor, Gear Box with Impeller MOC: SS 304 RPM: 20 RPM HP: 1 HP	1 No
10.	Recirculation Arrangement Air recirculation only through Blower air Flow: 1 m ³ /hr Arrangement MOC: uPVC	1 Set
11.	AIR PIPING Non submerged piping: MSEP / GI/ uPVC	1 lot

	Submerged piping: uPVC Make of UPVC: Finolex/ Astral/ Supreme of MSEP/ GI: Standard available	
12.	LIQUID PIPING Non submerged piping: uPVC - Sch – 40 Submerged piping: uPVC - Sch – 40 Make: Finolex/ Astral/ Supreme	1 lot
13.	CONTROL PANEL Type of panel: Automatic panel of micro controllerbase Housing: MS with Powder Coating Mode of operation: Automatic / ManualMake of panel: Enviro Engineers Size of HMI: 7” All Contactor: C&S/ ABB/ SchneiderReal Time Operation	1
14.	SKID MOC MOC of skid: SS 304 Dimension if Skid: As per final size of membrane	As per design
15.	DISINFECTANT DOSING SYSTEM Dosing pump make: Verito/ Milton Roy/aavolate Capacity of Dosing pump: 0 - 4 LPH Dosing tank make: Sinon / Equivalent Dosing tank capacity: 50 Lit Dosing tank MOC: LDPE	1
16.	CEB/CIP DOSING SYSTEM Dosing pump make: Milton Roy / Verito Capacity of Dosing pump: 0 - 4 LPH Dosing tank make: Sinon / Equivalent Dosing tank capacity: 50 Lit Dosing tank MOC: LDPE	As per Recommend ed by MBR OEM
17.	DIFFUSER Type: Disc membrane diffuser Make: Pure Aqua / Vision/ equivalentSize: 600 x 63 or 12” MOC: Silicon	6 Nos
18.	SOLENOID VALVE Type: ON/ OFF type, NC Valve	2 Nos
	MOC: Nylon/ SS – 304 Make: Torque / Equivalent/ uFlowLine Size: 1”	

19.	PRESSURE GAUGE Range: 0 - 7 kg/cm ² X 1 Nos Range: 0 – 1 kg/cm ² x 3 Nos Make: Brinda/ Vision/ La/ equivalent Type: Bottom mounted	4 Nos
20.	VACUUM GAUGE Range: 0 – -1 kg/cm ² Make: Brinda/ Vision/ La/ equivalent Type: Bottom mounted	1 No
21.	CENTRIFUGE Make: Maruti/ Equivalent MOC: SS 304 Size: 12 mm Dia Solid Handling: 30 Kg/Day	1 No
22.	LEVEL SENSOR Type: Ultrasonic Type Make: Truemen/ Accumax/ Equivalent Depth range: 1m to 5m Output Type: 4-20 mA	1
23.	LEVEL CONTROLLER Type: Float type level sensors Cable Length: 3m	4 Nos
24.	Flow Transmitter cum Totalizer Type: Magnetic Type Flow Meter Line Size: 1" Make: Accumax/ Equivalent Output: 4 to 20 mA	2 Nos

Volume of Units:

Sr.No	Unit Description	Capacity
1.	Collection Tank MOC: RCC/ Brickwork	1 No
	Capacity: 10,000 Lit	

2.	Anoxic Tank Capacity: 2 KL	MS having 5 mm sheet with 3 mm FRP Inside and double coat Epoxy or PU Paint Outside
3.	Aeration Tank Capacity: 5 KL	
4.	MBR Tank Capacity: 1.5 KL (As per MBR OEM)	
5.	Treated Water Tank Capacity: 5 KL LLDPE Readymade Tank Make: Sinon/Sintex	1 Nos

MISCELLANEOUS

- Providing and fixing Rubber Column guards of approved make at corners made out of 100mm x 8mm x 800mm (W x T x H approved EPDM fixed on column edges with reflective stickers and necessary screws etc. as per detail drawings, as per instruction and entire satisfaction the of the PM / Architect, at all levels and locations. (Location: Parking area columns)
- Providing and fixing stainless steel (SS316) TACTILE warning indicators (studs of (dimension 35mm x 25mm x 4.5mm, stem : 6mm x 12mm) surface design : skid proof circle. The layout shall be got approved by EIC before execution. Providing and fixing stainless steel (SS316) TACTILE directional strips of dimension 280mm x 35mm x 5mm, stem : 6mm x 12mm) surface design : skid proof diamond. The layout shall be got approved by EIC before execution. The TACTILE directional strips shall be fixed in 6mm dia & 12mm deep holes in granite flooring / tile flooring / other with epoxy glue all complete as per direction & satisfaction of EIC. The rate is inclusive of drilling, cleaning & applying glue in the hole for fixing stud, transportation, loading / unloading, taxes etc nothing extra will be paid.
- Expansion Joint For Internal Wall Providing and Fixing of Wall Flat Covers from approved make for Expansion Joints, having solid all metal expansion joint cover. maintenance- free, hard wearing and long-lasting. The cover must be design in such a way that there should be 65mm visible aluminium flange in the sides and no requirement of any gasket or sealant should be there. The centre plate can be individually designed to match the adjacent surface and can be printed in same adjacent wall texture. The bar construction ensures easy installation of the centring system. The Exp. Joint System have three-dimensional movement absorption, easy to install with optimized design allows for easy and safe

installation of the centring bar. Alloy to be used 6063 T66 for better tensile strength. Connection pins to ensure even installation with respect to both, height and width. For Precise Transitions the system should be installed by the way of positive connection between each single length by the way of the connecting pins that should ensure a level and precise transition.

- Expansion Joint For External Wall Providing and Fixing of Exp. Covers from approved make, FA 25/7 Model, for 200 mm Expansion Joints having flexible high quality electrometric inserts. The Inserts should be hard wearing and temperature resistance (- 30 C to + 120 C Degree). The total Movement should be 50 mm (+/- 25 mm). The system should be in 6063 alloy T66 in Mill finish and the total exposed surface of the profile should not be more than 282 mm (+/- 5 mm) and the installation height should be of 12 mm. Expansion Joint covers/ Profile insert should have a double protection from water due to its double sliding of sealing insert within metal profiles. The Side Profile should have a MULTI HOLE mounting bracket allowing for secure fixing and flexible anchoring and excellent bonding with given slab surface/masonry/epoxy bedding. For Precise Transitions the factory supplied connection pieces should be used during the installation of the cover system.
- Providing , designing , detailed engineering, supplying, Fabrication and Installation of suitable MS structure using MS pipe, base plate and necessary hardware as applicable duly painted with necessary primer & PU paint as approved shade. Design, Supply Fabrication and installation of tensile membrane fabric type II - 902S2-750gsm , both side PVDF coat, Acoustic Performance-Weaking Index-13dBA-ISO717-1,Light Transmission-5% UV Transmission 0%,with tensile strength minimum 420/ 400 daN/ 5cm, minimum tear strength 55/ 50 daN as per manufacturer's specification and 15 year manufacturer warranty or equivalent. Flame Retardancy M2/NFP92-507,Including cutting, welding and cables, plates and necessary hardware for fixing the fabric as per approved shape. Membrane shall be cut and manufactured with high frequency PVC welding machine, cost of all materials complete as per directions. Quality in conformity with ISO9001,Envirnmental communication in conformity with ISO14021
- Providing and laying terra medium duty doormat of colour as approved, coil type open loop design with vinyl foam backing, with removing of dry dust by wiping action, Suitable for medium traffic areas, 3M or approved equivalent.
- Supplying and installing Kids play equipment as given below and approved as per landscape architect (make Arihant or equivalent)

a) Maps68- Product size- 7m x7m , Age Group- 5-15years
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b) Double arc swing : PGSW02- Product size- 3.2m x 1.5m , Age Group- 4- 14years

c) Cystal Maze- Product size- 2.5m x 2.5m , Age Group- 5- 12years

d) Disc Challenger- Product size- 4.5m x 1.1m , Age Group- 5- 12years

e) Spiral Scrambler 9ft- Product size- 1.4m x 0.6m , Age Group- 4- 12years
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f) Balancing bridge- Product size- 7.3m x 0.8m , Age Group- 5- 12years
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- Supplying and installing Infant play equipment as given below and approved as per landscape architect (make Arihant or equivalent)

a) Animal MGR : PGMR 02- Product Size - 2.1m dia , Age Group- 3-12 years.

b) Dolphine sea-saw : PGSS07FS- Product Size - 0.4m x 0.75m , Age Group- 3-8 years.

c) Jumbo Spring Rider : PGKD36FS- Product Size - 1m x 0.5m , Age Group- 3-6 years.
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d) Duck spring rider : PGKD11FS- Product Size - 1m x 0.5m , Age Group- 3-6 years.

e) Net rock scrambler : PGSL 31- Product Size - 2 x 1.5m , Age Group 3-4 years.

- Providing and installing rubber flooring -
 - *36 MM Thick SBR with EPDM In situ Rubber Flooring for Outdoors.
 - *Base layer of 30mm SBR (Buffing) with 6mm EPDM Top Layer In situ Rubber Flooring
 - *100% Hygienic and Safer for Children
 - *An unmatched range of creative design possibilities & Long Life with Minimal Wastage possibilities & Long Life with Minimal Wastage
 - *Resistance to abrasion, slipping, indentation & ignition & Virtually Maintenance Free
- Providing and locating at site a to the scale (1:100 or as instructed by Eng in charge) 3D model made up of acrylic sheet of appropriate thickness and as per the design drawing made available including strong base with wooden framing and covered with transparent acrylic/glass sheet with lighting and illumination i.e. night view complete inclusive of all material, labour, T & P, loading, unloading, taxes etc. as per the instruction and satisfaction of EIC.
- Submit colour photographs of the works as directed by the Engineer and supply with monthly progress report, or as instructed by the Engineer. One set shall comprise of minimum 25 photographs in 3 soft copy of all photographs on DVD with 3 copies of prints (hard copy) of each photograph of size not less than 225 x 175 mm each in album form. The photographs chosen should cover important activities of the work. Photos should have date and time as per Technical Specifications.
- Supply of Video DVD of 180 minutes duration comprising one master copy and one extra copy as per technical specifications showing the progress of works and methodology and at interval as directed by Engineer and as per Technical Specifications.

- Existing top layer of 150mm thk (Fertile Soil) to be stacked at site Removing excavated existing top fertile soil and stacking the same at a location as approved by EIC including lead upto 250m and lift upto 1.50m. This fertile soil shall be used for landscaping purpose.
- Providing Wheel washing facilities of Appropriate Size at site as per the specifications and design Drawing The rate includes cost of construction of the wheel washing facilities including mud pump as specified in the specification but excludes water pipeline works Complete including cost of all labour, material, T & P, lead, lift, taxes etc. as per instruction & satisfaction of EIC.
- Hire and running charges of crane 20 tonne capacity Complete including cost of all labour, material, T & P, lead, lift, taxes etc as per instruction & satisfaction of EIC.
- Provision of One (1) number of New Commercial Vehicle on monthly chargeable basis i.e Mahindra Marrazzo, Honda BRV or similar model in Price (central locking system & rear camera parking) inclusive of 4000 Kilometre. The vehicle shall be provided day and night as required by the Engineer/ Employer inclusive of fuel, consumables, driver, repairs, maintenance, all applicable taxes as per special conditions of contract
- Bolero, Scorpio, Ertiga, Marazzo or similar(For old Vehicle Upto 50000 Km)
- Extra for running and maintenance of every additional km over and above 4000 kms as specified in item NS-233 (For old Vehicle Upto 50000 Km)
- Disposal of excavated earth / moorum/building rubbish/ malba/ similar unserviceable, dismantled or waste material by mechanical transport including loading, transporting, unloading for all lifts, complete as per directions of Engineer, by Contractor at his own cost. The Contractor is allowed to dispose the excavated material as per his arrangement.
- Implementation of building information modelling (BIM) from start of maintenance period including defect liability period to create 3D modelling of all members, asset etc, level of development of construction documents and information to LOD-350, LOD-400, LOD-500, BIM Modelling in dimensions- 3D,4D,5D,6D & 7D as per special conditions and details in section 5 of tender document. The rate includes training of staff. The rates shall include the modelling of any new work done in the premises after the completion of the main work during the DLP & maintenance work. The work up to 3D will be given by consultant Arch. After the start of work, working drawings, 4D, 5D, 6D & 7D will be done by construction contractor in co-ordination with the Architect.
- Electric stage curtain
Molar Main Stage Curtain
(Commissioning of a velvet curtain with horizontal sliding, including rails, brackets, motorized operation, track, mounting hardware, pulley, hooks, and motor for both

directions, ensuring a smooth and draped stop. Minimal overlap at the centre when closed, maximizing usable space.)

- Construction of RCC overhead water tank on 20m. high RCC staging with contractors own design based on trial pit details and bearing capacity of soil tested and submitted by recognised Government Engineer college. The rate includes designing, constructing the OHT with all material, labour at all heights including necessary scaffolding etc complete. Sample drawings are given in the document for reference only. The tank is to be design based on the soil characteristics based on trial pits. The design is to be approved by EIC.
- Supplying, placing and fixing of position of ISI Marked SMC panel tanks of capacity 200KL for water storage as confirming with IS 14399: 1996 and material to be confirming as per IS 4249:1967 for fire retardant, required capacity of suitable size including fixing and assembling / erecting the tank complete as per direction of engineer in-charge. The tanks to be leak proof after installation and having following specifications.

(160) Special condition in respect of cement.

- (1) The contractor shall procure 53 grade (conforming to IS 269-1989) OPC cement, as required in the work, from reputed manufacturers of cement having a production capacity not less than one million tons or more per annum as approved by the Ministry of Industry, Government of India, and holding license to use ISI certification mark for their product.
- (2) The supply of cement shall be taken in 50 kg. bags bearing manufacturer's name, date of manufacturing, batch number and ISI marking. The cement shall be brought at site in bulk supply of approximately 50 tons or as decided by the Engineer- in- charge. **The cement godown of the capacity to store a minimum of 200 bags** of cement shall be constructed by the contractor at site of work for which no extra payment shall be made. In case of big projects with mass consumption of cement, the same can be brought in Silos.
- (3) Samples of cement arranged by the contractor shall be taken by the Engineer-in-charge and got tested in accordance with provisions of relevant BIS codes. In case the test results indicate that the cement arranged by the contractor does not conform to the relevant BIS codes, the same shall stand rejected, and it shall be removed from the site by the contractor at his own cost within

a week's time of written order from the Engineer- in-charge to do so. The cement shall be used on the work only after satisfactory test results have been received. The contractor shall supply free of charge the cement required for testing including its transportation cost to testing laboratories. The cost of tests shall be borne by the contractor.

- (4) Double lock provision shall be made to the door of the cement godown. The keys of one lock shall remain with the Engineer-in-Charge or his authorized representative and the keys of the other lock shall remain with the contractor. The contractor shall be responsible for the watch and ward and safety of the cement godown. The contractor shall facilitate the inspection of the cement godown by the Engineer- in- Charge at any time.
- (5) The actual issue and consumption of cement on work shall be regulated and proper accounts maintained as provided in the contract. The theoretical consumption of cement shall be worked out as per procedure prescribed in the contract and shall be governed by conditions laid therein. In case the cement consumption is less than theoretical consumption including permissible variation, recovery at the rate so prescribed shall be made. In case of excess consumption, no adjustment need be made.
- (6) The damaged cement shall be removed from the site immediately by the contractor on receipt of a notice in writing from the Engineer- in- charge. If he does not do so within 3 days of receipt of such notice, the Engineer-in-charge shall get it removed at the cost of the contractor.
- (7) The cement procured by the contractor should not have aged more than 6 weeks. The original bills for verification to this effect shall be submitted with every bill of measurement.

(B) Special conditions for steel

- (1) The contractor shall procure TMT bars of Fe415/ Fe500/ Fe550 grade as per tender conditions.
 - (a) The grade of the steel such as Fe415/Fe500/Fe 550 or other grade to be procured is to be specified as per BIS 1786-2008.

- (b) The TMT bars procured from primary producers shall conform to manufacture's specifications.
- (c) For TMT bars procured either from primary producers or secondary producers, the specifications shall meet the provisions of IS 1786 : 2008 pertaining to Fe 415D or Fe 500D or Fe 550D grade of steel as specified in the tender.
- (2) The contractor shall have to obtain and furnish test certificates to the Engineer-in-charge in respect of all supplies of steel brought by him to the site of work.
- (3) Samples shall also be taken and got tested by the Engineer-in-Charge as per the provisions in this regard in relevant BIS codes. In case the test results indicate that the steel arranged by the contractor does not conform to the specifications as defined under para (1) above, the same shall stand rejected, and it shall be removed from the site of work by the contractor at his cost within a week's time of written orders from the Engineer-in-Charge to do so.
- (4) The steel reinforcement bars shall be stored by the contractor at site of work in such a way as to prevent their distortion and corrosion, and nothing extra shall be paid on this account. Bars of different sizes and lengths shall be stored separately to facilitate easy counting and checking.
- (5) For checking nominal mass, tensile strength, bend test, re-bend test etc. specimens of sufficient length shall be cut from each size of the bar at random, and at frequency not less than that specified below:

<i>Size of bar</i>	<i>For consignment below 100MT</i>	<i>For consignment above 100MT</i>
Under 10 mm dia bars	One sample for each 25 MT or part thereof	One sample for each 40 MT or part thereof
10mm to 16mm dia bars	One sample for each 35 MT or part thereof	One sample for each 45 MT or part thereof
Over 16mm dia bars	One sample for each 45 MT or part thereof	One sample for each 50 MT or part thereof

- (6) The steel procured by contractor should not have aged more than 6 weeks. The original bills to this effect shall be submitted with every bill of measurement.
- (7) The contractor shall supply free of charge the steel required for testing including its transportation to testing laboratories and the testing charges shall be borne by the contractor.
- (8) The actual issue and consumption of steel on work shall be regulated and proper accounts maintained. The theoretical consumption of steel shall be worked out as per procedure prescribed in the contract. In case the consumption is less than theoretical consumption including permissible variations (+3% for cutting into pieces +/- 2% for variation in weight) recovery at the rate so prescribed shall be made. In case of excess consumption, no adjustment need to be made.

(161) Successful Bidder has to submit the Performance security @ 5% of contract price within 21 days of receipt of Letter of Acceptance / Intent, failing which the work will not be awarded and the bid security i.e. EMD will be forfeited.

Insurance Surety Bond shall also be acceptable for Performance security, to be submitted as per format attached as Form-8 A.

(162) SETTING OUT

The Contractor shall be responsible for the true and proper setting out of the "Works" and the correctness of the positions, levels, dimensions and alignment of all parts of the works and for the provision of all necessary instruments, appliances and labour in connection herewith. If at any time during the progress of the works any error shall appear or arise in the position levels, dimensions or alignment of any part of the works, the Contractor shall immediately notify the Engineer/Engineer-in-Charge or his Representatives who will direct the Contractor in what way the work shall be carried out and the Contractor, on being required to do so by the Engineer/Engineer-in-Charge or his Representative, shall at his own expense rectify such error to the satisfaction of the Engineer / Engineer-in- Charge or Engineer's Representatives at any stage of the work or the checking of any setting out or any line or level by the Engineer/Engineer- in-Charge or Engineer's Representative shall not in any way relieve the Contractor of his obligations under the contract.

The Contractor shall carefully protect and preserve all benchmarks, site rails, pegs and other things used in setting out the works to the approval of the Engineer-in-Charge.

(163) NOTICE OF ADDRESS

The Contractor shall notify in writing to the Engineer an address at Gandhidham/ Adipur for the service on the Contractor any communication or any notice to be given to him under the Contract and any such notice/communication to the Contractor shall be deemed to be duly served if sent by registered post to or left at such address or if delivered to the agent or representative of the Contractor. Any notice/communication to the Contractors shall also be deemed to be duly served if sent by registered Post to or left at the principal place of business or if the Contractor be a company the registered office of the Contractor or at the contractors last known address.

(164) Special Conditions for Environmental Protection

1. The contractor(s) shall strictly follow up the environmental rules as per the Environmental (Protection) Act 1986 while execution of the work and as directed by Engineer-In-Charge.
2. All construction materials i.e. Cement, Aggregates, sand & fill materials which are to be used in construction work shall be covered with Tarpaulin or other fabric materials as directed by Engineer-in-charge.
3. The Contractor(s) should stacked and disposed the waste materials in such a manner which are not destroy the environment.
4. The contractor(s) shall sprinkles the water to minimize the dust emission.
5. Machine mixers, vibrators, way batches plant, diesel generator sets and other vehicles engines shall not be left running when not in use.
6. Emission of NO₂ and SO₂ shall be maintained within the worksite area as per the International Regulations (MARPOL).
7. To prevent and minimize vibration and noise levels from machineries / vehicles during construction activities the contractor(s) shall take the remedial action to minimize noise pollution as under:
 - a. Provide adequate silencers attached with all vehicles and machines.

- b. Install suitable mufflers on engine exhaust and compressor component.
 - c. The diesel generators set shall be used of noise less.
- 8. To contractor(s) shall stacked / stored the construction materials at adequate distance from coastal area.
 - 9. The contractor(s) shall provide the barrier to prevent the construction materials from mixing up with surface / ground water.
 - 10. The contractor(s) should discharge Waste generated during construction work as per CPCB / GPCB regulations.
 - 11. For tenders costing Rs. 5 crores & above: 100 saplings (min. 3 ft. height) have to be planed.

The plantations have to be made within 4-6 months from the date of award of work and has to be maintained till the completion of the maintenance period of contract. After the completion of the maintenance period of contract, contractor has to hand over the plantation to the DPA. The maintenance shall include trimming, watering, providing temporary guards, etc.

The location of the plantation and type of saplings to be planned shall be manually decided by the Engineer-in-charge of DPA and the contractor. The cost of the above plantations and its maintenance has to be borne by the contractor as a part of their social responsibility. No extra payment shall be made to the contractor for the above. In the event of failure by the contractor to execute the above work, it shall be done departmentally at the cost and risk of contractor.

(165) GST Clause

- (a) The contractor shall quote the price exclusive of GST. The contractor shall quote prevailing GST rate separately which shall be reimbursed by DPA after ascertaining necessary compliance as per Goods & Service Tax – 2017. The contractor should have valid GST registration number to become eligible for Participating in the bid. However, GST will not be considered for evaluation of bid Price. All other duties, taxes, cesses applicable if any, shall be borne by the contractor.
- (b) GST Registration should be invariably mentioned in the bid / tender, failing which the bid / tender will be treated as non-responsive and liable to be discharged.
- (c) GST & PAN No. may be furnished with documentary evidence along with the Tender Documents.

- (d) It is mandatory to upload scanned copies of all the documents including GST registration certificate as stipulated in the bid document. If such document is not uploaded his bid will become invalid and cost of bid document shall not be refunded.
- (e) The TDS under GST Act is required to be deducted @ 2% (1% CGST and 1% SGST or 2% IGST) from payment / credit given to contractors
- (f) /professionals and others for work order/contracts exceeding Rs. 2,50,000.00
- (g) Contractor/service provider/supplier etc. has to ensure timely and proper filling of GSTR 1 so that Deendayal Port AUTHORITY can avail input tax credit in timely manner. In case DPA not allowed input tax credit due to failure on part of the contractor/service provider/supplier etc., it will be a financial loss to the DPA and therefore same shall be recovered from the payment/deposit of the contractor/service provider/supplier.

(166) NIL.

(167) NIL

(168) NIL.

(169) The contractor shall be registered under The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996.

- a) The payment from 2nd bill to pre-final bill, shall be released, subject to the condition that the documentary evidence (copy of paid Challan in govt. Treasury) of the Welfare Cess @1% of work done or as amended by Statutory Authority from time to time, paid concerned authority is submitted for the previous bill
- b) The documentary evidence (copy of paid Challan in Govt. Treasury) of Welfare cess @ 1% of work done or as amended by Statutory Authority from time to time, paid on Final bill shall be submitted before releasing the Performance Guarantee.

(170) The rate quoted by contractor shall be realistic. During the evaluation of tender, if rates quoted by the contractor are found unrealistic, the tender shall be considered non-responsive and Engineer in Charge reserves right to cancel no any correspondence shall be entertained in this regard.

(171) The work shall be done strictly in accordance with specifications laid down in Indian Standard Code of Practice for different building trades of latest edition, in addition to the specifications given in Schedule B, approved plans and instructions issued by Engineer-in-charge from time to time.

(172) Deleted.

(173) Individual quantity for any tender items of work may vary to any extent as required by DPA for which the contractor shall not submit any dispute/claim what-so-ever, so long

as the total amount of such variation does not exceed plus or minus 30 % of the Total contract value awarded.

CONTRACTOR

**EXECUTIVE ENGINEER (P)
DEENDAYAL PORT AUTHORITY**

Name of Work: Construction of Administrative office building at Kandla

SPECIAL CONDITIONS FOR ELECTRICAL PART

1. In the event of dimension figures upon a drawing differing from those obtained by measuring drawings shall be referred to the Chief Mechanical Engineer, whose decision shall be final and binding upon the Contractor.
2. The Contractor shall submit the coloured three sets Hard copy of approved drawing of cable routes, circuit diagram of LT installation layout, plans of wiring with technical literature and soft copy and also three sets of as made drawing on completion of work along with tracing.
3. While carrying out the work of electrical nature, the Contractor shall adhere to the provisions of the Indian Electricity Rules, 1956 and as amended from time to time and shall not violate any Regulations, which he will be solely responsible.
4. While crossing the rail/road, damaged caused to it should be set right by Tenderers to the Satisfaction of the Executive Engineer (P), Deendayal Port Authority. Before laying the new cables at existing route through Road/ rail / jetty, contractor shall take written permission from Engineering –In-Charge, in this regard contractor shall make earmarked drawing in two set, which will clear indicated the whereas cable will pass and take permission from TD Division. After completion of new cable, laying work contractor shall take NOC from Harbour Division regarding satisfactory completion of Road/Rail/RCC crossing work at inside cargo jetty area & copy of NOC same should be submitted to Executive Engineer (Electrical).
5. The work also includes liaisoning with Estate Division Civil Department and land ownership concern for approval of route of overhead line and crossing at various point. Traceability drawing & coordinates will be submitted for approval.
6. The work shall be programmed in such a way that the electric supply to the existing installations is not disturbed to the extent possible keeping in view of the work of cutting existing cables, making straight joints and terminating cable ends in the feeder pillar, switchgear etc. shall be carried out within the shortest possible shut down periods to instruction.
7. Armouring of the PVC-A-PVC / XLPE armoured cables shall be effectively earthed at the termination glands and connecting to the nearest earth point. The tail end shall be taped with PVC adhesive tape appropriate colour.
8. The cable to be supplied by the Contractor shall be in standard drum length and straight joint shall be avoided as far as possible. In case same cannot be avoided the Contractor shall supply the requisite number of straight joints complete with jointing materials and accessories shall carry out the jointing work at their cost.

- 9.** Necessary marking and lettering giving details of the circuits, cables etc. shall be carried out on the pedestal and LT panels as per the directions given.
- 10.** All the supporting framework of the DB/LLP and other equipment shall be painted with two coats of primer and two coats of finishing paints of grey shade no 631 of IS: 5 after proper surface Cleaning, de-greasing, chemical cleaning as per the recommendation of the manufacturer.
- 11.** Caution board vitreous enamelled written in three languages, one being the regional language, shall be fixed or displayed to indicate danger and supply pressure according to the Indian Electricity Rules 1956 wherever the supply is at 440 Volts and above.
- 12.** Necessary cable route indicators and cable joint indicators shall provide at an interval of 100 Meters approximately.
- 13.** The Contractor has to provide the materials and equipments of following make as per the approved list attached.
- 14.** The contractor shall study the local working conditions at the site of work before tendering and no claim what-so-ever shall be entertained.
- 15.** The work shall be carried out in accordance with the best standards of workmanship and to the entire satisfaction of the Engineer-in-Charge.
- 16.** The electrical installation shall confirm to all currently applicable ISI specification such as IS: 732, IS: 3043, IS: 2309, IS: 3045 etc. with up to date amendments including relevant IEC regulation and Indian Electricity rules 1956 with up to date amendment.
- 17.** Necessary earthing of wiring, Load Panel, etc. set will be carried as per the IE rule & Act.
- 18.** For any Civil work shall be carried out under supervision of Civil Engineering Department. Necessary Drawing & Material shall be approved from civil Engineering Department.
- 19.** The Tenderers shall quote the rate for cable lying, which shall include the, cable tagging, dressing, end termination, appropriate size of glands & ferrule work as per requirement etc.
- 20.** All wiring, shall be concealed/Surface as per specification & LED fittings will be surface mounted Bulk Head, hence at the time of CIVIL work , firm shall be planed accordingly & continues touch with EIC, For concealed wiring / Points/ sub Ckt. /location of LED fitting, LPP/Meter/DB, otherwise firm shall be responsible for any untoward situation & no claim what-so-ever shall be entertained
- 21.** Queries about the Technical Data
The Engineer-in-Charge will clarify queries on the Technical Data.
- 22.** Instructions

The contractor shall carry out all instructions of the engineer or his nominee which comply with applicable laws where the site is located

23. Safety

The Contractor shall be responsible for the safety of all activities on the Site.

24. Quality Control

Identification of Defects

The Engineer-in-Charge or his nominee shall check the work carried out by Contractor and notify the Defects found if any. The Engineer-in-Charge or his nominee may instruct the Contractor to rectify the Defect.

25. Employer's right of Rejection:

The employer shall reserve the right to reject a part portion or consignment thereof within a reasonable time after actual delivery thereof at the place of destination, if consignment is not in all respects in conformity with terms & conditions of the contract whether on account of any loss, deterioration or damage before dispatch or delivery or during transit or otherwise whatsoever.

26. Removal of Rejected goods:

Rejected goods shall under all circumstances lay at the risk of the contractor from the moment of rejection and if such goods are not removed by the contractor within 21 days from the date of intimation from the Engineer-in-Charge. Engineer-in-Charge may either return to the contractor at the risk and cost of the contractor by such mode of transport as the Engineer-in-Charge may select or dispose off such material at the contractor's risk on his account and retain such portion of the sale proceeds as may be necessary to recover any expenses incurred in such disposals.

27. Deviations:

The bidder must read the tender document carefully and prepare the bid for submission. It is important to note that deviations, if any, must be brought out clearly in the technical offer, which shall be examined by DEENDAYAL PORT AUTHORITY. If the deviation statement submitted by the bidder does not contain any item, then it shall be construed that the bidder has accepted the same and no request from the Contractor, for any change, shall be accepted by DPA at a later stage. In any case, no change in specifications given in the tender agreement shall be permitted. However, only in unavoidable circumstances, DEENDAYAL PORT AUTHORITY may consider such requests from the Contractor, provided the Contractor submits its request with adequate justification.

28. Approvals:

The Executive Engineer (E) shall give specific approval in writing within 7 Days to Contractor after written submission regarding Makes of Material to be used for the Contract and Drawings, if any to be furnished by the Contractor to Executive Engineer (E) for approval. Any corrections to be suggested by Executive Engineer (E) in drawings, the days taken for rectification in drawings shall be in account of the Contractor.

29. Engagement of Labour:

The contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport.

30. Registers to be maintained at site.

1. Site order Book:

A site order book is to be maintained by the contractor at the site. The work orders and instructions written in the site order book shall be deemed to have been legally issued to the contractor shall sign each entry in the site order book as a token of his having seen the same. The site order book shall be property of the Board and shall be handed over to the Engineer- in-charge of the work in good condition on the completion of the work or whenever required by the Engineer-in-charge or his authorized representative.

2. Hindrance Register:

Every type of hindrance arising during the execution of work should be invariably recorded in the hindrance register. The Hindrance Register is to be maintained by the Engineer In Charge at the site. The contractor shall sign each entry in the hindrance Register as a token of his having seen the same. The Hindrance Register shall be property of the Board.

31. Indian Dock Safety Regulations:

Necessary Indian Dock Safety Regulations for the safety purpose shall be adhered to by the contractor and he will be held responsible for any violation of the same.

32. Labour License:

The contractor will have to obtain License from Assistant Labour Commissioner (ALC), Gopalpuri, Gandhidham (Kutch), in case he is engaging ten or more workers on any day during execution of work.

33. Payments Terms for Electrical Part:

All payments shall be made in Indian rupees unless specifically mentioned.

- (i) 70% payment (subject to deductions as per tender conditions) will be released after receipt of material at site in good condition, after obtaining insurance cover as per tender condition (If TPI appointed then after inspection & certification of the same by TPI) and after inspection & acceptance of material by DPA.
- (ii) 20% of item rate (subject to deductions as per tender conditions) after completion of erection, installation, testing and commissioning etc. and 90% of item rate for item covers only laying/fixing/removal etc. (If TPI appointed then after inspection & certification of the same by TPI).
- (iii) 10% (subject to deductions as per tender conditions) will be released after successful completion of whole work (If TPI appointed then after inspection & certification of the same by TPI) and handing over to DPA.

- 34. Valid Electrical Contractor license:** The contractor / Sub Contractor shall have valid electrical contractor's license issued by their respective state for carrying out electrical work of nature involved in this tender. The contractor shall also have a valid Electrical Supervisor's certificate of competency, issued from the Commissioner of Electricity, Energy & Petrochemical Department, (Inspection wing), Block No.18, 6th floor, Sector No. II, Udyog Bhavan, Gandhinagar, Government of Gujarat or equivalent authority from the other states/centralGovt.
- 35. Guarantee:**
- 35.1 The guarantee period shall be valid up to 24 months with effect from the date of Completion Certificate of the whole work by DPA, However LED light fittings & fixtures shall carry warranty for the period of five years as per manufacturer guarantee terms.
- 35.2 The Contractor shall give guarantee to the Board that the goods and services under this contract will comply strictly with the contract, shall be first class in every particular case and, shall be free from defects. The Contractor shall further give guarantee to the Board that all materials, equipment and the supplies furnished by him will be new and fit for their intended purposes.
- 35.3 The Board shall promptly notify the Contractor in writing of any claim arising under this guarantee. Upon receipt of such notice, the Contractor shall promptly repair or replace the defective goods and/or services at no cost to the Board. If the Contractor, having been notified, fails to rectify the defects in accordance with the contract, the Board may proceed to take such remedial action as may be necessary, at the Contractor's risk and cost.
- 36. Insurance:**
- 36.1 The contract shall provide in the joint names of the employer and the contractor, insurance cover from the start date to the end of guarantee period for the following events which are due to the contractor risk:
- a) Loss of or damage to the works, plan and materials
 - b) Loss of or damage to equipment
 - c) Loss of or damage of property (except the works, plant, materials and equipment) in connection with contract, and
 - d) Personal injury or death
- 36.2 All the materials shall stand insured from the time of arrival at site till commencement of erection against fire, pilferage, damage and against natural calamities for the value of 90 of each item.
- 36.3 During erection and till the work is completed and satisfactory taken over by the DPA after testing the materials shall stand covered by suitable erection insurance also for the value of 110% of the item. The charges for the insurance shall be borne by the Contractor.
- 37. The contractor shall not deposit any materials at such a place that may cause inconvenience to the public or staff or nearby offices.**
- 38. The Contractor shall execute the work in such a way that not to cause inconvenience to the public or staff or nearby offices and not to cause hindrance to traffic. Necessary barricading shall be done by the contractor at his own cost if required.**

- 39.** For the purpose of measurements, the method prescribed in standard code of measurements of the concern work shall be applicable.
- 40.** All tools, plants, scaffolding ladder etc. and other machinery etc. required temporary for the purpose of execution of work will have to be arranged by the contractor at his own cost and storing of such tools, plants etc. will have to be made by him.
- 41.** All the rules and regulations governing DPA will be applicable.
- 42.** After completion of the work, the site should be neatly cleaned by the contractor.
- 43.** The contractor shall ensure not to cause any damages to the port properties in the vicinity of work site during execution of work. If any damage occurs due to workmen/ machinery of the contractor, the contractor has to make good the loss / damage at his cost.
- 44.** All the work shall be carried out to the entire satisfaction of Engineer in Charge.

Signature & Seal of Contractor

**Executive Engineer (E)
Deendayal Port Authority**

Name of Work: “Construction of Administrative office building at Kandla - Electrical Part”

TECHNICAL SPECIFICATIONS

14001 2004

1.0 GENERAL:

- 1.1 All equipment and material shall be designed manufactured and tested in accordance with the latest applicable IEC standard.
- 1.2 Equipment and material conforming to any other standard, which ensures equal or better quality, may be accepted. In such case copies of English version of the standard adopted shall be submitted.
- 1.3 The electrical installation shall meet the requirement of Indian Electricity Rules- 1956 as amended up to date; relevant IS code of practice and Indian Electricity Act- 1910. In addition, other rules and regulations applicable to the work shall be followed. In case any discrepancy, the most stringent and restrictive one shall be binding.

**SECTION PROJECT AND SPECIFIC SCOPE
DETAILED SCOPE OF WORK**

Name Of Work: - Construction of New A.O. Building at kandla- Electrical Part for provision of power supply.

- The aim of the work, providing power supply to proposed AO building, power supply taken from PPH S/s, to proposed AO building location, kandla through overhead line which also includes Road-Crossing, Trench, Hard /Soft Marcy soil etc.
- The works also include, providing 5 Way Module, 11 KV GIS panel for proposed AO location at Electric Room.
- The rate has been derived on individual items and on kilometre basis. However, contractor has to complete the work in all respect satisfactory manner, and if any extra items are required for completion of work, same is to be arranged by contractor and the amount for same will be paid by DPA on Pro-Rata basis after completion of work.
- The work also includes liaising with Land Section, Estate Civil Department and land ownership concern for approval of route of overhead line and crossing at various point. Traceability drawing & coordinates will be submitted for approval.
- It is the responsibility of the contractor to submit the system drawing in seven sets with all details of inspectorate and obtain their approval.
- Necessary document required, if any, will be delivered by DPA to contractor and work shall be completed in time bound manner.
- For above work, DPA will not pay any extra amount to contractor.

- The Route / location may get changed, as per the site situation; accordingly, firm shall bind to carry out the work at their own cost.

- **TECHNICAL SPECIFICATION NO. 01**

Supply at site 5 module Compact GIS panel at site having following technical specification.
For 11 KV GIS Breaker Panel the scheme configuration as under.

- 1) **2 I/C.**
- 2) **3 O/G for 11 KV Feeder.**

Technical Data:

3.1 System particulars:

- a. Rated voltage ... 12Kv
- b. Rated Frequency ... 50 Hz $\pm 3\%$
- c. Rated short –duration power frequency with stand voltage: 28KV¹⁾
- d. Rated lighting impulse withstand voltage: 75KV¹⁾
- e. Rated peak withstand current: 65.75kA
- f. Rated short-circuit making current: 65.75kA
- g. Partition Class: PM
- h. Normal Feeder current: 1250A
- i. Internal Arc Classification: IAC A FLR 26.3kA 1s
- j. Rated short-time withstand current 3s: 26.3kA
- k. Rated short circuit breaking current: 26.3kA
- l. Relative Humidity 90 %.
- m. Maximum ambient Temp. ---- 45°C.

Standards:

Metal Enclosed switchgear:	IEC 62271-200
General Purpose switches:	IEC 60265-1
Dis-connector and Earthing switches:	IEC 62271-102
Switch Fuse Combination:	IEC 62271-105
Circuit Breakers:	IEC 62271-100
Common clauses:	IEC 60694
Pressure of SF6 gas:	1.4 bar at 20 °C
Cable bushings:	DIN 47636
Temperature class:	-25 °C - +40 °C Indoor

Degree of protection:

- SF6 tank:	IP 67
- Fuse canisters:	IP 67

- Front cover: IP 4X
- Cable cover: IP 4X

Bus bars to be designed for 1250Amps.

Earth bar (external): 120 mm² Cu - Bolt dimension: M10

The item includes 5 module Fixed-mounted 12KV Gas insulated medium voltage Switchgear, three position isolator/earthing switch, bus bars, interlocking, earth bar and stored spring energy mechanism (A-mech.).

Detailed technical particular as under:

1	Switchgear Panel	<ul style="list-style-type: none"> ➤ The Gas insulated Metal clad switchgear shall be complete with all the accessories for efficient and trouble-free operation. The equipment offered shall be safe, reliable and compact to install. The workmanship shall be high order. The circuit breaker switches and protective device etc shall be latest design so as to ensure rapid and efficient interruption of fault current low arc energy, small arcing time and freedom from fire hazards. The switchgear panel shall be fully arc proof, free standing, floor mounted, fully compartmentalized, metal enclosed construction complying requirements of IEC 62271- 200. Each circuit shall have a separate vertical panel with required compartments for circuit breaker, cable termination, main bus-bars and auxiliary control devices. ➤ Switchgear shall have an Internal Arc Classification of IAC-A-FLR 26 KA, 1 sec. (as per EI guidelines all switchgear shall be at least 1.2 meters away from wall) The switchgear construction shall be such that the operating personnel are not endangered by breaker operation and internal explosions, and the front of the panels shall be specially designed to withstand these. Gas Pressure relief device/Explosion Vent/ Pressure relief duct shall be provided for each SF6 gas compartment, so that in case of a fault in a compartment, the gases produced are safely vented out, thereby minimizing the possibility of it's spreading to other compartments and panels. The pressure relief device/Explosion Vent/ Pressure relief duct shall not however reduce the degree of protection of panels under normal working conditions.
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		<ul style="list-style-type: none"> ➤ The switchgear shall be cooled by natural air flow. The switch board shall have the facility for extension on both sides. The facility of Extension of additional breakers (to existing set up) for future expansion shall be provided. ➤ The manufacturer shall give guarantee for maximum leakage rate of SF6 gas will be lower than 0.1 % per year. In case of Gas leakage the GIS should have the capability to withstand die-electric strength at 1bar pressure. Separate gas monitoring sensors should be available for all the gas filled chambers. ➤ The minimum operating SF6 gas pressure shall be 1.4 Bar at 20°C. Alarm shall be generated if the SF6 gas pressure drops to 85% of the minimum operating pressure and if it further drops below 80% the Circuit breaker shall trip & go into lockout mode. ➤ Thermostatically controlled space heater with common MCB shall be provided for various compartments.
2	GIS SWITCHGEAR WITH BUS BAR IN SF6 GAS:	<ul style="list-style-type: none"> ➤ The SF6 gas insulated metal enclosed switchgear shall be constructed from corrosion- resistant stainless steel sheet of min 2 mm thickness, filled with SF6 accommodating the primary switching devices (Busbar and Three position dis-connector cum earthing switch) and all live parts. This panel complying ingress protection min IP 67. ➤ The GIS switchgear shall be provided with Silicon coated Busbars. ➤ The Switchgear enclosure complying ingress protection IP4X. ➤ Paint shade of Indoor Switchgear shall be 694 as per IS: 5(Dove Grey).
3	Bus Bar	<ul style="list-style-type: none"> ➤ Busbar shall be of made of electrolytic high grade Copper of adequate size and bus bar size calculation / supporting type test report shall be submitted for approval (current density of copper shall not exceeded more than 1.6 Amp/sq.mm). They shall be adequately supported on insulators to withstand electrical and mechanical stresses due to specified short circuit currents. ➤ Capacity 1250 Amps. ➤ All piping for SF6 gas shall be made of copper & their fittings shall be made of non- magnetic stainless steel.

		<ul style="list-style-type: none"> ➤ The temperature of the busbars and all other equipment, when carrying the rated current continuously shall be limited 60deg C above ambient temperature 45deg C as per the relevant Standards.
4	GIS Circuit Breaker	<ul style="list-style-type: none"> ➤ GIS Circuit Breaker can be used for system voltage 11KV. ➤ 11 KV GIS breaker shall comprise of three single pole interrupting units or 3-pole interrupting unit, operated through a common shaft by a sturdy operating mechanism. ➤ Closing spring charging shall only be acceptable. Anti-pumping features shall be provided for each breaker. An arrangement of two breakers in parallel to meet a specified current rating shall not be acceptable. (No parallel interrupter). ➤ Circuit breaker shall be provided with two trip coils. ➤ Suitable indicators shall be provided on the front of panel to indicate OPEN / CLOSED conditions of the circuit breaker, and CHARGED / DISCHARGED conditions of the closing spring, SF6 gas density monitor for all gas compartments. ➤ For 11kv feeder: Tripping time; 45-50 ms (Including Relay Time) Closing Time: 40-60 ms. ➤ Manual/ Auto Spring Charging shall be provided in all feeders. ➤ The circuit-breaker has to control at least 10,000 Make-Break cycles without maintenance. The mechanical life and operating cycles of the vacuum interrupter shall confirm relevant IS/IEC amended up to date. ➤ The circuit breaker shall be provided with motor operated spring charged closing. Spring charging motor shall be suitable for 240V, 50 Hz, single phase AC. Suitable rating starter shall be provided for Motor protection. Spring release coil for closing shall be suitable for 110V DC. ➤ Tripping of the circuit breakers shall be through "Shunt trip" coils rated for 30V DC auxiliary supply. It shall be possible to trip the breaker manually in case of necessity. ➤ Power pack battery must be 110 DC Output, ampere hour of battery shall be at least 500 Ah.

4	Dis-connector & Earth Switch	<ul style="list-style-type: none"> ➤ Switchgear panel shall be provided with three (3) position disconnecting-cum-earthing switch of required rating. ➤ The earthing position for all 3 phases must be visible via a mechanical position indicator (MIMIC) directly connected to the drive shaft on panel front Fascia. The mechanical operation of isolator / 3 position dis-connector switch must be possible with door closed for operator safety.
5	Control & Interlock	<ul style="list-style-type: none"> ➤ Switchgear having Mechanically & Electrically Interlock as per scheme configuration. ➤ Necessary mechanical & Electrical interlocks shall be provided between CB, Isolator & Earth switches for safe operation.
6	SCADA compatibility	<ul style="list-style-type: none"> ➤ Panel shall have SCADA compatibility
7	Numerical protection Relay	<ul style="list-style-type: none"> ➤ Indoor switchgear panels shall have communicable numerical protection relays (IEDs) complying with IEC-61850 on all feeders which shall be networked on Ethernet to communicate with substation SAS/SCADA system on IEC-61850. Relay shall have redundant RJ45 ports complying to PRP redundancy of IEC 61850. These IEDs shall also be used for control & monitoring the switchgear from SAS. In addition to status of devices (CBs/Isolators/Earth Switches) and equipment alarms, Metering data shall also be made available to SAS/SCADA station from protection IEDs. Directional numerical relays shall have provision of both current (CT) and voltage (PT) inputs as required for protection & measurement purposes using protection cores. ➤ All Numerical relays shall have features for electrical measurements of current. ➤ Numerical relays as per IEC including report for IEC 61850 protocols from accredited lab. ➤ All numerical relays shall be rated for control supply voltage 110 Volt DC and shall be capable of satisfactory continuous operation between 80-110% of the rated voltage. Making, carrying and breaking current ratings of their contacts shall be adequate for the circuits in which they are used. Heavy duty binary output contacts of IEDs to be used for breaker close and trip commands shall be so rated as to be used directly used in the closing and tripping circuits of breaker without the need of any interposing / master trip relays.
8	Numerical Protection for I/C feeder	<ul style="list-style-type: none"> ➤ The relay shall have instantaneous as well as time delayed three over current (50) and one earth fault (50N) protection elements. with standard inverse characteristics (1.3 and 3 Sec) IDMT. ➤ The over current element should have the minimum setting adjustable between 20-200% of CT secondary

		<p>rated current with increment/decrement by 1 % and high set setting 100-2000%.</p> <ul style="list-style-type: none"> ➤ The earth fault element of relay shall be suitable for detection of earth fault currents in the range of 5% to 80% of the CT rated current (IDMT) and high set 100-1000%. ➤ The relay shall have selectable directional & non-directional feature. ➤ Trip circuit supervision shall be provided to monitor the circuit breaker trip circuit both in pre-trip and post-trip conditions.
9	Numerical Protection for O/g Feeder	<ul style="list-style-type: none"> ➤ Self-powered, Earth Fault, O/C, instantaneous earth Fault.
10	2 Nos. I/C feeder	<p><u>CT Ratio 150-100/1-1.</u></p> <ul style="list-style-type: none"> ➤ Accuracy Class =0.5 ➤ CT shall be designed considering the 25 KA for 3 sec. ➤ CT shall have metering & protection core both. ➤ Rated Burden 15/5 VA. ➤ Insulation Class E. ➤ 5P10 ➤ The CTs shall be resin/epoxy cast. Correct polarity shall be invariably marked on each primary and secondary terminal. ➤ All current transformers for GIS shall be ring type (Tape wound / resin cast). ➤ Confirming to IEC: 60044-1. ➤ No of secondary core: 2. <p><u>PT Ratio 11KV/3/110 V AC.</u></p> <ul style="list-style-type: none"> ➤ P.T. shall be epoxy/resin cast. Contact tips of primary/secondary contacts shall be silver plated. Correct polarity shall be distinctly marked on primary and secondary terminal. ➤ 3 Phase Primary Input 11 KV. ➤ Output 110 Volt. ➤ Core 2. ➤ Rated Burden 15 VA.
11	3 O/G. feeder	<p>CT=> 100-75/1-1 Accuracy Class => 0.5. Metering & Protection Core. Insulation Core Class E</p>

		The CTs shall be resin/epoxy cast. Correct polarity shall be invariably marked on each primary and secondary terminal. Burden 10VA. 5P10
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General requirement of 5 module Gas Insulated switchgear as under:

Qty. (In Nos.)	Requirement
5	Set of Terminal Protector boots for covering cable-termination.
2	Manometer installed on for Gas Pressure indication.
5	Operating handle
5	Suitable Power Pack for Auxiliary 100 volt DC Power supply for Electro-Mechanical Aux Relays and Master Trip Relays. To be add Battery Life and specification .
5	Ammeter, Voltmeter for 2 I/c + 3 O/G
5	Breaker ON(red)/OFF(green)/TRIP(amber) LED Indication for each
5	Local/remote selector switch for each feeder
5	Auto/Manual selector switch for each feeder
5	Numeric relay for 2 Nos. I/C Feeder for over Current, Earth Fault, Instantaneous Earth Fault, with Master Trip with trip Ckt Supervision relay.
5	Numeric relay for 3 Nos. O/G Feeder for over Current, Earth Fault, Instantaneous Earth Fault, with trip Ckt Supervision relay
Relay Make	ABB REF 615/Siemns 7SR only
Make of GIS	SIEMENS / ABB /Schnider

- **TECHNICAL SPECIFICATION NO. 02**

This includes erection, testing and commissioning of 5 ways of 11KV Gas Insulated switchgear at proposed AO building Electrical Room as directed by EIC.

The GIS shall be erected on fabricated "C" Channel platform of suitable size of M.S. channel having height of .5 Mtr. & the platform shall be grouted with suitable Anchor Fasteners. Surrounding the MS platform, the brick masonry with fine plaster may be provided. Each panel shall be connected with 2 separate and distinct Earthing. After installation of GIS panel, necessary test and trial are to be carried out for proper functioning of safety, devices, relay etc. and before charging GIS's all the tests required under relevant ISS and IEC – Rules 1956 shall be carried out and the result shall be in conformity with specifications and copies of test results shall be furnished to EIC. The complete work shall be carried out as directed by E.I.C. The side cable fix/adaptor box wherever necessary/required shall be provided, to interconnect to existing feeder. The works include end terminations/straight through supplied cable joints of existing O/G, I/C cable in 5 Way GIS by clearing the loops of cables if available and also terminates the control cable. The work includes all special tools, Tackle Man & material.

The work includes all Labour & material required for installation & commissioning of GIS and shall be done as directed by E.I.C.

- **TECHNICAL SPECIFICATION NO. 03**

This includes supply at site following size HT 11/12 KV grade, 3 cores Aluminum conductor, XLPE insulated armored cable of given size which confirming to IS: 7098 (Part-II) 1988 with up-to-date amendments and of approved make with ISI mark. The manufacturer shall produce TYPE TEST certificate with similar size of cable, which shall not be more than 3 years old. The cable shall have marking/embossing at the interval of every meter showing its progressive length. During the cable inspection, the manufacturer shall show the relevant ROUTINE TESTS to inspecting authority or otherwise the manufacturer / Contractor shall produce the routine test certificate during supply of cable at site.

i). 3CX150 Sq. mm (U/E) XLPE Insulated

- **TECHNICAL SPECIFICATION NO. 04**

The cable laying method as mentioned below, however providing & fixing necessary indicated day & night, 11 KV route marker (5 feet) wherever cable laid in underground.

IN ROAD THROUGH HDD

Cable shall be laid underneath by using {12" Boar Dia} Horizontal Directional Drilling (HDD) method by putting suitable diameter Dia HDPE (suitable for cable size up to HT 3.5CX 150 Sq.mm) HDPE pipe having strength 10Kg/sq.cm} shall in contractor scope), the contractor shall be arranged JCB Machine for excavation, water for drilling, de- watering pump, HDD equipment's at their own cost.

The cable shall be pass-through heavy-duty HDPE /DWC pipe buried at nominal minimum depth 165 cm or according to construction of RCC Road or as per directed by EIC. For single size/length cable, individual HDPE/DWC pipe shall be passing through a road /rail crossing, for another cable; separate HDPE/DWC pipe shall pass through the Tunnel / trench. Laying of HDPE/DWC pipes coupled by HDPE/DWC socket only after standard length in excavated trench/tunnel and also sealing of HDPE pipe ends by suitable cap at every manhole. Back filling & dressing of excavated trenches as per specification. Necessary civil works if required (CC, RCC, Dammar) as direction by Civil Department, same shall be included in scope of work. This includes all labour and material as directed by Engineer-in-Charge.

IN HARD / SOFT SOIL

The cable shall be laid through excavation in soft/hard soil. The trench to be excavated 0.3 Mtr. Wide 1.5 Mtr. deep. The bed of 50mm of river sand shall be provided in the bottom of the excavated trench. The bed of 50mm of river sand shall be provided in the bottom of the excavated trench. This includes providing & lying of 150mm half ROUND RCC NP-2 pipe of cable lengthwise i.e. parallel to

the cable and the gaps shall be filled by fresh river sand. & followed by excavated stuff & should be watered and rammed properly to its original position. The excess excavated stuff shall be disposed off from the Site of work and spreaded in low laying area as directed. The contractor shall provide heat shrinkable straight through joint of relevant size of approved make if the laying of cable shall be more than standard drum length. This includes all labour and material as directed by Engineer-in-Charge

IN CABLE TRENCH/TRAY

The cable shall be laid through trench, if laid in existing trench same, then clean the trench properly without disturbing existing cable and laid accordingly. however, if cable laid in proposed location through tray, same shall be cable bind with cable tie/binder, as per norms. This includes all labour and material as directed by Engineer-in-Charge

• TECHNICAL SPECIFICATION NO. 05

Supply, Installation, testing and commissioning of 11kv line with 100 mm² AAAC Conductor(dog) with wind pressure 180 kg/m² on rsj/tubular pole-11 Mtr (span-35 Mtr). This includes supply at site & stringing of stranded AAAC conductor code name DOG of size 100 sq.mm as per Indian Standard Title International Standard

IS:398 (Part-IV) Aluminum Alloy IEC : 208-1966 stranded conductor BS-3242-1970 IS : 9997-1988 Aluminum Alloy Redraw Rods IEC 104-1987 IS : 1778-1980 Reels and Drums for bare conductors BS:1559-1949 in a minimum length of 2000meters length in wooden drum, the conductor manufacturing batch shall be of 2019 and same shall be submitted along with necessary documents same is to be string on HT pin and strain insulators, binding on insulators, jumpering, the jointing in HT line will be done by twisting sleeve joints as per standard practice. Care must be taken in handling the conductor to protect against cuts, scratches or kinks. The conductor must not be drawn over hard surface ground, where it is liable to be damaged. AAAC conductors must be drawn on wooden or aluminum pulley only. Wastage and cutting should be avoided as far as possible. Not more than 2% sag will be accepted in the materials account. The sag and spans will be maintained as per PGVCL norms.

The cross arms insulators must be so fixed that neither tilts nor brands from position. The rate quoted should be of three conductor route per kilometer. The sagging should be uniform for all conductors and uneven sagging will not be allowed. The ground clearance, line to line clearances etc. to be maintained as per latest IE Rules. Apart from above if in our existing lines some part is to be replaced/re-laid same will be done by contractor and no extra cost will be paid to them.

11KV LINE WITH 100 MM² AAAC COND.(DOG) WITH W. PRESS. 100 KG/M² ON RSJ POLE-11 MTR (SPAN-30 MTR), Item mentioned for per km. accordingly contractor calculate for proposed line.

SL. NO.	PARTICULARS	UNIT	QTY
1	RSJ POLE (116X110---11 MTR)	NO.	25.00

2	11KV V CROSS ARM. (From Angle of 65X65X6)	NO.	25.00
3	Side clamp (65x65X6 m.s Angle)	NO.	50.00
4	HT TOP fittings (angle from 65x65X6 M.S - 150MM)	NO.	25.00
5	(a) Ancher rod - 1 No.	NO.	4.00
6	(b) Turn buckle - 1 No.	NO.	4.00
7	(c) Eye Bolt - 1No(16mmX590 mm Round Bar).	NO.	4.00
8	(d) Stay wire- 7/12	KG	13.60
9	(e) HT Guy Insulator - 1 No.	NO.	4.00
10	(f) Guy Clamp - 1 Set.	SET	5.00
11	(a) GI Wire No. 8 From Pole Top to Earthing Coil	KG	34.00
12	(b) Rigid PVC Pipe -20mm dia (1.5 Mtr) - 1No	NO.	25.00
13	(c) Earthing Bolt	NO	25.00
14	(d) Earthing Coil (GI Wire No 8)	NO	25.00
15	Barbed wire	NO.	25.00
16	CAUTION & DANGER BOARD.	NO.	25.00
17	(a)22 KV Pin Insulator	No	75.00
18	(b) 22 KV GI Pin	No	75.00
19	(a) 11 KV Ball & Socket Type Comp (Polymer) Insulator (Long Rod)	NO.	24.00
20	(b) 11 KV Disc. Hardware	Set	24.00
21	AL. ALLOY CONDUCTOR 100 MM2 SIZE.	KM.	3.09
22	(a) M.S. Bolts & Nuts 65x16mm	KG	1.60
23	(b) M.S. Bolts & Nuts 180x16mm	KG	35.60
24	(b) P.G. Clamp for 'DOG'/Wedge Connectors 100 sq.mm	No	24.00
25	(c) Alu. Binding wire	KG	0.90
26	(d) HT Tape	Mtr	18.00

The work includes 150 mm PCC shall be done in the base of pole by providing & fixing suitable casing with respect to RSJ pole & after erection of pole in casing the cement concreting of ratio (1:2:4) by proper excavation and insertion of Pole. Cement Concrete shall be done 600 mm below GL & 600

mm Below GL. The work complete with labour and material and same should be in proper alignment cement concreting with one part of cement, two part of specified quality sand and four parts of grit (1:2:4). The mixture should be prepared on GI sheet and should be free from the dust. Cement river sand and metal should be used by contractor at his own cost. Concern for muffing of poles and stay rods should be cement one part, sand two parts and four parts of Metal (1:2:4). Cement, sand and metal must be got approved from our civil department and work execution will also be in there scope regarding cement concrete. The concrete shall be used in above proportion and should be thoroughly mixed at least three times in dry state before water is added and as far possible a fairly wet mixture must be used all concrete must be mixed on watertight platform. In any case, the work finishing coat of cement plaster should be applied on outer surface of the smooth. One finishing coat of cement plaster should be applied on outer surface of the muffing. The concrete block, when slightly dried, should be kept wet continuously for period of 10 days. The location for concerting will be decided by the Engineer-in-charge and the contractor will follow his instructions scrupulously. If the concerting work is not found as per the specifications and quality, the same is liable to be rejected. The cement concerting work and muffing has to be done in the presence of DPT representative only and work done in his absence will be rejected and no payment made thereof. The cement, sand, metal grit shall be procured by the contractor. The normal size of concreting/muffing for stay 2'x2'x2', Muffing for stay shall be 12" diax2.9".

- **TECHNICAL SPECIFICATION NO. 06**

For 11 kV Double Pole Structure with 11 kv A.B. Switch& DO Fuse on 11 Mtr RSJ pole. Underground Cable shall be terminated in DP pole However, location of DP pole may get change as per site situation.

SR	PARTICULARS	UNIT	QTY
1	RSJ POLE (116X110---11 MTR)	NO.	2.00
2	M.S. Angle Top FEBRI.65x65x6mm - 2750mm	No	2.00
3	M.S. Angle 11 KV A.B. Switch - Fabri 65x65x6mm- 2750mm	No	4.00
4	M.S. Angle Fabri. 65x65x6mm - 2750mm for cross bracing	No	4.00
5	11 KV A.B. SWITCH 400 AMP.	SET	1.00
6	Side Clamps for mounting A.B Switch (M.S Flat of size 50X6)	NO	16.00

7	(a) Ancher rod - 1 No.	NO.	4.00
8	(b) Turn buckle - 1 No.	NO.	4.00
9	(c) Eye Bolt - 1No (16mmX590 mm Round Bar).	NO.	4.00
10	(d) Stay wire- 7/12	KG	13.60
11	(e) HT Guy Insulator - 1 No.	NO.	4.00
12	(f) Guy Clamp - 1 Set.	SET	4.00
13	(a) GI Wire No. 8 From Pole Top to Earthing Coil	KG	2.72
14	(b) Rigid PVC Pipe -20mm dia (1.5 Mtr) - 1No	NO.	2.00
15	(c) Earthing Bolt	NO	2.00
16	(d) Earthing Coil (GI Wire No 8)	NO	2.00
17	(a) 11 KV Porcelyn Disc Insulator	No	12.00
18	(b) 11KV Disc. Hardware	Set	6.00
19	11 KV COMPOSITE POLYMERIC D O FUSE	No	3.00
20	(a) M.S.Bolts& Nuts 65x16mm	KG	7.20
21	(b) M.S.Bolts& Nuts 180x16mm	KG	2.49
22	(c) P.G.Clamp for Weasel or Rabbit	No	9.00
23	(d) Binding tape HT for jumpering	Mtr	20.00
24	(e) Alu. Binding wire	KG	0.50

The work includes 150 mm PCC shall be done in the base of pole by providing & fixing suitable casing with respect to RSJ pole & after erection of pole in casing the cement concreting of ratio (1:2:4) by proper excavation and insertion of Pole. Cement Concrete shall be done 600 mm below GL & 600 mm Below GL. The work complete with labour and material and same should be in proper alignment cement concreting with one part of cement, two part of specified quality sand and four parts of grit (1:2:4). The mixture should be prepared on GI sheet and should be free from the dust. Cement river sand and metal should be used by contractor at his own cost. Concern for muffing of poles and stay rods should be cement one part, sand two parts and four parts of Metal (1:2:4). Cement, sand and metal must be got approved from our civil department and work execution will also be in there scope regarding cement concrete. The concrete shall be used in above proportion and should be thoroughly mixed at least three times in dry state before water is added and as far possible a fairly wet mixture

must be used all concrete must be mixed on watertight platform. In any case, the work finishing coat of cement plaster should be applied on outer surface of the smooth. One finishing coat of cement plaster should be applied on outer surface of the muffing. The concrete block, when slightly dried, should be kept wet continuously for period of 10 days. The location for concerting will be decided by the Engineer-in-charge and the contractor will follow his instructions scrupulously. If the concerting work is not found as per the specifications and quality, the same is liable to be rejected. The cement concerting work and muffing has to be done in the presence of DPA representative only and work done in his absence will be rejected and no payment made thereof. The cement, sand, metal grit shall be procured by the contractor. The normal size of concreting/muffing for stay 2'x2'x2', Muffing for stay shall be 12" diax2.9".

The work is to be carried out as per Indian Electricity Rules and as per norms of PGVCL. However, contractor shall be providing, fabricated & erecting the M.S fencing & duly painting shall be provided on such switches.

- **TECHNICAL SPECIFICATION NO. 07**

The guarding will have to provide at crossing of overhead lines, road crossing and such other places as indicated by the DPT. The work comprises of fixing of guard cross arms, eye bolts, guard cradle as per design, GI cross lacing wires complete. Binding cross arms must be used where the HT line crosses the road. The ground clearance, line to line clearances etc. to be maintained as per latest IE Rules. The poles for road crossing is of RSJ 11 Mtrs in length. Accordingly, the work is to be carried out at suitable height. The work has to be carried out as per norms of PGVCL or as per instructions of the Engineer In-charge.

SR	PARTICULARS	UNIT	QTY
1	M.S.Angle 65x65x6mm - 2 Mtr for guarding Angle cross arm/Guarding Channel	No	50.00
2	Side clamp(Flat Bar of size 50X6)	No	50.00
3	G.I. WIRE NO.10 (3.15 MM)	KG.	37.50
4	G.I. WIRE NO. 8	KG.	237.50

5	(c) Eye Bolt - 1No(16mmX590 mm Round Bar).	No	100.00
6	Bolts & Nuts - 65x16mm	KG	20.00
7	Alu. Binding wire	KG	5.00

- **TECHNICAL SPECIFICATION NO. 08**

This includes supply & fixing of heat shrinkable outdoor type end termination KIT to HT 3 Core X 150 sq mm. This including fixing of all required materials. The joint shall be electrically and mechanically permanent. The work includes all labour, tools tackles, joint kit of approved make and as directed by Engineer-in-Charge. The Make: -Raychem, 3M only.

- **TECHNICAL SPECIFICATION NO. 09**

This includes Supply & fixing of heat shrinkable Indoor type end termination KIT to HT 3 Core X 150 sq mm. This including fixing of all required materials. The joint shall be electrically and mechanically permanent. The work includes all labour, tools tackles, joint kit of approved make and as directed by Engineer-in-Charge. The Make: -Raychem, 3M only.

- **TECHNICAL SPECIFICATION NO. 10**

This includes Supply & fixing of heat shrinkable Straight Through Joint KIT to HT 3 Core X 150 sq mm. This including fixing of all required materials. The joint shall be electrically and mechanically permanent. The work includes all labour, tools tackles, joint kit of approved make and as directed by Engineer-in-Charge. The Make: -Raychem, 3M only.

- **TECHNICAL SPECIFICATION NO. 11**

This item includes preparation of maintenance free earth station by providing 80 mm diameter, 3 meter, 100-micron hot dipped GI chemical electrode with back fill compound including accessories & masonry work. A cement concrete (ratio 1:4:8) chamber of at least 300 mm × 300 mm shall be prepared and a CI cover of suitable size shall be provided for the chamber. The work shall be

carried out to entire satisfaction of Engineer in charge. This work includes all material, labour, tools & tackles as directed by Engineer-in-Charge.

- **TECHNICAL SPECIFICATION NO. 12**

This item includes preparation of maintenance-free, heavy duty, pure electrolytic copper chemical earthing electrode of 17.2 mm dia., pipe dia. 50 mm wall thickness 16 gauge and 3 m length with internal strip of copper 50 mm X 6 mm along with 60 kg bag of backfill compound (high conductivity, non-corrosive, moisture retaining chemical) complete with excavation, civil works including top 300 mm deep one brick thick masonry chamber with cast iron (CI) complete with heavy duty earth chamber (underfloor test box) without separating piece and having 5000 kg load bearing capacity to ensure safety of earthing system with necessary accessories complete all as specified and directed by the engineer-in-charge.

NOTES:
[i] The voltage between neutral and earth not to exceed 0 V and IR value shall be less than 1 ohm.
[ii] The earth resistance shall be as per IS 3043: 2018.

- **TECHNICAL SPECIFICATION NO. 13**

This item includes supply at site, laying, fixing and connection of HOT DIP GI strip from earth station to electrical equipment as directed. The GI strip shall be laid and clamped suitably on wall/floor/structure or buried in the ground as directed. This work includes all material, labour, tools & tackles as directed by Engineer in-Charge.

- **TECHNICAL SPECIFICATION NO. 14**

Supply, installation, testing and commissioning of 1000 kVA, 11 / 0.433 kV, 50 Hz, oil immersed, ONAN cooled, 3-Phase step-down distribution transformer, having efficiency level 3, on load tap changer (OLTC) with remote tap changer control (RTCC) and automatic voltage regulator (AVR), conforming to IS 1180-3: 2021, including first filling of natural ester oil having dielectric breakdown strength ≥ 50 kV and conforming to IS 16659: 2017, CRGO bolt-less prime grade core (M4 or better) having high endurance, HV & LV windings wound from paper insulated electrolytic grade copper conductor with tapping on the HV winding for variation of HV voltage within range of +5% to -15% in steps of 1.25%, hermetically sealed corrugated tank, HV cable box & LV busduct terminations having 180° orientation with all standard fittings / accessories and mounted on a platform as per manufacturer's recommendations, complete all as specified and directed by the engineer-in-charge.

THE TRANSFORMER SHALL CONFORM TO THE FOLLOWING TECHNICAL SPECIFICATIONS.

[i] Transformer Rating: 1000 kVA
[ii] Highest System Voltage: 12 kV
[iii] Rated Voltage (HV/LV): 11 kV / 433 V
[iv] Frequency: 50 Hz \pm 3%
[v] No. of Phases: 3
[vi] Connection (HV / LV): Delta / Star (neutral brought out)
[vii] Vector Group: Dyn11
[viii] Type of Cooling: ONAN
[ix] Audible Sound Level: < 75 dB
[x] Insulation Level:
(1) HV Peak Impulse Voltage: 75 kV
(2) HV Power Frequency Voltage: 28 kV
(3) LV Power Frequency Voltage: 2 kV
[xi] Impedance @ rated current, 75 °C & normal tap position: 5.00%
[xii] Maximum Losses:
(1) No load loss @ rated current, 75 °C & normal tap position: 2.460 kW
(2) Full load loss @ rated current, 75 °C & normal tap position: 6.364 kW
[xiii] Efficiency
(1) at 100% load, unity PF: 98.60%
(2) at 100% load, 0.8 PF: 98.25%
[xiv] Regulation
(1) at 100% load, unity PF: 1.499%
(1) at 100% load, 0.8 PF: 4.800%
[xv] Cable Box / Busduct Clearance (as per CBIP):
(1) HV Cable Box: 165 mm Phase to Phase; 75 mm Phase to Earth
(2) LV Busduct: 40 mm Phase to Phase; 25 mm Phase to Earth
[xvi] Terminal Markings:
(1) HV: 1U, 1V, 1W
(2) LV: 2u, 2v, 2w, 2n
[xvii] On Load Tap Changer (OLTC) +5% to -15% in steps of 1.25% @ 11 kV along with RTCC having voltage setting device, voltage sensing & regulating devices, line drop compensator with adjustable R & X elements, timer 5 to 25 seconds for delaying the operation of the tap changer in the first step for every tap change operation and adjustable dead band for voltage variation
[xviii] The following standard fittings / accessories shall be provided along with the transformer:
(1) Non-detachable rating & terminal marking plates
(2) Monogram plate
(3) Lifting lugs for main tank & top cover & jacking lugs
(4) Top filter valve

(5) Drain cum bottom filter valve
(6) Oil sampling valve
(7) Earthing terminals with lugs: 2 Nos.
(8) Storage & instruction plate
(9) Skid type under base
(10) Bi-directional plain / flange rollers
(11) Detachable type radiators with top & bottom shut-off valve
(12) WTI & OTI with alarm & trip contact
(13) Marshalling box
(14) Magnetic Oil level gauge low oil level alarm contact
(15) Pressure Relief Valve

NOTES:

[i] The LV side of the transformer shall be compatible with busduct termination.

[i] The Contractor shall submit the type test certificate / report of transformers of similar or higher rating to the engineer-in-charge for verification before finalization of the purchase order (PO).

[ii] The Contractor shall furnish dimensional drawings of the items offered indicating all the fittings, dimensional tolerances, typical GADs, etc. to the engineer-in-charge for approval of the MEP Consultant and thereafter A.O. / representative.

[iii] The bidder shall intimate the A.O. for the routine tests in accordance with IS 1180 and / or IS 2026 and the tests shall be performed in the OEM factory in presence of a representative nominated by the engineer-in-charge before dispatch.

- **TECHNICAL SPECIFICATION NO. 15**

Supply, installation, testing and commissioning of 1000 kVA, 3-Ph, oil-cooled industrial voltage stabilizer to offer complete protection to electrical as well as electronic equipment from any variation of current and voltage from low to high having overload cut-off & short-circuit protection, low / high voltage (out of input range) alarm & cut-off, phase reversal alarm & cut-off, digital multifunction meter, manual bypass & auto phase correction, IC based solid-state relay-less plug-in control cards for easy online serviceability, wide ambient temperature operation from -20 °C to 50 °C, etc., complete all as specified and directed by the engineer-in-charge.

The voltage stabilizer shall conform to the following technical specifications:

[i] Rating: 1000 kVA
[ii] Input Voltage Range: 340 V to 480 V AC
[iii] Output Voltage: 400 V \pm 1%
[iv] Output Adjustable: 380- 415 V AC
[v] Output Regulations: \pm 1%

[vi] Type: Unbalanced Type
[vii] Insulation: Class B
[viii] Vector Group: Star / Star, 3 Phase + Neutral
[ix] Frequency: 50 Hz $\pm 1\%$
[x] Nature of Cooling: Oil-Cooled
[xi] Construction: Variable Auto Transformer + Buck Boost Transformer + Servo Motor
[xii] Effect on Power Factor: Nil
[xiii] Waveform Distortion: Nil
[ixv] Control Circuit: IC based digital circuit and control
[xv] Response Time: 10 ms or as per IS 9815
[xvi] Voltage Correction Rate: 8-12 V/s
[xvii] General Efficiency: $\geq 96\%$ or as per IS 9815
[xviii] Ambient Temperature: 0 to 55 °C
[ixx] Protection: (a) Under / Over Voltage cut-off protection (b) Overload / Short-Circuit protection (c) Manual bypass / changeover (d) Surge Protection using SPD, Class C (e) Single Phase prevention

• **TECHNICAL SPECIFICATION NO. 16**

Supply, installation, testing and commissioning of IP65 rated sandwich type (3L+N+PE) busbar trunking system complete with two runs of 50 mm X 6 mm aluminum earthing strip and accessories all as specified and directed by engineer-in-charge.

The BTS shall conform to the following technical specifications:

[A] GENERAL

[i] The busbar trunking system (BTS), both feeder and plug-in, shall be of sandwich construction. All components and fittings (straight length, elbow, tee, flanged end, cable tap-off box and circuit breaker etc.) shall conform to IEC 61439-6:2012 or UL 857 and shall be procured from the OEM of BTS. The BTS shall have IP 65 protection with canopy for outdoor application and IP 66 protection in accordance with IEC 60529: 1989.

[ii] The rated operation voltage of BTS shall not be less than 1 kV. The neutral conductor shall have the same cross-sectional area as the phase conductor and the earth busbar shall be provided on both sides of the housing.

[B] CERTIFICATE

[i] The busbar, of full range and each rating, shall pass full type tests specified in IEC 61439-6-2012. The certificate shall be issued by an international independent testing authority, e.g. ASTA. KEMA. UL, ERDA, CPRI etc.

[ii] A product safety mark, e.g. KEMA-KEUR, ASTA DIAMOND, UL and ERDA, CE, etc. shall be on the product offering a visual assurance of full product safety testing, factory inspection and ongoing surveillance under independent authority.

[iii] The BTS shall be certified for seismic tests conforming to IEEE 693-2018 for seismic zone V.

[C] SHORT-CIRCUIT RATINGS & TESTS

[i] The entire BTS (busduct and plug-in box assembly) shall be capable of withstanding the short-circuit of electrical installation without undergoing any electrical, mechanical or thermal stress under fault condition at a service voltage of 1 kV at 50 Hz frequency. The minimum rated insulation voltage shall be 1 kV.

[ii] The certified minimum short-current withstand capacity

(a) for 800 A rating shall be 50 kA for 1 sec

(b) 1000 A rating shall be 50 kA for 1 sec

(c) for 1250 A rating shall be 65 kA for 1 sec

(d) for 1600 A rating shall be 80 kA for 1 sec

(e) for 1600 A rating shall be 80 kA for 1 sec

(f) for 2000 A rating shall be 80 kA for 1 sec

(h) for 2500 A rating shall be 80 kA for 1 sec

(i) for 3200 A rating shall be 100 kA for 1 sec

(j) for 4000 A rating shall be 100 kA for 1 sec.

(j) for 4000 A rating shall be 100 kA for 1 sec.

(k) for 5000 A rating shall be 100 kA for 1 sec.

(l) withstand capacity for 5000 A rating shall be 100 kA for 1 sec.

(m) withstand capacity for 6300 A rating shall be 100 kA for 1 sec.

[D] HOUSING

[i] The busbar trunking housing shall be constructed of 1.6 mm thick electro-galvanised steel and shall be provided with a suitable protective finish of epoxy paint.

[ii] The busbar trunking housing shall be totally enclosed non-ventilated for protection against mechanical damage and dust accumulation and it shall be tested for its characteristics offering resistance against corrosion. It shall also pass at least 1000 salt spray test to ensure its anti-corrosion ability.

[iii] The totally enclosed housing shall be manufactured by the BTS OEM and modifications of busbar trunking to make it totally enclosed by housing other than the busbar trunking OEM shall be unacceptable without written consent of the OEM.

[E] BUSBARS

[i] The busbars shall be of aluminium with tin / silver plating at joint and conductivity of the joint shall be > 60% IACS

[ii] There shall be no bolts passing through the busbars of the BBT.

[iii] Each busbar shall be insulated with Class-F (155 °C) multilayer PET insulation. Epoxy and Mica insulation shall be unacceptable.

[iv] The temperature rise at any point of busbar trunking enclosure shall not exceed 55 °C above the ambient temperature of 40 °C when operated at the rated current.

[F] JOINTS

[i] The busbar trunking joint shall be of one-bolt type utilizing high strength steel bolt(s) and Belleville washers to maintain proper pressure over a large contact surface area.

[ii] The bolt(s) shall be torque indicating and at earth potential.

[iii] The nut(s) shall be of two-headed design to indicate proper torque has been applied and shall require only a standard long handle wrench to be properly activated.

[iv] Access shall be required to only see one side of the busbar trunking to tighten joint bolts.

[v] It shall be possible to remove any joint connection assembly to allow electrical isolation or physical removal of a busbar trunking length without disturbing adjacent busbar trunking lengths.

[G] PLUG-IN OPENING

[i] The connecting jaw of a plug-in unit shall plug directly onto the busbar and have full contact with busbar itself. Welded tab at plug-in busbar is unacceptable.

[ii] All contact on joint and plug-in opening shall be of copper strip in order to avoid external force damage on busbar while plugging in or plugging out operation.

[iii] On plug-in busbar trunking there shall be three dead front, hinged cover type plug-in opening on each side.

[iv] All openings shall be usable simultaneously. Busbar trunking shall be installed in such a manner that plugs are side mounted to permit practical use of all plug-in openings.

[v] It shall be possible to inspect the plug-in opening and busbars prior to the installation of plug-in units.

[H] SUPPORT STRUCTURE

[i] Support structure shall be provided as per OEM's recommendation.

[ii] Indoor feeder and plug-in busbar trunking shall be approved for hanger spacing of up to 3 m for horizontally mounted run and 4.88 m for vertically mounted runs. Outdoor feeder busbar trunking shall be approved for spacing up to 1.5 m for horizontally or vertically mounted runs.

[I] VOLTAGE DROP

- | |
|---|
| [i] The voltage drop (sending end voltage minus receiving end voltage) specified shall be based on the busway operating at full rated current and stabilized operating temperature in |
| [ii] The 3- Phase line to line voltage drop shall not exceed 3.4 V per 100 feet length at 40% power factor concentrated load which may exist during motor starting. |
| [iii] The line to line voltage drop shall not exceed 4.1 V per 100 feet at the load power factor which produces the maximum voltage drop in the busway. |

[J] INSPECTION / SUPPORT OF INSTALLATION

- | |
|---|
| [i] The installation of busbar trunking system (BTS) shall be executed by skilled professionals with minimum experience of 5 yrs. having sufficient installation base & pre-commissioning experience. |
| [ii] The entire installation shall be directly supervised by the OEM. |
| [iii] The OEM shall also furnish a commissioning report underlining satisfactory installation after the commissioning of BTS. |

NOTES:

- | |
|---|
| [i] The Contractor shall furnish dimensional drawings of the items offered indicating all the fittings, dimensional tolerances, typical GADs, etc. to the engineer-in-charge for approval of the MEP Consultant and thereafter A.O. / representative. |
| [ii] Minimum 15% (at least one number minimum if 15% is less than 1) of all the line items shall be procured at site as spare items. |

• **TECHNICAL SPECIFICATION NO. 17**

Supply, installation, testing and commissioning of factory made, CPRI / ERDA type tested, fully compartmentalized bolted type MAIN LT PANEL (design verified assembly- DVA) of suitable size conforming to IEC 61439-1 & 2 and IEC 61641 and having modular extensible design suitable for indoor mounting, internal arc compliance of minimum 70 kA for 0.5s, made out of 2.0 mm thick mild steel CRCA sheet, having both sides openable with hinged doors and locking arrangement, IP 54 & IK 10 protection, supported and fixed on structural frame of angle iron of suitable size, including earthing stud, labelling, RAL 7010 painting to all internal & external exposed steel surfaces with powder coating paint (7 tank process), duly fixed in ground with PCC foundation (1:2:4) type B1, with danger notice plate of 1.6 mm thick mild steel vitreous enameled (white) with letters, figures and conventional skull and bones in signal red colour suitable for 3-Phase, 4-Wire system, 500 V grade with necessary wiring, PVC sheathed stranded copper conductor of appropriate length and size, including fixing lugs, bolts, screws, etc. complete all as specified and directed by the engineer-in-charge.

The MAIN LT PANEL shall comprise of the following:

[A] BUSBAR CHAMBER

[i] 02 Set (3L + N) of copper busbar of rated capacity 1600 A, 50 kA, 415V, 50 Hz covered with PVC insulated sleeves including insulator, nuts, bolts, etc. with complete connection

[B] INCOMING

[i] Circuit Breaker

(a) 1600 A, 415 V, Ics = 100% Icu = Icw (1 sec for total selectivity) = 50 kA, 50 Hz electrical draw-out type 4P ACB, conforming to IS/IEC 60947-2 & 3, having 100% neutral with inbuilt release protection, no derating up to 50 °C, microprocessor based trip & LED based display systems with thermal memory providing overload, short-circuit, instantaneous & earth-fault protection, zone selective interlocking, pre-trip alarm & individual fault indicating LEDs, 20 trip record, % loading, bar graph, max. & min. meter and pre-alarm function for overload, short-circuit & earth fault - 02 Nos.

(b) 1250 A, 415 V, Ics = 100% Icu = Icw (1 sec for total selectivity) = 50 kA, 50 Hz electrical draw-out type 4P ACB, conforming to IS/IEC 60947-2 & 3, having 100% neutral with inbuilt release protection, no derating up to 50 °C, microprocessor based trip & LED based display systems with thermal memory providing overload, short-circuit, instantaneous & earth-fault protection, zone selective interlocking, pre-trip alarm & individual fault indicating LEDs, 20 trip record, % loading, bar graph, max. & min. meter and pre-alarm function for overload, short-circuit & earth fault - 01 Nos.

(c) 1600 A, 415 V, Ics = 100% Icu = Icw (1 sec for total selectivity) = 50 kA, 50 Hz electrical draw-out type 4P ACB, conforming to IS/IEC 60947-2 & 3, having 100% neutral bus coupler- 01 Nos.

[ii] Instrumentation & Measurement

(a) CI 1.0 multi-function meter capable of measuring V, A, F, PF, W/VA, Wh/VAh, Runhrs. Onhrs & interrupts- 02 Nos.

(b) 1600/5A CL5P10 C.T. with 15 VA burden- 02 Nos.

(c) 1250/5A CL5P10 C.T. with 15 VA burden- 01 Nos.

(d) 1600/5A CI. 1.0 C.T. with 15 VA burden- 03 Nos.

(e) 1250/5A CI. 1.0 C.T. with 15 VA burden- 01 Nos.

(f) 6A, 10kA, 415V, 50 Hz 4P MCB- 02 Nos.

[iii] Indication & Annunciation

(a) LED phase indicators (Red, Yellow, Blue)- 03 Set

(b) LED status indicators (ON, OFF, TRIP)- 03 Set

(c) LED status indicators (SC, SP, TP)- 03 Set

(d) Auto / Manual Switch- 03 Set

(e) EM (emergency) Switch- 03 Set

(f) TNC Switch- 03 Set

[C] OUTGOING

[i] Circuit Breaker

(a) 800 A, 415 V, Ics = 100% Icu = Icw (1 sec for total selectivity) = 50 kA, 50 Hz electrical draw-out type 4P ACB, conforming to IS/IEC 60947-2 & 3, having 100% neutral with inbuilt release protection, no derating up to 50 °C, microprocessor based trip & LED based display systems with thermal memory providing overload, short-circuit, instantaneous & earth-fault protection, zone selective interlocking, pre-trip alarm & individual fault indicating LEDs, 20 trip

record, % loading, bar graph, max. & min. meter and pre-alarm function for overload, short-circuit & earth fault - 02 Nos.

(b) 800 A, 415 V, $I_{cs} = 100\%$ $I_{cu} = I_{cw}$ (1 sec for total selectivity) = 50 kA, 50 Hz electrical draw-out type 3P ACB, conforming to IS/IEC 60947-2 & 3, having 100% neutral with inbuilt release protection, no derating up to 50 °C, microprocessor based trip & LED based display systems with thermal memory providing overload, short-circuit, instantaneous & earth-fault protection, zone selective interlocking, pre-trip alarm & individual fault indicating LEDs, 20 trip record, % loading, bar graph, max. & min. meter and pre-alarm function for overload, short-circuit & earth fault - 02 Nos.

(C) 320 A, 415 V, $I_{cs} = 100\%$ $I_{cu} = 25$ kA, 50 Hz 4P MCCB, conforming to IEC 60947-2: 2016, having microprocessor-based trip unit, adjustable overload setting, adjustable short-circuit setting, adjustable neutral protection, front indication LEDs, etc.- 02 Nos.

(d) 200 A, 415 V, $I_{cs} = 100\%$ $I_{cu} = 25$ kA, 50 Hz 4P MCCB, conforming to IEC 60947-2: 2016, having thermal magnetic trip unit, adjustable overload setting, adjustable short-circuit setting, front indication LEDs, etc.- 02 Nos.

(e) 200 A, 415 V, $I_{cs} = 100\%$ $I_{cu} = 25$ kA, 50 Hz 3P MCCB, conforming to IEC 60947-2: 2016, having thermal magnetic trip unit, adjustable overload setting, adjustable short-circuit setting, front indication LEDs, etc.- 02 Nos.

(f) 100 A, 415 V, $I_{cs} = 100\%$ $I_{cu} = 25$ kA, 50 Hz 4P MCCB, conforming to IEC 60947-2: 2016, having thermal magnetic trip unit, adjustable overload setting, adjustable short-circuit setting, front indication LEDs, etc.- 04. Nos.

(g) 63 A, 415 V, $I_{cs} = 100\%$ $I_{cu} = 25$ kA, 50 Hz 4P MCCB, conforming to IEC 60947-2: 2016, having thermal magnetic trip unit, adjustable overload setting, adjustable short-circuit setting, front indication LEDs, etc.- 03. Nos.

[ii] Indication & Annunciation

(a) LED status indicators (ON, OFF, TRIP)- 17 Set

(b) LED status indicators (SC, SP, TP)- 04 Set

NOTES:

[i] The busbars shall be of double deck arrangement for rating ≥ 1600 A interleaved /non-interleaved design as per OEM. Separation of busbar shall be as per Form 4b. **The Panel shall be compatible with BTS incoming.**

[ii] The Panel shall be completely Ethernet communication ready to communicate with Energy Management System / SCADA System.

[iii] ACBs shall have separately powered, individual fault trip indication LEDs (For overload, short circuit, earth fault and trip-unit failure) shall be available on the trip unit which shall function even in

the absence of external power supply to the breaker. ACB shall be suitable for ZSI. Trip units shall have thermal memory as standard.

[iv] All the MCCBs up to 250 A shall be with thermal magnetic trip unit & above 250A shall be with microprocessor trip units. To ensure failsafe emergency tripping of the breakers (ACBs & MCCBs), it shall be supplied with continuous rated shunt trip coils.

[v] Necessary control and switching devices to execute the switching and control logic shall be deemed inclusive of the scope of supply irrespective of them being specified / not specified above or in the SLD.

[vi] The Panel / Switchboard shall be tested to withstand vibration caused by an earthquake in accordance with IEC 60068-3-3:2013 or IS 1893 Zone V.

[vii] The Panel shall be purchased from the original equipment manufacturer (OEM) or OEM authorized channel partners only.

[viii] All the necessary noble components (viz., structural, Door noble like hinge, Bush, Door alignment gauge and Bus bar noble - Bus bar support, Close profile structure - horizontal & vertical) of the Panel shall be supplied by the OEM.

[ix] The Contractor shall furnish dimensional drawings of the items offered indicating all the fittings, dimensional tolerances, typical GADs, etc. to the engineer-in-charge for approval of the MEP Consultant and thereafter A.O. / representative.

[x] The Contractor shall intimate the Engineer-in-Charge of the routine tests in the OEM factory in presence of a representative nominated by the Engineer-in-Charge before dispatch.

- **TECHNICAL SPECIFICATION NO. 18**

“APFC panels shall be Type Tested according to IEC 61921 & IEC 61439. The panels should be manufactured by authorized franchisee of the switchgear Original Equipment Manufacturers”. These panels to be supplied through Franchisee Based Model.

POWER CAPACITOR (LTXL CYLINDRICAL)

The capacitor shall be cylindrical type suitable for APFC panels and comply the standard: IEC 60831-1+2

- Type: 3-Phase, delta connected. Dry resin impregnated and self-healing type fitted with Over Pressure disconnecter in each individual phase.
- Rated Voltage/Frequency: 525 V / 50 Hz
- Minimum Over voltage withstand Capacity: +10% (12h / 24h), + 15% (30m / 24h), + 20% (5m), +30% (1m) as per standard
- Minimum Over current withstand Capability: 3 x In
- Minimum Peak Inrush current withstand Capability: 500 x In

- Total Operating watt-losses*: $\leq 0.45 \text{ W / kVAr}$.
- Minimum Number of Switching operations per year Permissible: 18,000
- Temperature Withstand category: -40°C to 65°C .
- Minimum Operating Life**: 3,00,000 hours

*Including Discharge resistors

**Standard operating Conditions

POWER CAPACITOR (MPP SH)

The capacitor shall be cylindrical type suitable for APFC panels and comply the standard: IEC 60831-1+2

- Type: 3-Phase, delta connected. Dry resin impregnated and self-healing type fitted with Over Pressure disconnecter in each individual phase.
- Rated Voltage/Frequency: 525 V / 50 Hz
- Minimum Over voltage withstand Capacity: +10% (12h / 24h), + 15% (30m / 24h), + 20% (5m), +30% (1m) as per standard
- Minimum Over current withstand Capability: $2.5 \times I_n$
- Minimum Peak Inrush current withstand Capability: $350 \times I_n$
- Total Operating watt-losses*: $\leq 0.45 \text{ W / kVAr}$.
- Minimum Number of Switching operations per year Permissible: 15,000
- Temperature Withstand category: 65°C .
- Minimum Operating Life**: 2,00,000 hours

*Including Discharge resistors

**Standard operating Conditions

SERIES DETUNED REACTORS

- The reactors shall comply with the following standard: IEC 60076 - 6, IS 5553.
- Reactor shall be used with power capacitors to control harmonic amplification, improve power factor and avoid electrical resonance in LV electrical networks.
- The reactor shall be series type having a three phase, iron core construction suitable for indoor use (IP 00). Insulation should be of class H.
- The reactors shall be able to withstand high Voltage Harmonics up to 15% continuously.
- Losses: 4 to 5 Watts / kVAr.
- Quality Factor: > 35
- The reactor shall be fitted with a thermistor switch in the center coil (normally open) for connection to trip circuits in case of high operating temperatures.

DETUNED FILTER

- Detuned harmonic filter reactors shall be used along with power capacitors to mitigate harmonics amplification and to avoid electrical resonance in LV electrical networks.
- The reactors shall be made of high-grade aluminum/copper windings and insulation shall be Class H.
- The reactor should conform to IEC 60289 / IS 5553.
- The permitted tolerance of inductance is $\pm 3\%$ of rated inductance value.

- Reactor tuning factor shall be 7 % (189 Hz) and the current rating of the reactor shall include the effects of harmonics and other possible over-currents
- The limit of linearity of inductance of the filter reactor is: $1.8 \cdot I_n$ with $L=0.95 \cdot L_N$.
- The reactor shall be fitted with a temperature sensitive micro-switch in the center coil (normally open) for connection to trip circuits in case of high operating temperatures.
- Power loss in each reactor shall be less than 5 W/kVAr

AUTOMATIC POWER FACTOR CONTROL (APFC) RELAY

An automatic power factor correction relay shall be microprocessor based. The relay should decide optimum configuration of capacitor banks in order to achieve desired power factor by taking into consideration the kVAr of each step, no of operations, total usage time, re-connection time of each step etc. The relay should have automatic and manual mode of operation that makes it possible to turn the capacitor banks “on” and “off” manually regardless of the line value measured. In auto mode, the relay should offer power factor correction without any need for manual intervention. The APFC Relay should be of maximum 14 step. Actual steps to be decided based on kVAr of panel.

APFC Controllers - 3 CT sensing

- APFC controller with 3 Phase Voltage and Current inputs.
- Automatic correction of power factor, with help of contactors/ Thyristors for the connection and disconnection of capacitor banks.
- Option of hybrid control [Contactors + Thyristor] should be available in the controller.
- Three CT sensing for better PF in case of unbalance systems.
- Cascading - Master-slave configuration should be possible to increase the contact outputs up to 64 steps, if required.
- APFC controller should have option of Dual target PF setting for DG- Main application.
- Individual harmonic measurement up to 31st level should be available.
- Target PF setting up to 3rd digit after decimal to ensure better PF.
- Display of voltage angles and current angles for ease of troubleshooting.
- CT secondary should be site selectable – 1 / 5 Amp.
- Communication capable with RS485 port.

CAPACITOR DUTY CONTACTOR

- Contactor should have De-latching Auxiliary contacts for improved switching
- Contactor should be with Inbuilt 1NO/1NC
- Contactor should have Separate termination for damping resistors
- Contactor should have Common coil for 50 and 60Hz control supply
- Contactor should have Separate Termination for damping resistor for ease of wiring and enhanced product safety
- All contactors shall be AC6b duty 3 pole air-break, magnetic, capacitor duty type. The rating of contactor shall be suitably assigned.
- The contactor coil voltage shall be as specified.
- The minimum life expectancy of the contactor shall be one million switching operations

- Contactor should be with surge suppressor to minimize the impact of voltage surge during contactor operation
- Contactor should have Operation voltage up to 440V
- Contactor should have Insulation voltage 1 kV
- Contactor should have Rated impulse withstand up to 8 kV
- The individual capacitor bank/step shall be switched automatically / manually with selector switch

Supply, installation, testing and commissioning of free-standing indoor semi-compartmentalized cubical type 250 kVAr Hybrid PFC Panel (APFC + ASVG) made out of 2.0 mm thick load bearing members and built upon rigid framework, having MPP/APP type capacitor with 7% copper wound reactor units type tested in accordance with fully type tested at an Independent laboratory and conforming to IEC 61439-1&2 and IEC 61921 or IS 16636: 2017 with contactor switching, IP 4X protection and including air system provided by axial flow fan or centrifugal fan, control wiring with FR-LSH copper wires complete as specified and directed by the engineer-in-charge.

The Hybrid PFC Panel shall comprise of the following:

[i] 800 A, 415 V, Ics = 100% Icu = Icw (1 sec for total selectivity) = 50 kA, 50 Hz electrical draw-out type 3P ACB, conforming to IS/IEC 60947-2 & 3, having 100% neutral with inbuilt release protection, no derating up to 50 °C, microprocessor based trip & LED based display systems with thermal memory providing overload, short-circuit, instantaneous & earth-fault protection, zone selective interlocking, pre-trip alarm & individual fault indicating LEDs, 20 trip record, % loading, bar graph, max. & min. meter and pre-alarm function for overload, short-circuit & earth fault - 01 Nos.
[ii] High performance microprocessor-based hybrid controller with 3 CT input & CT secondary with 5A and 18 transistor output - 01 Nos.
[iii] 3- Phase power analyser with in-built digital VAF meter, phase indicating LED lamps (R, Y, B), step indicating LED lamps, ON / OFF push buttons, timer, CT- 800/5 A, CI1.0, 15 VA- 01 Nos.
[iv] MPP / APP capacitor of 150 (2 X 12.5 + 3 X 25 + 50) kVAr
[1] 12.5 kVAr- 02 STEPS
(a) 32 A, 415, Ics = 100% Icu = 50 kA, 50 Hz 3P MCCB with fixed magnetic settings and adjustable thermal settings- 02 Nos.
(b) 3P, 12.5 kVAr power contactor (capacitor duty), 415 V, 50 Hz 230 VAC coil- 02 Nos.
(c) 7% copper detuned reactor, 3- Ph, 12.5 kVAr, 440 V, 50 Hz- 02 Nos.
[2] 25 kVAr- 03 STEPS
(a) 50 A, 415, Ics = 100% Icu = 50 kA, 50 Hz 3P MCCB with fixed magnetic settings and adjustable thermal settings- 01 Nos.
(b) 3P, 25 kVAr power contactor (capacitor duty), 415 V, 50 Hz 230 VAC coil- 01 Nos.
(c) 7% copper detuned reactor, 3- Ph, 25 kVAr, 440 V, 50 Hz- 01 Nos.
[3] 50 kVAr- 01 STEPS
(a) 80 A, 415, Ics = 100% Icu = 50 kA, 50 Hz 3P MCCB with fixed magnetic settings and adjustable thermal settings- 01 Nos.
(b) 3P, 50 kVAr power contactor (capacitor duty), 415 V, 50 Hz 230 VAC coil- 01 Nos.
(c) 7% copper detuned reactor, 3- Ph, 50 kVAr, 440 V, 50 Hz- 01 Nos.
[v] ASVG - 100 kVAR

NOTES:

[i] The Hybrid PFC Panel shall be purchased from the original equipment manufacturer (OEM) or OEM authorized channel partners only.

[ii] To ensure safety, reliability and accountability of component coordination, all the major capacitor bank components such as capacitor units, detuning reactors, PF controllers, circuit breakers, contactors and the enclosure system called for in this specification should preferably be from a single manufacturer. The OEM shall preferably manufacturer PFC components and switchgear.

[iii] The Hybrid PFC Panel shall have 10% extra space for future expansion.

[iv] The Hybrid PFC Panel shall be Internet of things (IoT) enabled and communicable / integrable with Energy Management System / SCADA System.

[v] ACB releases shall have self-powered, individual fault trip indication LEDs (For overload, short circuit, earth fault and trip-unit failure) shall be available on the trip unit which shall function even in the absence of external power supply to the breaker. Trip units shall have thermal memory as standard.

[vi] All the MCCBs up to 250 A shall be with thermal magnetic trip unit & above 250A shall be with microprocessor trip units. To ensure failsafe emergency tripping of the breakers (ACBs & MCCBs), it shall be supplied with continuous rated shunt trip coils.

[vii] Necessary control and switching devices to execute the switching and control logic shall be deemed inclusive of the scope of supply irrespective of them being specified / not specified above or in the SLD.

[viii] The Contractor shall furnish dimensional drawings of the items offered indicating all the fittings, dimensional tolerances, typical GADs, etc. to the engineer-in-charge for approval of the MEP Consultant and thereafter A.O. / representative

- **TECHNICAL SPECIFICATION NO. 19**

Supply, installation, testing and commissioning of factory made, CPRI / ERDA type tested, fully compartmentalized bolted type LDB (design verified assembly- DVA) of suitable size conforming to IEC 61439-1 & 2 and IEC 61641 and having modular extensible design suitable for indoor mounting, internal arc compliance of minimum 70 kA for 0.5s, made out of 2.0 mm thick mild steel CRCA sheet, having both sides openable with hinged doors and locking arrangement, IP 54 & IK 10 protection, supported and fixed on structural frame of angle iron of suitable size, including earthing stud, labelling, painting to all internal & external exposed steel surfaces with powder coating paint (7 tank process), duly fixed in ground with PCC foundation (1:2:4) type B1, with danger notice plate of 1.6 mm thick mild steel vitreous enamelled (white) with letters, figures and conventional skull and bones in signal red colour suitable for 3-Phase, 4-Wire system, 500 V grade with necessary wiring, PVC

sheathed stranded copper conductor of appropriate length and size, including fixing lugs, bolts, screws, etc. complete all as specified and directed by the engineer-in-charge.

The LDB shall comprise of the following:

[A] BUSBAR CHAMBER
[i] 01 Set (3L + N) of copper busbar of rated capacity 100 A, 25 kA, 415V, 50 Hz covered with PVC insulated sleeves including insulator, nuts, bolts, etc. with complete connection
[B] INCOMING
[i] Circuit Breaker
(a) 100 A, 415 V, $I_{cs} = 100\% I_{cu} = 25 \text{ kA}$, 50 Hz 3P MCCB, conforming to IEC 60947-2: 2016, having thermal magnetic trip unit, adjustable overload setting, adjustable short-circuit setting, front indication LEDs, etc.- 01 Nos.
[ii] Instrumentation & Measurement
(a) CI 1.0 multi-function meter capable of measuring V, A, F, PF, W/VA, Wh/VAh, Runhrs. Onhrs & interrupts- 01 Nos.
(b) 100/5A CI. 1.0 C.T. with 10 VA burden- 01 Nos.
(c) 6A, 10kA, 415V, 50 Hz 4P MCB- 01 Nos.
[iii] Indication & Annunciation
(a) LED phase indicators (Red, Yellow, Blue)- 01 Set
(b) LED status indicators (ON, OFF, TRIP)- 01 Set
[C] OUTGOING
[i] Circuit Breaker
(a) 63 A, 415 V, $I_{cs} = 100\% I_{cu} = 25 \text{ kA}$, 50 Hz 3P MCCB, conforming to IEC 60947-2: 2016, having thermal magnetic trip unit, adjustable overload setting, adjustable short-circuit setting, front indication LEDs, etc.- 04 Nos.
[ii] Indication & Annunciation
(a) LED status indicators (ON, OFF, TRIP)- 04 Set

NOTES:

[i] The busbars shall be of double deck arrangement for rating $\geq 1600\text{A}$ interleaved /non-interleaved design as per OEM. Separation of busbar shall be as per Form 4b.

[ii] The Panel shall be completely Ethernet communication ready to communicate with Energy Management System / SCADA System.

[iii] ACBs shall have separately powered, individual fault trip indication LEDs (For overload, short circuit, earth fault and trip-unit failure) shall be available on the trip unit which shall function even in the absence of external power supply to the breaker. ACB shall be suitable for ZSI. Trip units shall have thermal memory as standard.

[iv] All the MCCBs up to 250 A shall be with thermal magnetic trip unit & above 250A shall be with microprocessor trip units. To ensure failsafe emergency tripping of the breakers (ACBs & MCCBs), it shall be supplied with continuous rated shunt trip coils.

[v] Necessary control and switching devices to execute the switching and control logic shall be deemed inclusive of the scope of supply irrespective of them being specified / not specified above or in the SLD.

[vi] The Panel / Switchboard shall be tested to withstand vibration caused by an earthquake in accordance with IEC 60068-3-3:2013 or IS 1893 Zone V.

[vii] The Panel shall be purchased from the original equipment manufacturer (OEM) or OEM authorized channel partners only.

[viii] All the necessary noble components (viz., structural, Door noble like hinge, Bush, Door alignment gauge and Bus bar noble - Bus bar support, Close profile structure - horizontal & vertical) of the Panel shall be supplied by the OEM.

[ix] The Contractor shall furnish dimensional drawings of the items offered indicating all the fittings, dimensional tolerances, typical GADs, etc. to the engineer-in-charge for approval of the MEP Consultant and thereafter A.O. / representative.

[x] The Contractor shall intimate the Engineer-in-Charge of the routine tests in the OEM factory in presence of a representative nominated by the Engineer-in-Charge before dispatch.

- **TECHNICAL SPECIFICATION NO. 20**

Supply, installation, testing and commissioning of factory made, CPRI / ERDA type tested, fully compartmentalized bolted type PDB (design verified assembly- DVA) of suitable size conforming to IEC 61439-1 & 2 and IEC 61641 and having modular extensible design suitable for indoor mounting, internal arc compliance of minimum 70 kA for 0.5s, made out of 2.0 mm thick mild steel CRCA sheet, having both sides openable with hinged doors and locking arrangement, IP 54 & IK 10 protection, supported and fixed on structural frame of angle iron of suitable size, including earthing stud, labelling, painting to all internal & external exposed steel surfaces with powder coating paint (7 tank process), duly fixed in ground with PCC foundation (1:2:4) type B1, with danger notice plate of 1.6 mm thick mild steel vitreous enameled (white) with letters, figures and conventional skull and bones in signal red colour suitable for 3-Phase, 4-Wire system, 500 V grade with necessary wiring, PVC sheathed stranded copper conductor of appropriate length and size, including fixing lugs, bolts, screws, etc. complete all as specified and directed by the engineer-in-charge.

The PDB shall comprise of the following:

[A] BUSBAR CHAMBER
[i] 01 Set (3L + N) of copper busbar of rated capacity 320 A, 25 kA, 415V, 50 Hz covered with PVC insulated sleeves including insulator, nuts, bolts, etc. with complete connection
[B] INCOMING
[i] Circuit Breaker
(a) 320 A, 415 V, Ics = 100% Icu = 36 kA, 50 Hz 4P MCCB, conforming to IEC 60947-2: 2016, having microprocessor based trip unit, adjustable overload setting, adjustable short-circuit setting, adjustable neutral protection, front indication LEDs, etc.- 01 Nos.
[ii] Instrumentation & Measurement
(a) CI 1.0 multi-function meter capable of measuring V, A, F, PF, W/VA, Wh/VAh, Runhrs. Onhrs & interrupts- 01 Nos.
(b) 400/5A CI. 1.0 C.T. with 15 VA burden- 01 Nos.
(c) 6A, 10kA, 415V, 50 Hz 4P MCB- 01 Nos.
[iii] Indication & Annunciation
(a) LED phase indicators (Red, Yellow, Blue)- 01 Set
(b) LED status indicators (ON, OFF, TRIP)- 01 Set
[C] OUTGOING
[i] Circuit Breaker
(a) 125 A, 415 V, Ics = 100% Icu = 25 kA, 50 Hz 3P MCCB, conforming to IEC 60947-2: 2016, having thermal magnetic trip unit, adjustable overload setting, adjustable short-circuit setting, front indication LEDs, etc.- 04 Nos.
[ii] Indication & Annunciation
(a) LED status indicators (ON, OFF, TRIP)- 04 Set

NOTES:

[i] The busbars shall be of double deck arrangement for rating $\geq 1600A$ interleaved /non-interleaved design as per OEM. Separation of busbar shall be as per Form 4b.

[ii] The Panel shall be completely Ethernet communication ready to communicate with Energy Management System / SCADA System.

[iii] ACBs shall have separately powered, individual fault trip indication LEDs (For overload, short circuit, earth fault and trip-unit failure) shall be available on the trip unit which shall function even in the absence of external power supply to the breaker. ACB shall be suitable for ZSI. Trip units shall have thermal memory as standard.

[iv] All the MCCBs up to 250 A shall be with thermal magnetic trip unit & above 250A shall be with microprocessor trip units. To ensure failsafe emergency tripping of the breakers (ACBs & MCCBs), it shall be supplied with continuous rated shunt trip coils.

[v] Necessary control and switching devices to execute the switching and control logic shall be deemed inclusive of the scope of supply irrespective of them being specified / not specified above or in the SLD.

[vi] The Panel / Switchboard shall be tested to withstand vibration caused by an earthquake in accordance with IEC 60068-3-3:2013 or IS 1893 Zone V.

[vii] The Panel shall be purchased from the original equipment manufacturer (OEM) or OEM authorized channel partners only.

[viii] All the necessary noble components (viz., structural, Door noble like hinge, Bush, Door alignment gauge and Bus bar noble - Bus bar support, Close profile structure - horizontal & vertical) of the Panel shall be supplied by the OEM.

[ix] The Contractor shall furnish dimensional drawings of the items offered indicating all the fittings, dimensional tolerances, typical GADs, etc. to the engineer-in-charge for approval of the MEP Consultant and thereafter A.O. / representative.

[x] The Contractor shall intimate the Engineer-in-Charge of the routine tests in the OEM factory in presence of a representative nominated by the Engineer-in-Charge before dispatch.

- **TECHNICAL SPECIFICATION NO. 21**

Supply, installation, testing and commissioning of factory made, CPRI / ERDA type tested, fully compartmentalized bolted type UDB (design verified assembly- DVA) of suitable size conforming to IEC 61439-1 & 2 and IEC 61641 and having modular extensible design suitable for indoor mounting, internal arc compliance of minimum 70 kA for 0.5s, made out of 2.0 mm thick mild steel CRCA sheet, having both sides openable with hinged doors and locking arrangement, IP 54 & IK 10 protection, supported and fixed on structural frame of angle iron of suitable size, including earthing stud, labelling, painting to all internal & external exposed steel surfaces with powder coating paint (7 tank process), duly fixed in ground with PCC foundation (1:2:4) type B1, with danger notice plate of 1.6 mm thick mild steel vitreous enamelled (white) with letters, figures and conventional skull and bones in signal red colour suitable for 3-Phase, 4-Wire system, 500 V grade with necessary wiring, PVC sheathed stranded copper conductor of appropriate length and size, including fixing lugs, bolts, screws, etc. complete all as specified and directed by the engineer-in-charge.

The UDB shall comprise of the following:

[A] BUSBAR CHAMBER
[i] 01 Set (3L + N) of copper busbar of rated capacity 200 A, 25 kA, 415V, 50 Hz covered with PVC insulated sleeves including insulator, nuts, bolts, etc. with complete connection
[B] INCOMING
[i] Circuit Breaker

(a) 200 A, 415 V, $I_{cs} = 100\% I_{cu} = 25 \text{ kA}$, 50 Hz 3P MCCB, conforming to IEC 60947-2: 2016, having thermal magnetic trip unit, adjustable overload setting, adjustable short-circuit setting, front indication LEDs, etc.- 01 Nos.
[ii] Instrumentation & Measurement
(a) CI 1.0 multi-function meter capable of measuring V, A, F, PF, W/VA, Wh/VAh, Runhrs. Onhrs & interrupts- 01 Nos.
(b) 200/5A CI. 1.0 C.T. with 10 VA burden- 01 Nos.
(c) 6A, 10kA, 415V, 50 Hz 4P MCB- 01 Nos.
[iii] Indication & Annunciation
(a) LED phase indicators (Red, Yellow, Blue)- 01 Set
(b) LED status indicators (ON, OFF, TRIP)- 01 Set
[C] OUTGOING
[i] Circuit Breaker
(a) 63 A, 415 V, $I_{cs} = 100\% I_{cu} = 25 \text{ kA}$, 50 Hz 3P MCCB, conforming to IEC 60947-2: 2016, having thermal magnetic trip unit, adjustable overload setting, adjustable short-circuit setting, front indication LEDs, etc.- 04 Nos.
[ii] Indication & Annunciation
(a) LED status indicators (ON, OFF, TRIP)- 04 Set

NOTES:

[i] The busbars shall be of double deck arrangement for rating $\geq 1600\text{A}$ interleaved /non-interleaved design as per OEM. Separation of busbar shall be as per Form 4b.

[ii] The Panel shall be completely Ethernet communication ready to communicate with Energy Management System / SCADA System.

[iii] ACBs shall have separately powered, individual fault trip indication LEDs (For overload, short circuit, earth fault and trip-unit failure) shall be available on the trip unit which shall function even in the absence of external power supply to the breaker. ACB shall be suitable for ZSI. Trip units shall have thermal memory as standard.

[iv] All the MCCBs up to 250 A shall be with thermal magnetic trip unit & above 250A shall be with microprocessor trip units. To ensure failsafe emergency tripping of the breakers (ACBs & MCCBs), it shall be supplied with continuous rated shunt trip coils.

[v] Necessary control and switching devices to execute the switching and control logic shall be deemed inclusive of the scope of supply irrespective of them being specified / not specified above or in the SLD.

[vi] The Panel / Switchboard shall be tested to withstand vibration caused by an earthquake in accordance with IEC 60068-3-3:2013 or IS 1893 Zone V.

[vii] The Panel shall be purchased from the original equipment manufacturer (OEM) or OEM authorized channel partners only.

[viii] All the necessary noble components (viz., structural, Door noble like hinge, Bush, Door alignment gauge and Bus bar noble - Bus bar support, Close profile structure - horizontal & vertical) of the Panel shall be supplied by the OEM.

[ix] The Contractor shall furnish dimensional drawings of the items offered indicating all the fittings, dimensional tolerances, typical GADs, etc. to the engineer-in-charge for approval of the MEP Consultant and thereafter A.O. / representative.

[x] The Contractor shall intimate the Engineer-in-Charge of the routine tests in the OEM factory in presence of a representative nominated by the Engineer-in-Charge before dispatch.

- **TECHNICAL SPECIFICATION NO. 22**

Supply, installation, testing and commissioning of factory made, CPRI / ERDA type tested, fully compartmentalized bolted type ACDB (design verified assembly- DVA) of suitable size conforming to IEC 61439-1 & 2 and IEC 61641 and having modular extensible design suitable for indoor mounting, internal arc compliance of minimum 70 kA for 0.5s, made out of 2.0 mm thick mild steel CRCA sheet, having both sides openable with hinged doors and locking arrangement, IP 54 & IK 10 protection, supported and fixed on structural frame of angle iron of suitable size, including earthing stud, labelling, painting to all internal & external exposed steel surfaces with powder coating paint (7 tank process), duly fixed in ground with PCC foundation (1:2:4) type B1, with danger notice plate of 1.6 mm thick mild steel vitreous enamelled (white) with letters, figures and conventional skull and bones in signal red colour suitable for 3-Phase, 4-Wire system, 500 V grade with necessary wiring, PVC sheathed stranded copper conductor of appropriate length and size, including fixing lugs, bolts, screws, etc. complete all as specified and directed by the engineer-in-charge.

The ACDB shall comprise of the following:

[A] BUSBAR CHAMBER
[i] 01 Set (3L + N) of copper busbar of rated capacity 100 A, 25 kA, 415V, 50 Hz covered with PVC insulated sleeves including insulator, nuts, bolts, etc. with complete connection
[B] INCOMING
[i] Circuit Breaker
(a) 100 A, 415 V, Ics = 100% Icu = 25 kA, 50 Hz 3P MCCB, conforming to IEC 60947-2: 2016, having thermal magnetic trip unit, adjustable overload setting, adjustable short-circuit setting, front indication LEDs, etc.- 01 Nos.
[ii] Instrumentation & Measurement
(a) Cl 1.0 multi-function meter capable of measuring V, A, F, PF, W/VA, Wh/VAh, Runhrs. Onhrs & interrupts- 01 Nos.
(b) 100/5A Cl. 1.0 C.T. with 10 VA burden- 01 Nos.
(c) 6A, 10kA, 415V, 50 Hz 4P MCB- 01 Nos.

[iii] Indication & Annunciation
(a) LED phase indicators (Red, Yellow, Blue)- 01 Set
(b) LED status indicators (ON, OFF, TRIP)- 01 Set
[C] OUTGOING
[i] Circuit Breaker
(a) 63 A, 415 V, Ics = 100% Icu = 25 kA, 50 Hz 3P MCCB, conforming to IEC 60947-2: 2016, having thermal magnetic trip unit, adjustable overload setting, adjustable short-circuit setting, front indication LEDs, etc.- 04 Nos.
[ii] Indication & Annunciation
(a) LED status indicators (ON, OFF, TRIP)- 04 Set

NOTES:

[i] The busbars shall be of double deck arrangement for rating $\geq 1600\text{A}$ interleaved /non-interleaved design as per OEM. Separation of busbar shall be as per Form 4b.

[ii] The Panel shall be completely Ethernet communication ready to communicate with Energy Management System / SCADA System.

[iii] ACBs shall have separately powered, individual fault trip indication LEDs (For overload, short circuit, earth fault and trip-unit failure) shall be available on the trip unit which shall function even in the absence of external power supply to the breaker. ACB shall be suitable for ZSI. Trip units shall have thermal memory as standard.

[iv] All the MCCBs up to 250 A shall be with thermal magnetic trip unit & above 250A shall be with microprocessor trip units. To ensure failsafe emergency tripping of the breakers (ACBs & MCCBs), it shall be supplied with continuous rated shunt trip coils.

[v] Necessary control and switching devices to execute the switching and control logic shall be deemed inclusive of the scope of supply irrespective of them being specified / not specified above or in the SLD.

[vi] The Panel / Switchboard shall be tested to withstand vibration caused by an earthquake in accordance with IEC 60068-3-3:2013 or IS 1893 Zone V.

[vii] The Panel shall be purchased from the original equipment manufacturer (OEM) or OEM authorized channel partners only.

[viii] All the necessary noble components (viz., structural, Door noble like hinge, Bush, Door alignment gauge and Bus bar noble - Bus bar support, Close profile structure - horizontal & vertical) of the Panel shall be supplied by the OEM.

[ix] The Contractor shall furnish dimensional drawings of the items offered indicating all the fittings, dimensional tolerances, typical GADs, etc. to the engineer-in-charge for approval of the MEP Consultant and thereafter A.O. / representative.

[x] The Contractor shall intimate the Engineer-in-Charge of the routine tests in the OEM factory in presence of a representative nominated by the Engineer-in-Charge before dispatch.

- **TECHNICAL SPECIFICATION NO. 23**

Supply, installation, testing and commissioning of UL listed clean-agent fire suppression system designed to provide a uniform concentration within the electrical panels, conforming to NFPA 2021: 2022 complete all as specified and directed by the engineer-in-charge.

The clean-agent fire suppression system shall conform to the following technical requirements:

[A] GENERAL
[i] Provide all engineering design and materials for a complete agent suppression system including Clean Agent storage cylinders with steel bracket, extinguishing agent, detection tube, cylinder valve and associated accessories including but not limit to; adaptors, pressure switch, Fire Detection tube fittings etc, required for complete operation of system.
[ii] The necessary nomenclature such as pressurization level, agent volume, gross/net weight of cylinder shall be clearly marked on cylinder.
[B] STANDARDS
The design and installation of the Clean Agent based Fire Detection tube system is based on the latest applicable codes and also as per the manufacturer's recommendations; the required Clean Agent gas quantity is arrived as per the volume of the respective panels to be protected. In addition, the following standards, references and rules and regulations shall be applicable:
[i] NFPA-2001-Standard on Clean Agent Fire Extinguishing System
[ii] Green Gas needs to use as per EPA/SNAP with low GWP
[iii] Detection components must be UL as per UL 521
[iv] Suppression agent as per NFPA-2001 & UL listed
[C] SYSTEM DESCRIPTION
[i] The UL detection tube shall be fixed with cylinder valve at top of cylinder. The tube shall be pressurized with dry nitrogen at 16 bars. In case of fire and on reaching of pre-determined temperature (120-140 °C), the tube shall rupture and gas shall be released from tube over the protected area.
[ii] The CE/UL listed pressure switch shall be provided for indication of discharge of gas.
[iii] The Extinguishing Agent (FK 5112 gas) shall be stored in PESO approved cylinder, super pressurized with dry nitrogen.
[iv] The PESO approved cylinder shall be equipped with direct low pressure valve, pressure gauge (to monitor agent pressure) and isolation valve for maintenance purposes. The cylinder bracket shall be of steel construction with quick release clamp.
[v] The Fire detection tube shall be installed throughout the compartments of panel. The location and spacing of tube shall be above the hazard, to be protected.

[vi] With system activation, a signal should be generated via Audio Visual Alarm installed at convenient location as per Engineer-in-Charge.

[D] SYSTEM COMPONENTS

The bidder shall provide an under taking from Principle Manufacturer of product they intent to install, that manufacturer will fully support the bidder for this specific project.

[i] Storage Cylinder(s) (dedicated for each electrical cabinet/panel) to be PESO approved

[ii] UL/FM approved FK 5112 Clean Agent gas as per NFPA-2001

[iii] Low Pressure Direct Type Valve

[iv] Pressure Switch- CE/UL listed

[v] Fire Detection Tubing- UL listed with approval marking and red in color

[vi] End of Line adapter with pressure gauge, T connector, End of plug as per OEM

[vii] Control panel for indication and should be with potential free contacts to integrate with existing BMS/SCADA/Fire alarm system

[viii] Each cylinder shall have pressure gauge and low-pressure switch to provide visual and electrical supervision of the cylinder pressure. The low-pressure switch shall be wired to the Audio-Visual Alarm to provide audible and visual trouble alarm in the event of drop of pressure. The pressure gauge shall be color coded to provide an easy, visual indication of cylinder pressure

[E] APPROVALS

[i] Authorization letter from Principal OEM of System if applicable

[ii] Clean agent FK 5112 gas- UL certificate

[iii] Pneumatic Heat Sensing Tube - UL Listed and marked certificate

[iv] Pressure Switch Assembly: CE/ UL Listed certificate

[v] PESO Approved filling station certificate

• **TECHNICAL SPECIFICATION NO. 24**

Supply, installation, testing and commissioning of silent LT Diesel GenSet of 750 kVA rating, conforming to ISO 8528-1, along with AMF cum synchronizing panel with associated switchgear, control panel and exhaust piping as per latest CPCB norms (with amendments up to date at the time of execution), necessary foundation, HSD oil storage & distribution system etc. with all necessary statutory approvals complete all as specified and directed by the engineer-in-charge.

The Diesel GenSet shall conform to the following technical specifications.

[A] GenSet
• Minimum Rating: 750 kVA / 500 kW
• Maximum Rating: 663 kW / 901 HP
• Emissions / Fuel Strategy: Fuel Optimised
• Starting System: 24 V DC electrical
• Overload: 10% for 1 hr in every 12 hrs
• Cooling System: Radiator Cooled
• Silencer Type: Residential
• DG Set noise level as per CPCB norms: < 75 dBA

<ul style="list-style-type: none"> • Mounting Type: AVM Pad
[B] Starting System
<ul style="list-style-type: none"> • Type of Starting System: Battery Starting System (Ele.)
<ul style="list-style-type: none"> • Type of Battery: SMF VRLA type
<ul style="list-style-type: none"> • Battery Voltage: 12 V
<ul style="list-style-type: none"> • Number of Battery: 02 Nos.
<ul style="list-style-type: none"> • Ah Capacity: 180 Ah
[C] Engine
<ul style="list-style-type: none"> • Rated Output (Prime Rating) as per ISO 3046: 663 kW (901 HP)
<ul style="list-style-type: none"> • Governing Class: G3
<ul style="list-style-type: none"> • Governor Type: Electronic-A1
<ul style="list-style-type: none"> • Specific Fuel Consumption @ 75% load: ≤ 144 g/HP-hr
<ul style="list-style-type: none"> • Specific Fuel Consumption @ 100% load: ≤ 143 g/HP-hr
<ul style="list-style-type: none"> • Fuel consumption @ 50% load: ≤ 90 litre/hr
<ul style="list-style-type: none"> • Fuel consumption @ 75% load: ≤ 130 litre/hr
<ul style="list-style-type: none"> • Fuel consumption @ 100% load: ≤ 155 litre/hr
<ul style="list-style-type: none"> • Fuel tank capacity: ≥ 990 litre (outside)
<ul style="list-style-type: none"> • Fuel tank thickness & MOC: 3 mm thick mild steel
<ul style="list-style-type: none"> • Lube oil sump capacity: ≥ 70 litre
<ul style="list-style-type: none"> • Lube oil consumption: $\leq 0.12\%$ of SFC
<ul style="list-style-type: none"> • Lube oil Grade: CHW 15W 40
[D] Alternator Details
<ul style="list-style-type: none"> • Rating: 750 kVA
<ul style="list-style-type: none"> • Phase / Voltage: 3 / 440 V
<ul style="list-style-type: none"> • Power Factor (PF): 0.8 lag
<ul style="list-style-type: none"> • Insulation: Class H
<ul style="list-style-type: none"> • Temperature Rise: Limited to Class H
<ul style="list-style-type: none"> • Degree of Protection: IP 23
<ul style="list-style-type: none"> • Rated Speed: 1500 RPM
<ul style="list-style-type: none"> • Time to built up rated voltage at rated RPM: ≤ 5 sec.
<ul style="list-style-type: none"> • Excitation System: Separately Excited
<ul style="list-style-type: none"> • Frequency: 50 Hz
<ul style="list-style-type: none"> • Voltage Variation: $\pm 5\%$
<ul style="list-style-type: none"> • Voltage Regulation: $\pm 0.5\%$
[E] Integrated DG Set Controller
(1) Control:
<ul style="list-style-type: none"> • Run/ Off / Auto Switch
<ul style="list-style-type: none"> • Emergency Stop
<ul style="list-style-type: none"> • Manual Run Stop Control Switch
<ul style="list-style-type: none"> • Idle / Run Mode Control
(2) Metering (Engine):
<ul style="list-style-type: none"> • Starting Battery Voltage

• Lube Oil Temperature & Pressure
• Engine coolant Temperature
• Coolant Pressure
• Engine rpm
• Operating Hours
• Number of Starts
(3) Electrical:
• Current
• Voltage
• Frequency
• kW
• kWh
• PF
• kVA
(4) Protection / Warning (Engine):
• Overspeed Shutdown
• Low Lube Oil Pressure Warning / Shutdown
• High coolant Temperature Warning / Shutdown
• Low coolant Temperature Warning
• Low Coolant Level Warning / Shutdown
• Low and High Battery Voltage Warning
• Weak Battery Warning
• Over Crank Shutdown
• Fail to Crank Shutdown
• Magnetic Pickup Failure Shutdown
(5) Alternator:
• Overcurrent
• High Voltage
• Low Voltage
• Under / Over Frequency
• Reverse Power (kVA & kVAr)
• Phase Sequence
(6) Misc:
• Digital AVR
• Amp Sentry Protection
• Sensor Failure Indication
• Programmable Idle Speed Control
• Digital Synchronizing Function
• Sync Check
• Synchronoscope
• Auto Load Sharing
• Compatibility to Remote Monitoring

<ul style="list-style-type: none"> • Smart Starting
[F] Exhaust System
<ul style="list-style-type: none"> • Exhaust piping of size 12" dia. (300 mm NB), 4.85 mm thick plate and 16" dia. & (400 mm NB) 5 mm thick, MS Class B pipes conforming to IS 3589: 2001 with 75 mm thick glasswool / mineral wool insulation with wire chicken mesh over insulation and 24 gauge aluminium sheet cladding over the exhaust pipes from silencer to atmosphere including welding joint(s), bend(s), clamp(s), dash fasteners, flanges, nuts, bolts, etc. complete as required and as per specification
<ul style="list-style-type: none"> • Aluminium cladding for residential silencer with mineral wool 50 mm thick, density 64 kg/m³, wire mesh and 24 gauge aluminum cladding
<ul style="list-style-type: none"> • MS self-support structure for exhaust piping
<ul style="list-style-type: none"> • (iv) SS flexible bellows, 16" dia. (400 mm NB) complete with counter flanges, heat resistant gaskets, nuts, bolts and washers, etc. complete as required
<ul style="list-style-type: none"> • Lightning arrester with GI strip up to earth pit
[G] Power Cabling
<ul style="list-style-type: none"> • 3# of 1.1 kv grade 3.5 core, 240 mm² 2XWY cable, specified separately.
[H] CONTROL CABLES & TERMINATION KITS
<ul style="list-style-type: none"> • 24 core, 2.5 mm², Cu conductor, XLPE insulated armoured control cable as required along with necessary termination kits
<ul style="list-style-type: none"> • 4 core, 2.5 mm², Cu conductor, XLPE insulated armoured control cable as required along with necessary termination kits
<ul style="list-style-type: none"> • 2 core, 2.5 mm², Cu conductor, XLPE insulated armoured control cable as required along with necessary termination kits
<ul style="list-style-type: none"> • 4 core, 4 mm², Cu conductor, XLPE insulated armoured control cable as required along with necessary termination kits
<ul style="list-style-type: none"> • 3 core, 6 mm², Cu conductor, XLPE insulated armoured control cable as required along with necessary termination kits
[I] FUEL PIPE
<ul style="list-style-type: none"> • 50 mm NB MS Class C pipe of required length (ii) Fuel pipe fittings, viz. bends, flanges, valves, tees, elbows, etc as required

NOTES:

[i] Initial / first charge of lube oil shall be deemed included in the quoted rate.

[ii] Necessary civil work viz. foundation for placement of the DG Set shall be deemed included in the scope of work.

[iii] 3# of 3.5 core, 240 mm² power cabling from the DG Set to the Main LT Panel shall be measured and paid for separately.

- **TECHNICAL SPECIFICATION NO. 25**

M & L for 1.1 kV grade fire survival cable, conforming to IS 17505-1: 2021, and having electrolytic annealed plain / tinned copper (Class 1/2) conductor conforming to IS 8130: 2013, mica tape layer(s) primary insulation, cross linked PE (XLPE) / cross linked HFFR secondary insulation, thermoplastic HFFR inner sheath, glass fibre heat barrier tape, galvanized round wire armour, thermoplastic HFFR (HFS-TP 90) / Cross Linked HFFR (HSF-XL 90) outer sheath including necessary clamping / dressing with cable ties and termination complete as all specified and directed by engineer- in- charge.

- Supply of 3 core 6 mm², 2XWY fire survival cable
- Labour for 3 core 6 mm², 2XWY fire survival cable
- Supply of 3.5 core 25 mm², 2XWY fire survival cable
- Labour for 3.5 core 25 mm², 2XWY fire survival cable
- Supply of 3.5 core 35 mm², 2XWY fire survival cable
- Labour for 3.5 core 35 mm², 2XWY fire survival cable

- **TECHNICAL SPECIFICATION NO. 26**

M & L for 1.1 kV grade XLPE insulated armoured cable conforming to IS 7098 (Part 1): 1988, having stranded compact shaped conductors as per Cl. 2 of IS 8130: 1984, PVC inner sheath, single armouring of galvanised steel strip/wire and PVC Type ST-2 outer sheath conforming to IS 5831: 1984, including necessary clamping / dressing with cable ties and termination complete as all specified and directed by engineer- in- charge.

- Supply of 4 core 240 mm², A2XWY cable
- Labour for of 4 core 240 mm², A2XWY cable
- Supply of 3.5 core 300 mm², A2XWY cable
- Labour for of 3.5 core 300 mm², A2XWY cable
- Supply of 3.5 core 300 mm², 2XWY cable
- Labour for of 3.5 core 300 mm², 2XWY cable
- Supply of 3.5 core 25 mm², A2XWY cable
- Labour for of 3.5 core 25 mm², A2XWY cable
- Supply of 3.5 core 95 mm², 2XWY cable
- Labour for of 3.5 core 95 mm², 2XWY cable
- Supply of 3.5 core 6 mm², 2XWY cable
- Labour for of 3.5 core 6 mm², 2XWY cable
- Supply of 3 core 50 mm², 2XWY cable
- Labour for of 3 core 50 mm², 2XWY cable
- Supply of 3 core 16 mm², 2XWY cable
- Labour for of 3 core 16 mm², 2XWY cable
- Supply of 3 core 10 mm², 2XWY cable
- Labour for of 3 core 10 mm², 2XWY cable
- Supply of Single core 500 mm², A2XWY cable

- Labour for of single core 500 mm², A2XWY cable

- **TECHNICAL SPECIFICATION NO. 27**

S & F of perforated hot dipped galvanized iron cable tray having galvanization thickness not less than 50 microns and perforation not more than 17.5% including fittings viz. joints, bends, tees, etc. in convenient sections of length complete including cable tray supports and associated accessories, all as specified and directed by the engineer-in-charge.

- Supply of 300 mm X 50 mm X 1.6 mm cable tray
- Labour for 300 mm X 50 mm X 1.6 mm cable tray
- Supply of 150 mm X 50 mm X 1.6 mm cable tray
- Labour for 150 mm X 50 mm X 1.6 mm cable tray
- Supply of 100 mm X 50 mm X 1.6 mm cable tray
- Labour for 100 mm X 50 mm X 1.6 mm cable tray

- **TECHNICAL SPECIFICATION NO. 28**

Supplying, installation, testing and commissioning of online double conversion fully microprocessor based, indoor type, compact UPS system of 10 kVA rating with IGBT based PWM technology to achieve THD < 3% and input power factor of greater than 0.95 at 50% loading, suitable for three phase AC input voltage 380 V to 440 V, 50 Hz +3% / - 3 % and three phase AC output voltage $415 \pm 1\%$ V & frequency $50 \pm 0.5\%$ Hz , inbuilt isolation transformer, necessary VRLA batteries of suitable size having 90 minutes back up time, mounting rack including and suitable size connecting cable (for UPS to battery and battery to battery), static and maintenance bypass switch, SNMP card for RS232/ ethernet IP compatibility for operation and monitoring etc. complete with all necessary components and accessories as specified and directed by the engineer-in-charge.

The UPS shall conform to the following technical parameters:

[A] UPS Technology
True Online Double Conversion as per VFI-SS-111
[B] Environmental
(i) Operating Temperature: 0 to 40 °C
(ii) Maximum Temperature: 40 °C
(iii) Storage Temperature: -25 to 70 °C
(iv) Relative Humidity: 95% Non-condensing
(v) Altitude: up to 1000 m from MSL
[C] Input
(i) Standard Voltage: 380 / 400 / 415 V, 3-Ph
(ii) Voltage Tolerance: +15% to -20% @ 400 V
(iii) Frequency: 50 Hz

(iv) Frequency Tolerance: $\pm 10\%$ @ 50 Hz without UPS tripping
(v) Rectifier Type (Inverter Technology): IGBT three level PWM design
(vi) Power Factor at Rated Load: ≥ 0.99
(vii) Input THDi at Rated Load: $\leq 4\%$ at 100% Load
(viii) Input Phase Auto Correction: to be provided in built
[D] Output
(i) Output Rating: 10 kW
(ii) Voltage: 3-Phase, 415 V
(iii) Voltage Range: 320-480 V (line to line) @ full Load & 260-480 V @ $< 50\%$ Load
(iv) Frequency: 50 Hz
(v) Voltage Stability- Steady State: ± 0.5 to 1% typical
(vi) Phase Angle Accuracy: $\pm 1^\circ$ for balanced load, $\pm 2^\circ$ for unbalanced load
(vii) Non-linear Load Permissible: Yes
(viii) Voltage Stability- transient state with 100% Load change: $\pm 5\%$
(ix) Frequency Stability: 50 Hz $\pm 0.5\%$
(x) Crest Factor: 3:1 (minimum)
(xi) Output Voltage Distortion:
1. with 100% Linear Load $< 2\%$
2. with 100% non-Linear Load $< 4\%$
(xii) Power Factor: Unity
(xiii) Overall Efficiency at Rated Load (without transformer losses: $\geq 92\%$
(ixv) Overload: 110% for 10 minutes & 150% for 30 seconds
[E] Protection
(i) Input under voltage
(ii) Input over voltage
(iii) Output under voltage
(iv) Output over voltage
(v) Loss of input power
(vi) Output overload
(vii) Galvanic Isolation Transformer at input side
(viii) Protection against surges
(ix) Battery circuit breaker (BCB) for automatic isolation of battery line in case of battery under voltage and over current conditions.
(x) Fully rated static switch in inverter output
(xi) RS 232 / RS 485 Serial port computer compatibility.
(xii) Network monitoring (SNMP)
(xiii) External dry contacts
(ixv) Microprocessor based self-diagnostics and monitoring.
(xv) Inbuilt Isolator to be provided for isolating input & output, static bypass & maintenance bypass
(xvi) For 1/2/3 phase UPS, the output voltage is genuinely generated directly from the inverter itself.
(xvii) Fuse line protection for input.

(xviii) Protection against over temperature.
[F] Certification / Compliance
(i) IEC 62040-1
(ii) IEC 62040-2
(iii) IEC 62040-3
(iv) IS 16242-1
[G] Batteries
(i) Type: Sealed Maintenance free, 12 V
(ii) Power Backup 90 minutes
(iii) Battery Life: Minimum 5 yrs of design life

NOTES :-

[i] The bidder shall furnish the battery sizing calculations and GA drawing to the engineer-in-charge for approval of the MEP Consultant and thereafter the A.O. / representative.

• **TECHNICAL SPECIFICATION NO. 29**

Supplying, installation, testing and commissioning of online double conversion fully microprocessor based, indoor type, compact UPS system of 125 kVA rating with IGBT based PWM technology to achieve THD < 3% and input power factor of greater than 0.95 at 50% loading, suitable for three phase AC input voltage 380 V to 440 V, 50 Hz +3% / - 3 % and three phase AC output voltage $415 \pm 1\%$ volts & frequency 50 ± 0.5 Hz , inbuilt isolation transformer, necessary VRLA batteries of suitable size having 30 minutes back up time, mounting rack including and suitable size connecting cable (for UPS to Battery and battery to battery), static and maintenance bypass switch, SNMP card for RS232/ ethernet IP compatibility for operation and monitoring etc. complete with all necessary components and accessories as specified and directed by the engineer-in-charge.

The UPS shall conform to the following technical parameters:

[A] UPS Technology
True Online Double Conversion as per VFI-SS-111
[B] Environmental
(i) Operating Temperature: 0 to 40 °C
(ii) Maximum Temperature: 40 °C
(iii) Storage Temperature: -25 to 70 °C
(iv) Relative Humidity: 95% Non-condensing
(v) Altitude: up to 1000 m from MSL
[C] Input
(i) Standard Voltage: 380 / 400 / 415 V, 3-Ph
(ii) Voltage Tolerance: +15% to -20% @ 400 V
(iii) Frequency: 50 Hz

(iv) Frequency Tolerance: $\pm 10\%$ @ 50 Hz without UPS tripping
(v) Rectifier Type (Inverter Technology): IGBT three level PWM design
(vi) Power Factor at Rated Load: ≥ 0.99
(vii) Input THDi at Rated Load: $\leq 4\%$ at 100% Load
(viii) Input Phase Auto Correction: to be provided in built
[D] Output
(i) Output Rating: 125 kW
(ii) Voltage: 3-Phase, 415 V
(iii) Voltage Range: 320-460 V (line to line) @ full Load
(iv) Frequency: 50 Hz
(v) Voltage Stability- Steady State: ± 0.5 to 1% typical
(vi) Phase Angle Accuracy: $\pm 1^\circ$
(vii) Non-linear Load Permissible: Yes
(viii) Voltage Stability- transient state with 100% Load change: $\pm 5\%$
(ix) Frequency Stability: 50 Hz $\pm 0.5\%$
(x) Crest Factor: 3:1 (minimum)
(xi) Output Voltage Distortion:
1. with 100% Linear Load $< 1\%$
2. with 100% non-Linear Load $< 5\%$
(xii) Power Factor: Unity
(xiii) Overall Efficiency at Rated Load (without transformer losses: $\geq 95\%$
(ixv) Overload: 110% for 10 minutes & 150% for 30 seconds
[E] Protection
(i) Input under voltage
(ii) Input over voltage
(iii) Output under voltage
(iv) Output over voltage
(v) Loss of input power
(vi) Output overload
(vii) Galvanic Isolation Transformer at input side
(viii) Protection against surges
(ix) Battery circuit breaker (BCB) for automatic isolation of battery line in case of battery under voltage and over current conditions.
(x) Fully rated static switch in inverter output
(xi) RS 232 / RS 485 Serial port computer compatibility.
(xii) Network monitoring (SNMP)
(xiii) External dry contacts
(ixv) Microprocessor based self-diagnostics and monitoring.
(xv) Inbuilt Isolator to be provided for isolating input & output, static bypass & maintenance bypass
(xvi) For 1/2/3 phase UPS, the output voltage is genuinely generated directly from the inverter itself.

(xvii) Fuse line protection for input.
(xviii) Protection against over temperature.
[F] Certification / Compliance
(i) IEC 62040-1
(ii) IEC 62040-2
(iii) IEC 62040-3
(iv) IS 16242-1
[G] Batteries
(i) Type: Sealed Maintenance free, 12 V
(ii) Power Backup 30 minutes
(iii) Battery Life: Minimum 5 yrs of design life

NOTES:

[i] The bidder shall furnish the battery sizing calculations and GA drawing to the engineer-in-charge for approval of the MEP Consultant and thereafter the A.O. / representative.

- **TECHNICAL SPECIFICATION NO. 30**

S & F vertical triple pole & neutral, double door metallic modular distribution board conforming to IEC 61439-3, suitable for flush / surface mounting with provision for MCCB up to 160 A as incomer and SP/TP MCBs as outgoing, reversible metal door, fully insulated 160 A copper busbar for each phase, two fully insulated & shrouded neutral bars, two earth bars, cable ties for cable management, prefitted masking sheet, etc. having IK 09 & IP 43 protection complete all as specified and directed by engineer-in-charge.

NOTES:

[i] MCCB & MCBs shall be measured and paid separately.

- Supply Installation, testing and commissioning of vertical triple pole & neutral double door DB, 4 way
- Supply Installation, testing and commissioning of vertical triple pole & neutral double door DB, 6 way
- Supply Installation, testing and commissioning of vertical triple pole & neutral double door DB, 8 way

- **TECHNICAL SPECIFICATION NO. 31**

S & F triple pole & neutral double door, modular type, double door, per phase isolation metallic distribution board conforming to IEC 61439-3, suitable for flush / surface mounting with provision for FP RCCB / RCBO / Isolator / MCB as incomer and SP MCBs as outgoing, reversible metal door, 100 A copper busbar, fully shrouded neutral bar, earth bar, wire set & cable ties for cable management, pre

fitted masking sheet, etc. having IK 09 & IP 43 protection complete all as specified in IS 732: 2019 and directed by the engineer-in-charge.

NOTES:

[i] RCCB / RCBO / Isolator / MCB shall be measured and paid separately.

- Supply Installation, testing and commissioning of triple pole & neutral double door PPI DB, 6 way
- Supply Installation, testing and commissioning of triple pole & neutral double door PPI DB, 8 way
- Supply Installation, testing and commissioning of triple pole & neutral double door PPI DB, 12 way

- **TECHNICAL SPECIFICATION NO. 32**

S & F moulded case circuit breaker (MCCB), four pole, in single frame size up to 250 A with thermal magnetic trip unit (TMD), compression lug connectors, protection against overloads (I_r adjustable from 0.7- 1 X I_n), protection against short circuits (I_{sd} adjustable from 1.5- 10 X I_r), inbuilt encapsulated double break roto active type instantaneous protection, earth fault leakage protection, etc. having $I_{cs} = 100\%$ $I_{cu} = 25$ kA as per IEC 60947-2 complete all as specified and directed by engineer-in-charge.

- Supply of 125 A, 415V, 25 kA, 50 Hz 4P MCCB
- Labour for 125 A, 415V, 25 kA, 50 Hz 4P MCCB
- Supply of 63 A, 415V, 25 kA, 50 Hz 4P MCCB
- Labour for 63 A, 415V, 25 kA, 50 Hz 4P MCCB

- **TECHNICAL SPECIFICATION NO. 33**

S & F MCB for AC applications conforming to IS/IEC 60898-1-2002, having breaking capacity $I_{cn} = 10$ kA, sliding bottom clamp, colour coded on/off indication on dolly, bi-connect IP 20 protected lower terminals and sliding shutters, etc. complete all as specified in IS 732: 2019 and directed by the engineer-in-charge.

- Supply of 10 A, 230 V, 50 Hz, 1P MCB (C curve)
- Labour for 10 A, 230 V, 50 Hz, 1P MCB (C curve)
- Supply of 16 A, 230 V, 50 Hz, 1P MCB (C curve)
- Labour for 16 A, 230 V, 50 Hz, 1P MCB (C curve)
- Supply of 25 A, 230 V, 50 Hz, 1P MCB (C curve)
- Labour for 25 A, 230 V, 50 Hz, 1P MCB (C curve)
- Supply of 16 A, 230 V, 50 Hz, 1P MCB (D curve)

- Labour for 16 A, 230 V, 50 Hz, 1P MCB (D curve)
- Supply of 32 A, 415 V, 50 Hz, 3P MCB (C curve)
- Labour for 32 A, 415 V, 50 Hz, 3P MCB (C curve)
- Supply of 32 A, 230 V, 50 Hz, 1P MCB (D curve)
- Labour for 32 A, 230 V, 50 Hz, 1P MCB (D curve)
- Supply of 63 A, 415 V, 50 Hz, 3P MCB (C curve)
- Labour for 63 A, 415 V, 50 Hz, 3P MCB (C curve)
- Supply of 40 A, 415 V, 50 Hz, 3P MCB (D curve)
- Labour for 40 A, 415 V, 50 Hz, 3P MCB (D curve)

- **TECHNICAL SPECIFICATION NO. 34**

S & F residual current device (RCD) conforming to IS 12640 (Part 2): 2016, assembled for AC applications having front face indication for earth leakage fault, sliding shutters, IP 20 protected terminals suitable for cable sizes up to 35 mm², colour coded on / off indication on dolly, integrated label holder, etc. complete all as specified in IS 732: 2019 and directed by the engineer-in-charge.

- Supply of 40 A, 30 mA. 230 V, 50 Hz RCCB
- Labour for 40 A, 30 mA. 230 V, 50 Hz RCCB
- Supply of 40 A, 100 mA. 230 V, 50 Hz RCCB
- Labour for 40 A, 100 mA. 230 V, 50 Hz RCCB
- Supply of 63 A, 100 mA. 230 V, 50 Hz RCCB
- Labour for 63 A, 100 mA. 230 V, 50 Hz RCCB

- **TECHNICAL SPECIFICATION NO. 35**

M & L for submain wiring using 1.1 kV grade single core FR-LSH flexible cable conforming to IS 694: 2010, having multi-drawn thin strands of electrolytic copper conductors and insulation for phase, neutral and earth continuity conductor connecting to earth dolly, colour-coded as per IS 11353: 1985, drawn in medium grade stove enamelled steel surface / recessed conduits, conforming to IS 9537 (Part- 2): 1981, of size not less than 25 mm NB, including making good of disturbed surfaces of wall / ceiling / floor all complete as specified in IS 732: 2019 and directed by engineer-in-charge.

- Supply of submain wiring having 2 X 2.5 mm² + 1 X 2.5 mm² earth wire
- Labour for submain wiring having 2 X 2.5 mm² + 1 X 2.5 mm² earth wire
- Supply of submain wiring having 2 X 4.0 mm² + 1 X 4.0 mm² earth wire
- Labour for submain wiring having 2 X 4.0 mm² + 1 X 4.0 mm² earth wire
- Supply of submain wiring having 4 X 4.0 mm² + 1 X 4.0 mm² earth wire
- Labour for submain wiring having 4 X 4.0 mm² + 1 X 4.0 mm² earth wire
- Supply of submain wiring having 4 X 6.0 mm² + 1 X 6.0 mm² earth wire
- Labour for submain wiring having 4 X 6.0 mm² + 1 X 6.0 mm² earth wire

- **TECHNICAL SPECIFICATION NO. 36**

M & L for point wiring using 1.1 kV grade single core FR-LSH flexible wires, conforming to IS 694: 2010, having multi-drawn thin strands of electrolytic copper conductors and insulation for phase, neutral, and earth continuity conductor connecting to earth dolly, colour-coded as per IS 11353: 1985, drawn in medium grade stove enamelled steel surface / recessed conduits, conforming to IS 9537 (Part- 2): 1981, of size not less than 20 mm NB, including cutting chases, factory made not less than 1.2 mm thick sunken, modular flush sheet galvanized metal enclosure having zinc coating not less than 120 GSM, conforming to IS 14772: 2000, having top, bottom, side and back-wall knockouts for conduit entry from any direction, suitable modular cover-plates and making good of disturbed surfaces of wall / ceiling / floor, etc. complete all as specified in IS 732: 2019 and directed by the engineer-in-charge.

NOTES:

- [i] Sunken modular flush sheet metal enclosures shall be measured and paid for as separate item.
- [ii] Modular cover plates shall be measured and paid for as a separate item.

- Supply of One light point controlled by one switch, with cables 1.5 mm² size
- Labour for One light point controlled by one switch, with cables 1.5 mm² size
- Supply of One additional light point on the same switch, with cables 1.5 mm² size
- Labour for One additional light point on the same switch, with cables 1.5 mm² size
- Supply of One light point controlled by two 2-way switches, with cables 1.5 mm² size
- Labour for One light point controlled by two 2-way switches, with cables 1.5 mm² size
- Supply of One 6 A socket outlet, on the same board with other switches, with cables 1.5 mm² size
- Labour for One 6 A socket outlet, on the same board with other switches, with cables 1.5 mm² size
- Supply of One 6 A socket outlet, independent, with cables 1.5 mm² size
- Labour for One 6 A socket outlet, independent, with cables 1.5 mm² size
- Supply of One 6/16 A socket outlet, independent, with cables 2.5 mm² size
- Labour for One 6/16 A socket outlet, independent, with cables 2.5 mm² size
- Supply of One 25 / 32 A socket outlet, independent, with cables 4 mm² size
- Labour for One 25 / 32 A socket outlet, independent, with cables 4 mm² size

- **TECHNICAL SPECIFICATION NO. 37**

S & F modular type 6 A 1-way SP switch conforming to IS 3854: 2012 with finger-proof terminal complete all as specified in IS 732: 2019 and directed by the engineer-in-charge.

- Supply of 6 A 1-way SP switch
- Labour for 6 A 1-way SP switch

- **TECHNICAL SPECIFICATION NO. 38**

S & F modular type 6 A 2-way SP switch conforming to IS 3854: 2012 with finger-proof terminal complete all as specified in IS 732: 2019 and directed by the engineer-in-charge.

- Supply of 6 A 2-way SP switch
- Labour for 6 A 2-way SP switch

- **TECHNICAL SPECIFICATION NO. 39**

S & F modular type 16 A 1-way SP switch conforming to IS 3854: 2012 with finger-proof terminal complete all as specified in IS 732: 2019 and directed by the engineer-in-charge.

- Supply of 16 A 1-way SP switch
- Labour for 16 A 1-way SP switch

- **TECHNICAL SPECIFICATION NO. 40**

S & F modular type 2/3 pin combined shuttered type 6 A socket, conforming to IS 1293: 2005 complete all as specified in IS 732: 2019 and directed by the engineer-in-charge.

- Supply of 2/3 pin combined shuttered type 6 A socket
- Labour for 2/3 pin combined shuttered type 6 A socket

- **TECHNICAL SPECIFICATION NO. 41**

S & F modular type 3 pin combined shuttered type 6/16 A socket, conforming to IS 1293: 2005 complete all as specified in IS 732: 2019 and directed by the engineer-in-charge.

- Supply of pin combined shuttered type 6/16 A socket
- Labour for pin combined shuttered type 6/16 A socket

- **TECHNICAL SPECIFICATION NO. 42**

S & F 3 pin, 6 A, 250 V ceiling rose conforming to IS 371: 1999 and having terminal capacity 3 X 1.5 mm² with IK 04 and IP 20 protection complete all as specified in IS 732: 2019 and directed by the engineer-in-charge.

- Supply of 3 pin, 6 A, 250 V ceiling rose
- Labour for 3 pin, 6 A, 250 V ceiling rose

- **TECHNICAL SPECIFICATION NO. 43**

S & F factory made screwless, dust proof cover plates having superior finish, rounded corners, and solid strength supported by plastic frame behind with flexible wall alignment, horizontal adjustment facility complete all as specified and directed.

- Supply of 1 module cover plate
- Labour for 1 module cover plate
- Supply of 2 module cover plate
- Labour for 2 module cover plate
- Supply of 3 module cover plate
- Labour for 3 module cover plate
- Supply of 4 module cover plate
- Labour for 4 module cover plate
- Supply of 6 module cover plate
- Labour for 6 module cover plate
- Supply of 8 module cover plate
- Labour for 8 module cover plate

• **TECHNICAL SPECIFICATION NO. 44**

S & F factory made not less than 1.2 mm thick sunken, modular flush sheet galvanized metal enclosure having zinc coating not less than 120 GSM, , conforming to IS 14772: 2000, having top, bottom, side and back-wall knockouts for conduit entry from any direction, suitable modular cover-plates complete all as specified and directed by the engineer-in-charge.

- Supply of 1/2 module GI enclosure
- Labour for 1/2 module GI enclosure
- Supply of 3 module GI enclosure
- Labour for 3 module GI enclosure
- Supply of 4 module GI enclosure
- Labour for 4 module GI enclosure
- Supply of 6 module GI enclosure
- Labour for 6 module GI enclosure
- Supply of 8 module GI enclosure
- Labour for 8 module GI enclosure

• **TECHNICAL SPECIFICATION NO. 45**

S & F of 32 A 2P + E DP plug & socket DB, suitable for flush / surface mounting, conforming to IEC 61439-3, with provision for mounting modular devices and supplied with neutral links complete all as specified and directed by the engineer-in-charge.

- Supply of 32 A 2P + E DP plug & socket DB
- Labour for 32 A 2P + E DP plug & socket DB

- **TECHNICAL SPECIFICATION NO. 46**

SURFACE-MOUNTED DOWNLIGHT (2000 lm)

S & F of CE certified & RoHS compliant surface-mounted downlight in circular form-factor having LED light source with integral driver, luminous flux ≥ 2000 lm (luminous flux tolerance $\pm 10\%$), rated luminous efficacy ≥ 110 lm/W, power consumption ≤ 18 W (power consumption tolerance $\pm 10\%$), initial corrected colour temperature (CCT) 6500K, colour rendering index (CRI) ≥ 80 , SDCM < 5 , power factor ≥ 0.95 , median useful life L70B50 ≥ 30000 hrs, surge protection level ≥ 2.5 kV, etc. with aluminium pressure die cast housing, polycarbonate diffuser, mounting bracket, IP20 & IK02 protection, EMI / EMC (B1) compliant, and suitable for 220- 240 V input voltage, 50 Hz line frequency, ambient temperature range 0 to 45 °C, safety class I and fixture height ≤ 60 mm along with all necessary accessories complete all as specified and directed by the engineer-in-charge.

- Supply of surface-mounted downlight (2000 lm)
- Labour for surface-mounted downlight (2000 lm)

NOTES:

[i] The contractor shall furnish an LM80 report issued by the OEM and LM79 report from an NABL accredited laboratory.

- **TECHNICAL SPECIFICATION NO. 47**

RECESSED DOWNLIGHT (2000 lm, 18W)

S & F of CE certified & RoHS compliant surface mounted downlight in circular form-factor having LED light source with non-integral fixed output driver, luminous flux ≥ 2000 lm (luminous flux tolerance $\pm 10\%$), rated luminous efficacy ≥ 110 lm/W, power consumption ≤ 18 W (power consumption tolerance $\pm 10\%$), initial corrected colour temperature (CCT) 6500K, colour rendering index (CRI) ≥ 80 , SDCM < 5 , THD(i) $< 10\%$, Power Factor ≥ 0.95 , median useful life L70B50 @ Ta = 45 °C ≥ 50000 hrs, surge protection level ≥ 2.5 kV with pressure die cast aluminium housing, polycarbonate diffuser & steel clip (spring), IP20 & IK02 protection, EMI / EMC (B1) compliant, and suitable for 130- 320 V input voltage, 50 Hz line frequency, ambient temperature range 0 to 45 °C, class B serviceability, ceiling cutout dia. $\leq 6"$ (150mm) and fixture height ≤ 40 mm along with all necessary accessories complete all as specified and directed by the engineer-in-charge. class B serviceability, ceiling cutout dia. $\leq 6"$ (150mm) and fixture height ≤ 40 mm along with all necessary accessories complete all as specified and directed by the engineer-in-charge.

- Supply of recessed downlight (2000 lm)
- Labour for recessed downlight (2000 lm)

NOTES:

[i] The contractor shall furnish an LM80 report issued by the OEM and LM79 report from an NABL accredited laboratory.

- **TECHNICAL SPECIFICATION NO. 48**

RECESSED DOWNLIGHT (1500 lm, 13.4W)

S & F of CE certified & RoHS compliant surface mounted downlight in circular form-factor having LED light source with non-integral fixed output driver, luminous flux ≥ 1500 lm (luminous flux tolerance $\pm 10\%$), rated luminous efficacy ≥ 110 lm/W, power consumption ≤ 13.4 W (power consumption tolerance $\pm 10\%$), initial corrected colour temperature (CCT) 6500K, colour rendering index (CRI) ≥ 80 , SDCM < 5 , THD(i) $< 10\%$, Power Factor ≥ 0.95 , median useful life L70B50 @ Ta = 45 °C ≥ 50000 hrs, surge protection level ≥ 2.5 kV with pressure die cast aluminium housing, polycarbonate diffuser & steel clip (spring), IP20 & IK02 protection, EMI / EMC (B1) compliant, and suitable for 130- 320 V input voltage, 50 Hz line frequency, ambient temperature range 0 to 45 °C, class B serviceability, ceiling cutout dia. $\leq 6"$ (150mm) and fixture height ≤ 40 mm along with all necessary accessories complete all as specified and directed by the engineer-in-charge.

- Supply of recessed downlight (1500 lm)
- Labour for recessed downlight (1500 lm)

NOTES:

[i] The contractor shall furnish an LM80 report issued by the OEM and LM79 report from an NABL accredited laboratory.

- **TECHNICAL SPECIFICATION NO. 49**

RECESSED DOWNLIGHT (1200 lm, 11W)

S & F of CE certified & RoHS compliant surface mounted downlight in circular form-factor having LED light source with non-integral fixed output driver, luminous flux ≥ 1200 lm (luminous flux tolerance $\pm 10\%$), rated luminous efficacy ≥ 110 lm/W, power consumption ≤ 11 W (power consumption tolerance $\pm 10\%$), initial corrected colour temperature (CCT) 6500K, colour rendering index (CRI) ≥ 80 , SDCM < 5 , THD(i) $< 10\%$, Power Factor ≥ 0.95 , median useful life L70B50 @ Ta = 45 °C ≥ 50000 hrs, surge protection level ≥ 2.5 kV with pressure die cast aluminium housing, polycarbonate diffuser & steel clip (spring), IP20 & IK02 protection, EMI / EMC (B1) compliant, and suitable for 130- 320 V input voltage, 50 Hz line frequency, ambient temperature range 0 to 45 °C,

class B serviceability, ceiling cutout dia. $\leq 6"$ (150mm) and fixture height ≤ 40 mm along with all necessary accessories complete all as specified and directed by the engineer-in-charge.

- Supply of recessed downlight (1200 lm)
- Labour for recessed downlight (1200 lm)

NOTES:

[i] The contractor shall furnish an LM80 report issued by the OEM and LM79 report from an NABL accredited laboratory.

- **TECHNICAL SPECIFICATION NO. 50**

SUSPENDED LINEAR LIGHTING LUMINAIRE (2200 lm, 18 W)

S & F of suspended linear lighting luminaire having LED light source with integral driver, luminous flux ≥ 2200 lm (luminous flux tolerance $\pm 10\%$), rated luminous efficacy ≥ 120 lm/W, power consumption ≤ 18 W (power consumption tolerance $\pm 10\%$), initial corrected colour temperature (CCT) 4000K, colour rendering index (CRI) ≥ 80 , SDCM < 5 , power factor ≥ 0.95 , median useful life L70B50 ≥ 50000 hrs, surge protection level ≥ 4 kV, etc. with aluminium extruded housing with superior white powder coated finish, flat polycarbonate optical cover, mounting device (suspension set simple, standard), IP20 & IK02 protection, EMI / EMC (B1) compliant, and suitable for 220- 240 V input voltage, 50 Hz line frequency, ambient temperature range 0 to 45 °C, safety class I and fixture dimensions (L X W X H) 1126 X 53 mm X 70 mm along with all necessary accessories complete all as specified and directed by the engineer-in-charge.

- Supply of suspended linear lighting luminaire (2200 lm, 18 W)
- Labour for suspended linear lighting luminaire (2200 lm, 18 W)

NOTES:

[i] The contractor shall furnish an LM80 report issued by the OEM and LM79 report from an NABL accredited laboratory.

- **TECHNICAL SPECIFICATION NO. 51**

2' X 2' PANEL (3600 lm, 30W)

S & F of recessed 2' X 2' panel fixture with integral fixed output driver having LED light source engine, 120° luminaire light beam spread, luminous flux ≥ 3600 lm, rated luminous efficacy ≥ 120 lm/W,

power consumption ≤ 30 W (power consumption tolerance $\pm 10\%$), initial corrected colour temperature (CCT) 6500K, colour rendering index (CRI) > 80 , SDCM < 5 , power factor ≥ 0.90 , median useful life L70B50 ≥ 50000 hrs, surge protection level ≥ 4 kV with steel housing and polystyrene optical cover, square recessed mounting box, IP20 & IK02 protection, EMI / EMC (B1) compliant, and suitable for 220- 240 V input voltage, 50 Hz line frequency, ambient temperature range 0 to 45 °C, class B serviceability, dimensions (H X W X D) 35 x 595 x 595 mm, along with all necessary accessories complete all as specified and directed by the engineer-in-charge.

- Labour for 2' x 2' Panel (3600 lm, 30 W)
- 2' X 2' PANEL (4000 lm, 32W)

NOTES:

[i] The contractor shall furnish an LM80 report issued by the OEM and LM79 report from an NABL accredited laboratory.

- **TECHNICAL SPECIFICATION NO. 52**

2' X 2' PANEL (4000 lm, 32W)

S & F of recessed 2' X 2' panel fixture having LED light source with integral driver, luminous flux ≥ 4000 lm, rated luminous efficacy ≥ 125 lm/W, power consumption ≤ 32 W, power consumption tolerance $\pm 10\%$, initial corrected colour temperature (CCT) 6500K, colour rendering index (CRI) > 80 , SDCM < 4 , power factor ≥ 0.9 , median useful life L70B50 ≥ 50000 hrs, etc. with metal housing, polycarbonate optical cover, IP20 & IK03 protection, EMI / EMC (B1) compliant, and suitable for 140- 270 V input voltage, 50 Hz line frequency, ambient temperature range -20 to 40 °C, class B serviceability, dimensions (L X W X H) 597 mm X 597 mm X 69.7 mm along with all necessary accessories complete all as specified and directed by the engineer-in-charge.

- Labour for 2' x 2' Panel (4000 lm, 32 W)
- 2' X 2' PANEL (4000 lm, 32W)

NOTES:

[i] The contractor shall furnish an LM80 report issued by the OEM and LM79 report from an NABL accredited laboratory.

- **TECHNICAL SPECIFICATION NO. 53**

4' WATER-PROOF LED BATTEN

S & F of 4' waterproof surface mounted / suspended batten having LED light source engine delivering full window illumination, integral fixed output driver, SY120° / diffused light distribution, luminous flux ≥ 4400 lm, luminous efficacy ≥ 120 lm/W, power consumption ≤ 37 W, power consumption tolerance $\pm 10\%$, initial corrected colour temperature (CCT) 6500K, colour rendering index (CRI) ≥ 80 , SDCM < 5 , THD $< 20\%$, power factor > 0.85 , median useful life L70B50 @ Ta = 45 °C ≥ 30000 hrs, surge protection level ≥ 2.5 kV with polycarbonate co-extrusion housing, high transmittance PC diffuser, IP65 & IK08 protection, BIS approbation & RoHS sustainability compliance and suitable for 140- 270 V input voltage, 50 Hz line frequency, ambient temperature range -10 to 45 °C, class B serviceability, along with Click Fix mounting bracket and all necessary accessories complete all as specified and directed by the engineer-in-charge.

- Supply of 4' waterproof LED batten
- Labour for 4' waterproof LED batten

NOTES:

[i] The contractor shall furnish an LM80 report issued by the OEM and LM79 report from an NABL accredited laboratory.

- **TECHNICAL SPECIFICATION NO. 54**

S & F of recessed accent light having LED light source with driver, 36° beam angle of light source, luminous flux ≥ 4000 lm, rated luminous efficacy ≥ 100 lm/W, power consumption ≤ 42 W (power consumption tolerance $\pm 10\%$), initial corrected colour temperature (CCT) 4000K, colour rendering index (CRI) ≥ 80 , power factor (fraction) ≥ 0.9 , median useful life L70B50 ≥ 40000 hrs, surge protection level ≥ 2.5 kV with aluminium alloy housing, polycarbonate optical cover, adjustable mounting bracket, IP20 & IK02 protection, EMI / EMC (B1) compliant, and suitable for 240 V input voltage, 50 Hz line frequency, ambient temperature range 0 to 45 °C, class B serviceability, ceiling cutout dia. $\leq 8"$ (200 mm) and fixture height ≤ 150 mm along with all necessary accessories complete all as specified and directed by the engineer-in-charge.

ACCENT LIGHT (4000 lm, 40W)

- Supply of LED accent light (4000 lm, 40W)
- Labour for LED accent light (4000 lm, 40W)

NOTES:

[i] The contractor shall furnish an LM80 report issued by the OEM and LM79 report from an NABL accredited laboratory.

- **TECHNICAL SPECIFICATION NO. 55**

S & F of 2' X 2' luminaire suitable for suspended mounting, having LED light source with integral driver, luminous flux ≥ 3800 lm, rated luminous efficacy ≥ 90 lm/W, power consumption ≤ 44 W (power consumption tolerance $\pm 10\%$), initial corrected colour temperature (CCT) 6500K, colour rendering index (CRI) ≥ 80 , SDCM < 5 , power factor ≥ 0.95 , median useful life L70B50 ≥ 50000 hrs, surge protection level ≥ 2.5 kV, etc., with steel housing, polycarbonate optical cover, mounting device (recessed mounting box square), IP20 & IK02 protection, EMI / EMC (B1) compliant, and suitable for 120- 277 V input voltage, 50 Hz line frequency, ambient temperature range 0 to 45 °C, safety class I along with all necessary accessories complete all as specified and directed by the engineer-in-charge.

2' X 2' SUSPENDED LUMINAIRE (3800 lm, 44W)

- Supply of 2' X 2' suspended luminaire (3800 lm, 44W)
- Labour for 2' X 2' suspended luminaire (3800 lm, 44W)

NOTES:

[i] The contractor shall furnish an LM80 report issued by the OEM and LM79 report from an NABL accredited laboratory.

- **TECHNICAL SPECIFICATION NO. 56**

MIRROR LIGHT

S & F of water-proof wall light (mirror / bathroom light) having built-in water-resistant LED light source, luminous flux ≥ 450 lm, lifetime up to 15000 hrs, power consumption ≤ 8 W, IP44 protection (Class of Protection II- double protection), with electrical connection complete all as specified and directed by engineer-in-charge.

- Supply of mirror light
- Labour for of mirror light

NOTES:

[i] The contractor shall furnish an LM80 report issued by the OEM and LM79 report from an NABL accredited laboratory.

- **TECHNICAL SPECIFICATION NO. 57**

S & F of emergency exit sign having 3 hrs duration, LED light source engine with luminaire light beam spread 55°, upward light output ratio 0.01, luminous flux 85 lm, luminous efficacy ≥ 32 lm/W, luminous flux tolerance $\pm 5\%$, initial chromaticity ≤ 0.33 , colour rendering index (CRI) > 80 , initial colour rendering index tolerance $\pm 2\%$, corrected colour temperature 6500 K, standard tilt angle post top 0°, standard tilt angle side entry 0°, power factor 0.4, internal control interface (no external connection), suitable for input voltage 220-240 V at line frequency 50 Hz having initial / average / end CLO power consumption 4 W, inrush current 4 A, inrush time 100 ms, power consumption 4 W, 2 Push-in connector 3-pole connection, lithium battery (LiFePO4) suitable for 4 W power consumption during central DC emergency mode, 85 lm emergency lux, polycarbonate housing, UV stabilized polycarbonate optic cover, having overall dimensions 30 X 186 X 330 mm (H X W X D) complete all as specified and directed by the engineer-in-charge.

- Supply of emergency exit sign
- Labour for of emergency exit sign

NOTES:

[i] The contractor shall furnish an LM80 report issued by the OEM and LM79 report from an NABL accredited laboratory.

- **TECHNICAL SPECIFICATION NO. 58**

S & F of recessed linear lighting luminaire having LED light source with integral driver, luminous flux ≥ 1800 lm (luminous flux tolerance $\pm 10\%$), rated luminous efficacy ≥ 80 lm/W, power consumption ≤ 24 W, initial corrected colour temperature (CCT) 4000K, colour rendering index (CRI) ≥ 80 , SDCM < 5 , power factor ≥ 0.90 , THD $< 10\%$, UGR < 19 , median useful life L70B50 ≥ 50000 hrs, surge protection level ≥ 4 kV, etc. with aluminium extruded housing, round- 24° / square 50° wall-washers, gun-metal / black colour reflector, IP20 protection, EMI / EMC (B1) compliant, and suitable for 220- 240 V input voltage, 50 Hz line frequency, ambient

temperature range 0 to 45 °C, safety class I and fixture dimensions (L X W X H) 1060 X 55 mm X 64 mm along with all necessary accessories complete all as specified and directed by the engineer-in-charge.

- Supply of profile light
- Labour for profile light

NOTES:

[i] The contractor shall furnish an LM80 report issued by the OEM and LM79 report from an NABL accredited laboratory.

- **TECHNICAL SPECIFICATION NO. 59**

BOLLARD LIGHT

Supply, Installation Testing and Commissioning of symmetrical 360 Degree LED bollard luminaire Power consumption 9W, CCT : 3000K & CRI≥70. Luminaire should be BIS certified and CRS no for luminaire along with LM79 report from NABL accredited LAB should be submitted along with BID.

- Supply of bollard light
- Labour for of bollard light

NOTES:

[i] The contractor shall furnish an LM80 report issued by the OEM and LM79 report from an NABL accredited laboratory.

- **TECHNICAL SPECIFICATION NO. 60**

STEP LIGHT

Supply, Installation, Testing and Commissioning of integral driver LED step light with a system lumen output of 35 lumens and a minimum system efficacy of 10 lm/W. The luminaire shall

have a rated system lifetime of 25,000 burning hours at L70. The luminaire should have a color temperature of 4000K and CRI > 75. The luminaire shall meet IP67 rating with THD < 20% and PF > 0.9. The luminaire shall have polycarbonate diffuser. The total power consumption should not exceed 4W (including driver).

- Supply of LED step light
- Labour for of LED step light

NOTES:

[i] The contractor shall furnish an LM80 report issued by the OEM and LM79 report from an NABL accredited laboratory.

- **TECHNICAL SPECIFICATION NO. 61**

OCTAGONAL POLES

M & L for GI octagonal poles complete with single arm brackets as specified all for 6 m long with 70 mm top diameter and 130 mm bottom diameter, made of 3 mm thick tensile sheet along with base plate of size 225 X 225 X 12 mm thick, including 04 Nos. of M24 X 750 long 'J' type foundation bolts, MCB with 4-way heavy duty connector 32 A, double arm bracket and RCC foundation as per manufacturer's drawing(s) complete as specified and directed by engineer-in-charge.

- Supply of GI octagonal pole
- Labour for of GI octagonal pole

- **TECHNICAL SPECIFICATION NO. 62**

LED STREET LIGHT

S & F 60 W LED street light having high efficiency long life LED module with SMD LED package mounted on MCPCB with high LED efficacy of > 120 lumen/W, integral SMPS based constant current electronic LED driver with THD < 10%, surge voltage protection and other safety tests as per IS: 15885 (Part-2/Sec-13): 2012, IP 66 protection, high efficiency polycarbonate cover with

integrated lens housed in pressure die-cast aluminium alloy heat sink for effective thermal management, sturdiness, excellent corrosion resistance, separate optical and control gear compartment & top opening for easy maintenance, suitable for side entry, pole mounting with bracket arm OD 35 mm to 42 mm including necessary electrical connection to the fixture with 3 core flexible Cu conductor cable of appropriate size complete as all specified and directed by engineer- in- charge.

- Supply of street light
- Labour for of street light

- **TECHNICAL SPECIFICATION NO. 63**

OCCUPANCY SENSOR

Supply, installation, testing and commissioning of movement detector suitable for mounting height of 2.5- 4 m and detection radius of 3m and has features of adjusting daylight, holdtime and detecting angle delivering up to 30% energy savings, with a built-in switch to control an area of between 20- 25 m² and switching load up to 6 A, having a smart timer to extend the delay time by 10 minutes if movement is detected shortly after switch-off, retractable shield to shield of areas, detachable mains, etc., mounted in the ceiling complete with all mounting accessories as specified and directed by the engineer-in-charge.

- Supply of occupancy sensor
- Labour for of occupancy sensor

- **TECHNICAL SPECIFICATION NO. 64**

MOTION SENSOR

Supply, installation, testing and commissioning of Motion Detector Wired, Ceiling recess mount Sensor, Maximum detection range: 5.0m Detection Area: 7.4m x 5.6m rectangular (at a height of 2.5m), Dimensions: H 41 mm x D 72 mm. complete with all mounting accessories as specified and directed by the engineer-in-charge.

- Supply of motion sensor
- Labour for of motion sensor

- **TECHNICAL SPECIFICATION NO. 65**

PASSENGER LIFT (13 PAX.)

Supply, installation, testing & commissioning of passengers lift, conforming to IS 14665 (Part 1): 2000, IS 14665 (Part 2/ Sec 1 & 2): 2000, IS 14665 (Part 4/Sec 1 to 9): 2001 & IS 14665 (Part 5): 1999, suitable for 13 passengers / 884 kg rated load car at 1.5 m/s speed having single speed motor suitable for 3- Ph, 415 V, 50 Hz electric power supply to serve G+2 upper floors with AC variable voltage & variable frequency regenerative drive (VVVF regenerative drive) and complete with all standard accessories, simplex selective-collective operation with / without attendant, centre opening doors with door drive (electric motor driven mechanism), sliding stainless steel doors, automatic rescue device (ARD) having 25 Ah battery, false ceiling, infrared door protection system, CCTV inside the elevator car, Voice Synthesizer with MP3 for announcements of floor positions and other features complete all as specified and directed by the engineer-in-charge.

Make: Schindler, Thyssenkrupp, Trio

The lift shall conform to the following technical specification.

[i] Type of Lift: Passenger / Fire Lift

[ii] Load Capacity: 884 kg / 13 Passenger

[iii] Speed: 1.5 m/s with single speed motor

[iv] Power Supply: 3- Phase, 4 Wire, 415 V, 50 Hz AC

[v] Type of Drive: VVVF Regenerative Drive (Variable Voltage and Variable Frequency Regenerative Drive)

[vi] Type of Machine: Gearless

[vii] Car Size: Not less than 1.43 m²

[viii] Car & Landing Door at all Floors: Automatic center opening with VVVF door drive, opening size not less than 900 mm X 2100 mm, sliding type, fabricated by stainless steel sheet not less than 16 gauge having hairline finish (N-304)

[ix] Car Enclosure: Manufactured with stainless steel frame not less than 16 gauge with hairline finish (N-304) having stainless false ceiling with hairline finish, internal lighting arrangement with LED light fittings with auto cut-off system operated on commercial supply and one LED light fitting operated on battery with inverter as emergency light, complete internal ventilation system provided with concealed axial/cross flow fan with auto cut-off system and stainless steel grill / wiremesh for protection

[x] Handrail: Standard thickness 40 mm diameter stainless steel hand-rail all around inside the car cabin

[xi] Terminal Buffers: Metal special spring/PU/Oil buffers as per manufacturer specification. The buffing stroke shall not be less than 200 mm.

[xii] Door Opening (inside): Centre opening stainless steel doors with hairline finish doors with clear opening of 900 mm X 2100 mm and protected by infrared door protection system

[xiii] Car & Counter Weight Guide: Guide rails of MS 'T' section as per OEM design; counter weight shall be as recommended by OEM

[ixv] Flooring: granite flooring & toe guard of adequate depth / as per OEM design

[xv] Signals:

[a] Combined luminous hall button with LED / LCD hall position indicators of stainless steel at all floors

- [b] LED / LCD car position indicators of stainless steel
- [c] Car operating panel of stainless steel with luminous button in car
- [d] Car direction indicator in car & landing
- [e] Battery operated alarm bell & emergency light (rechargeable) along with suitable maintenance free battery (This system shall be separate from ARD batteries.)
- [f] Overload warning feature in car cabin (display and announcing type both)
- [g] One fireman's switch to be installed at ground floor near landing door
- [h] All signal fixture & car operating panel on hairline stainless steel face plate with hairline finish.
- [i] Infrared door sensor safety edge of door for entire height.
- [j] Voice Synthesizer with MP3: MP3 based Voice Synthesizer consisting of electronic PCB enclosed in a PVC (IP 54) Box to be fitted in the controller and speaker unit to be mounted on the ceiling of the car for announcements of floor positions and other features like door opening, Overload, ARD, power failure, etc.
- [xvi] Stops & Opening: 3-3 All opening on same side.
- [xvii] Safety Device:
 - [a] Automatic rescue device (ARD) / automatic landing device operating with maintenance-free batteries having 25 Ah capacity. The batteries shall have auto charging facilities. The charger input shall be connected with converter of regenerative drive.
 - [b] The ARD actuation time shall be less than one second after failure of power supply and when ARD is operative the car shall stop at the nearest floor and then open.
- [xviii] Operation: simplex selective-collective operation with / without attendant
- [ixx] Machine Room: Machine Room Less (MRL)
- [xx] Hoist way construction details as per building drawing(s).
- [xxi] Civil work: Necessary Civil work viz. making good disturbed surfaces, modification to landing space to suit to car size, necessary foundation to machine etc.
- [xxii] Mirror of suitable size to be provided above SS railing on the wall opposite to Centre opening stainless steel doors.

NOTES:

- [i] The lift shall work on microprocessor-based control system with self-diagnostic features, site programming, etc. to suit changing needs of the user.
- [ii] The lift shall be silent in operation & shall have smooth and controlled acceleration and de-acceleration with levelling accuracy of ± 5 mm.
- [iii] Potential free contacts for each floor position and up and down movement of the lift shall be provided in the controller.
- [iv] The quoted rate also includes telephone system / Instruction Plate in car.

• **TECHNICAL SPECIFICATION NO. 66**

LED BULKHEAD

S & F of wall-mounted bulkhead having LED light source engine, integral fixed output driver, 120° luminaire light beam spread, luminous flux ≥ 700 lm, luminous efficacy ≥ 107 lm/W, power consumption ≤ 6.5 W, power consumption tolerance $\pm 10\%$, initial corrected colour temperature (CCT) 6500K, colour rendering index (CRI) ≥ 80 , SDCM < 5 , power factor (fraction) $>$

0.90, median useful life L70B50 @ Ta = 45 °C ≥ 25000 hrs, surge protection level ≥ 2 kV with aluminum die cast housing, polycarbonate optical cover / lens, IP65 & IK08 protection, and suitable for mounting on normally flammable surfaces, 140- 270 V input voltage, 50 Hz line frequency, ambient temperature range 0 to 45 °C, class I safety, along with wall-mounting bracket and all necessary accessories complete all as specified and directed by the engineer-in-charge.

- Supply of 6.5 W LED bulkhead fitting
- Labour for 6.5 W LED bulkhead fitting

- **TECHNICAL SPECIFICATION NO. 67**

Supply, installation, testing and commissioning of factory made, CPRI / ERDA type tested, fully compartmentalized bolted type VERTICAL TRANSPORTATION DB (design verified assembly-DVA) of suitable size conforming to IEC 61439-1 & 2 and IEC 61641 and having modular extensible design suitable for indoor mounting, internal arc compliance of minimum 70 kA for 0.5s, made out of 2.0 mm thick mild steel CRCA sheet, having both sides openable with hinged doors and locking arrangement, IP 54 & IK 10 protection, supported and fixed on structural frame of angle iron of suitable size, including earthing stud, labelling, painting to all internal & external exposed steel surfaces with powder coating paint (7 tank process), duly fixed in ground with PCC foundation (1:2:4) type B1, with danger notice plate of 1.6 mm thick mild steel vitreous enamelled (white) with letters, figures and conventional skull and bones in signal red colour suitable for 3-Phase, 4-Wire system, 500 V grade with necessary wiring, PVC sheathed stranded copper conductor of appropriate length and size, including fixing lugs, bolts, screws, etc. complete all as specified and directed by the engineer-in-charge.

The VERTICAL TRANSPORTATION DB shall comprise of the following:

[A] BUSBAR CHAMBER

[i] 01 Set (3L + N) of copper busbar of rated capacity 100 A, 50 kA, 415V, 50 Hz covered with PVC insulated sleeves including insulator, nuts, bolts, etc. with complete connection

[B] INCOMING

[i] Circuit Breaker

(a) 100 A, 415 V, Ics = 100% Icu = 50 kA, 50 Hz 3P MCCB, conforming to IEC 60947-2: 2016, having thermal magnetic trip unit, adjustable overload setting, adjustable short-circuit setting, front indication LEDs, etc.- 01 Nos.

[ii] Instrumentation & Measurement

(a) CI 1.0 multi-function meter capable of measuring V, A, F, PF, W/VA, Wh/VAh, Runhrs. Onhrs & interrupts- 01 Nos.

(b) 100/5A CI. 1.0 C.T. with 10 VA burden- 01 Nos.

(c) 6A, 10kA, 415V, 50 Hz 4P MCB- 01 Nos.

[iii] Indication & Annunciation

(a) LED phase indicators (Red, Yellow, Blue)- 01 Set

(b) LED status indicators (ON, OFF, TRIP)- 01 Set

[C] OUTGOING

[i] Circuit Breaker

(a) 40 A, 415 V, $I_{cs} = 100\% I_{cu} = 50 \text{ kA}$, 50 Hz 3P MCCB, conforming to IEC 60947-2: 2016, having thermal magnetic trip unit, adjustable overload setting, adjustable short-circuit setting, front indication LEDs, etc.- 05 Nos.

[ii] Indication & Annunciation

(a) LED status indicators (ON, OFF, TRIP)- 05 Set

NOTES:

[i] The busbars shall be of double deck arrangement for rating $\geq 1600\text{A}$ interleaved /non-interleaved design as per OEM. Separation of busbar shall be as per Form 4b.

[ii] The Panel shall be completely Ethernet communication ready to communicate with Energy Management System / SCADA System.

[iii] ACBs shall have separately powered, individual fault trip indication LEDs (For overload, short circuit, earth fault and trip-unit failure) shall be available on the trip unit which shall function even in the absence of external power supply to the breaker. ACB shall be suitable for ZSI. Trip units shall have thermal memory as standard.

[iv] All the MCCBs up to 250 A shall be with thermal magnetic trip unit & above 250A shall be with microprocessor trip units. To ensure failsafe emergency tripping of the breakers (ACBs & MCCBs), it shall be supplied with continuous rated shunt trip coils.

[v] Necessary control and switching devices to execute the switching and control logic shall be deemed inclusive of the scope of supply irrespective of them being specified / not specified above or in the SLD.

[vi] The Panel / Switchboard shall be tested to withstand vibration caused by an earthquake in accordance with IEC 60068-3-3:2013 or IS 1893 Zone V.

[vii] The Panel shall be purchased from the original equipment manufacturer (OEM) or OEM authorized channel partners only.

[viii] All the necessary noble components (viz., structural, Door noble like hinge, Bush, Door alignment gauge and Bus bar noble - Bus bar support, Close profile structure - horizontal & vertical) of the Panel shall be supplied by the OEM.

[ix] The Contractor shall furnish dimensional drawings of the items offered indicating all the fittings, dimensional tolerances, typical GADs, etc. to the engineer-in-charge for approval of the MEP Consultant and thereafter A.O. / representative.

[x] The Contractor shall intimate the Engineer-in-Charge of the routine tests in the OEM factory in presence of a representative nominated by the Engineer-in-Charge before dispatch.

- **TECHNICAL SPECIFICATION NO. 68**

M & L for earth continuity conductor or main earthing lead fixed to wall on batten or recess or chases or buried in ground or drawn in conduit / pipe or fixed to poles or any other indicated situation for loop earthing etc. as required complete as specified and directed by the engineer-in-charge.

SCOPE OF WORK

Deendayal Port Authority (DPA) is one of the Major Port in India. The Specification is intended to cover the work of Design, Supply, Installation, Testing & Commissioning of On-Grid Solar Power Plants on Turnkey Basis at following Organizations under CSR by Deendayal Port Authority. **The name of Organization & minimum DC Capacity of Rooftop Solar Power Plant to be installed & commissioned is as listed below:**

The scope of work consists of Design, Supply, Installation, Testing & Commissioning of **150 kWp (MINIMUM 3-PHASE AC OUTPUT)** On-Grid Rooftop Solar Power Plant on Turnkey Basis at above Organizations. Payment of any Cost / Charges / Fees towards Registration in GEDA, Energy Meter of DPA, Net Meter Agreement etc. will be in scope of Contractor. Any required liaison, submission & getting approval of document from CEI/GEDA/DPA for successful commissioning of the work of Rooftop Solar Power Plants at all the above-mentioned Organisations will be in scope of Contractor.

The contractor shall arrange all types of tools, tackles, scaffoldings, temporary power supply at his own cost for installation, testing & commissioning of the work. The contractor shall submit layout colored drawing of complete Rooftop Solar Power Plant System in two set hard copy & soft copy after completion of work to DPA. The work shall be executed to the satisfaction of the Engineer in-Charge.

TECHNICAL SPECIFICATION

GENERIC:

A Grid Tied Photo Voltaic (SPV) power plant shall consist of SPV Array, Module Mounting Structure, Power Conditioning Unit (PCU) consisting of Maximum Power Point Tracker (MPPT), Inverter and Controls and Protections, interconnected cables and switches.

PV Array shall be mounted on a suitable Structure.

Grid tied SPV System shall be without battery and shall be designed with necessary features to supplement the Grid Power during Daytime.

Components and Parts used in the SPV Power Plants including the PV modules, Metallic Structures, Cables, Junction Box, Switches, PCUs etc. shall be as per relevant BIS or IEC or International Specifications, as applicable.

Installation and Testing for Complete System shall be complete in all respect including Designing, Civil work, Fabrication, Cabling work with suitable Bolts, Nuts, Clamps, Connectors and Testing etc.

INVERTER:

Switching Device: IGBT

No. of Phases: 3

Inverter Output Waveform: Pure Sinewave

Technology: MPPT Based

No. of MPPT per Inverter: As per design requirement.

No. of String at input side of Inverter: As per design requirement.

Maximum Power Point Tracker: Integrated in the PCU/Inverter to maximize energy drawn from the array.

Operating Voltage range of Inverter: 200V to 1000V

Overload support at Input side, DC: 15% of maximum Input Voltage

Maximum Input Current for MPPT (in A): As per design requirement.

Service Condition: Outdoor

Ingress Protection rating of Inverter: IP 65

Cooling medium for Inverter: Intelligent fan cooling

Inverter mounting type: Wall mounted

Standard accessories for Inverter: MC4 DC Connectors, AC Connectors, Mounting Bracket, Nuts & Bolts and Inverter manual.

Manual switch for disconnecting DC Supply shall be provided. Isolation between Input DC and Output AC shall be provided.

INVERTER OUTPUT:

Overall Efficiency (in %): >98

Maximum current for 3 Phase Inverter (in A): As per design requirement.

Output Voltage (in V): 415 V for 3 Phase

Auto-trip at Output side: Lower: at 160 V, Higher: at 285V with adjustable

Frequency range: 50 Hz \pm 3

Grid Frequency Synchronization range: + 3 Hz or more

Grid Voltage tolerance: -20% and +15%

Efficiency Measurements for Power Conditioners / Inverters: As per IEC 61683 / IS:61683

Environmental Testing for Power conditioners / Inverters: As per IEC 60068-2 (1, 2, 14, 30) / Equivalent BIS Standard.

PCU/Inverter shall be capable of complete automatic operation for wake-up, synchronization and shutdown.

PROTECTION FOR INVERTER:

Input Over Voltage Protection,

Low/High Frequency Protection,

Short Circuit Protection,
Output Over Current Protection,
Output Over Voltage Protection,
Output Under Voltage Protection,
Surge Protection,
Grid Input Under Voltage / Over Voltage Protection with auto recovery,
DC disconnect Device,
DC reverse Polarity,
Anti-Islanding Protection as per the Standard,
Insulation Resistance Monitoring,
Overload Protection: 110% for 1 minute,
Over temperature Protection: At 65 °C Cooling Fan shall auto Switch-ON.
THD shall be less than 1.5%
Power Factor at rated Output Power: ≥ 0.9
Material of Inverter Body: Aluminum Casting.

CABLE FOR OUTPUT:

ISI marked connecting Cables according to Inverter rating for each system: From Inverter to Net Meter.

Conformity of the Specification for Cable: Copper Cable as per IS 694: 2010 latest and Size of cable as per design requirement.

Cable length for output side (from Inverter to Net Meter for each System): As per site requirement.

Cabling work at Input side for each system: With HMS PVC conduit pipe with necessary clamps and screws.

Cabling work at Output side for each system: With HMS PVC conduit pipe with necessary clamps and screws.

Lightning Arrestor for each Unit: 1 No.

Chemical Earthing System for each Inverter: Minimum 3 Nos. & Size of Earthing Electrode as per design requirement.

Danger Boards and Signage: 2 Nos.

PV MODULE:

Bifacial Mono Crystalline Type

PV Module Rating (in Wp): 545 Wp and above

PV Module conforming to: IEC 61215 / IS 14286 latest for Crystalline Silicon Terrestrial

PV Modules Construction, Testing and Safety Requirements: As per IEC 61730 (Part 1) and (Part 2) latest

PV Modules shall comply Salt Mist Corrosion testing: As per IEC 61701 / IS 61701 latest

Tolerance for rated output Power of PV Module: $\pm 3\%$

No. of PV Module for each Solar Power Plant System: As per design requirement.

The peak-power point voltage and the peak-power point current of any supplied module shall not vary by more than 2%.

Protective devices against surges at the PV module shall be provided.

Material for Module Frame (Corrosion Resistant): Anodized Aluminum

PV Module shall be supplied with IV Curve Sheet at STC.

ARRAY STRUCTURE:

Material of Mounting Structure: Hot dipped Galvanized MS mounting Structure.

Angle of inclination as per the site conditions to take maximum insolation for each mounting structure.

Material of mounting structure for mounting the modules/panels/arrays: Structural Steel, Grade: E300 (as per IS 2062: 2011 latest).

Galvanization of the mounting structure: As per IS 4759 latest

Structural material shall be corrosion resistant and electrolytic compatible: Module frame, fasteners, nuts and bolts.

Material of fasteners: Steel as per IS 1367 (Part 1) 2002 latest.

Structures Design shall allow easy replacement of any module.

Civil Structure shall be as per the load bearing capacity of the roof and the suitable structures based on the quality of roof.

Minimum clearance of the structure from the roof level: 1 meter.

JUNCTION BOX:

Junction Boxes shall be provided in the PV array for termination of connecting cables.

Junction Box on PV Module shall be sealed type.

Material of Junction Box shall be Fibre Reinforced Plastic (FRP).

Ingress Protection Class: IP 65.

Termination of Wire/Cable shall be through cable lugs.

Input & Output Termination shall be through single or double compression cable glands.

Copper bus-bars/terminal blocks shall be housed in the Junction Box with suitable termination threads.

Provision of Earthing System shall be provided as per design requirement.

Surge Protection Device shall be provided for each Junction Box.

WIND LOAD:

The mounting structure shall be designed to withstand the wind speed of 150 km per hour.

DISPLAY FEATURE ON INVERTER:

Type of Display: LED

Display Parameters: DC Voltage, DC Current, AC Voltage, AC Current, Output Frequency, Power Factor.

Display for Generating Power Data: Daily, Weekly, Monthly, Yearly with Total Generation.

Generating Power Data Storage Facility shall be for 2 years from the date of commissioning.

NET METER:

Approved by concerned Government Authority for connecting to the Grid.

DC DISTRIBUTION BOARD:

DC Distribution Panel to receive the DC output from the Array field with Surge Arrestors.

Ingress Protection Class: IP 65.

Bus-bar: Copper Bus-bar of size as per rating of Inverter.

Circuit Breaker for input size (DC side) for Inverter: MCB of suitable rating.

CABLE FOR INPUT:

ISI marked connecting cables according to Inverter rating for each system: PV Module to Inverter DC.

Cable for Input: Minimum $1\text{C} \times 6\text{ Sq. mm}$ Copper Cable as per IS 694: 2010

Cable length for PV Module to Inverter DC: As per site requirement.

AC DISTRIBUTION BOARD:

AC Distribution Panel Board for controlling AC power from PCU/Inverter: 3 Phase 415 Volt $\pm 10\%$, 50 Hz $\pm 3\text{ Hz}$.

Panel Construction: Wall/Floor mounted, air insulated, cubical type with change-over switch, as per design requirement.

Ingress Protection Class: IP 65

All switches and the circuit breakers, connectors shall conform to IS 60947 Part I, II & III.

Circuit Breaker for Output side (AC side) for Inverter: MCB of suitable rating.

WARRANTY & GUARANTEE:

Minimum Guarantee for maintaining of Output peak watt capacity: $\geq 90\%$ at the end of 10 years and $\geq 80\%$ at the end of 25 years.

Warranty for PV Modules as per MNRE specification: 25 Years.

Warranty for Inverter: 5 Years

Warranty Card shall be submitted containing the details of the system and information about the system and conditions of warranty.

15 Set of Operation and Maintenance manual for each Solar PV Module shall be submitted.

All the test reports and certificates shall be submitted to DPA.

In case of Grid failure, or low or high Voltage, Solar PV system shall be out of synchronization and disconnected from the Grid.

4 Pole Isolator shall be provided for isolation of Inverter output with respect to the Grid.
Locking facility for isolation switch shall be provided.

CERTIFICATIONS:

The PV Cell type, make of SPV Cell, make of SPV Module & make of PCU/Inverter shall be BIS approved. The contractor shall submit valid BIS Certificates for the same.

Contractor shall provide design report of STAAD PRO for Mounting Structure of Modules for compliance of the Structural Stability which shall be duly verified by TPIA of DPA.

Contractor shall submit type test reports for PV Module, PCU/Inverter.

List of make for Solar Panel:

LONGI/TRINA/GOLDI/VIKRAM/REWNYSIS/RAYZON/WAAREE or Equivalent subject to submission of relevant documents of successful operation of minimum one year in any Government Organization.

List of make for Solar Inverter:

LUMINOUS/MICROTEK/EVVO/LENTO/DELTA/ABB/HITACHI/HUAWEI/SUNGROW or Equivalent subject to submission of relevant documents of successful operation of minimum one year in any Government Organization.

The Solar Inverters shall have warranty of minimum 5 Years and individual Solar Panel warranty shall be minimum 25 Years from the date of commissioning.

Signature & Seal

of Contractor

Executive Engineer (E)

Deendayal Port Authority

Approved Make List for Electrical Items

Sr. No.	Description	Recommended Makes
1	HT VCB	SIEMENS / CROMPTON GREAVES/ABB/Schneider
1(a)	HV Gas Insulated Breakers	SIEMENS /Schneider/ABB

2	POWER TRANSFORMERS	VOLTAMP/CROMPTON GREAVES /BHARAT BIJLEE/ BHEL/ SIEMENS/ ABB/ Schneider/T&R
3	DISTRIBUTION TRANSFORMERS	EMCO/KIRLOSKAR/PATSON/VOLTAMP/ ABB / Schneider / T&R
4	RESIN CAST TRANSFORMERS	
	A) RESIN CAST IMPREGNATED	VOLTAMP / KIRLOSKAR / EMCO
	B) DRY CAST	VOLTAMP/KIRLOSKAR/EMCO
5	HT XLPE CABLES	POLYCAB/TORRENT/RPG ASIAN/ /GLOSTER/ UNISTAR/ UNISTAR/KEI/FINOLEX/HAVELS
6	LT XLPE CABLES	POLYCAB/TORRENT/RPG ASIAN/ / RALLISON/PRIMECAB/ HAVELLS/ UNISTAR/AVOCAB / ADCAB
7	LT ACB	SIEMENS/L&T/SCHNEIDER/C&S
8	PROTECTION RELAYS	AREVA/L&T/SIEMENS/ABB/C&S
9	LT PANEL	CPRI APPROVED
10	CHANGE OVER SWITCH	SIEMENS/L&T/ABB/C&S/SCHNIDER/ LEGRAND / INDOASIAN
11	SFU FOR MAIN LT DISTRIBUTION PANELS	SIEMENS/L&T/ABB/C&S
12	SFU FOR DISTRIBUTION PANELS & FEEDER PILLERS	SIEMENS/L&T/ABB/C&S/ SCHNEIDER/ LEGRAND/ INDOASIAN/HAVELLS
13	MCCB FOR MAIN LT DISTRIBUTION PANELS	SIEMENS/L&T/ABB
14	MCCB FOR DISTRIBUTION PANELS AND FEEDER PILLERS	SIEMENS/L&T/ABB/C&S/ SCHNIDER/ LEGRAND/ INDOASIAN/HAVELLS

15	MCB/ELCB/RCCB/ RCCBO FOR MAIN LT DISTRIBUTION PANELS	SIEMENS/HAGER L&T/ABB
16	MCB FOR DISTRIBUTION PANELS AND FEEDER PILLERS	SIEMENS/L&T/ABB/C&S/ SCHNEIDER/ LEGRAND/ INDOASIAN/ HAVELLS/ STANDARD
17	MCB DISTRIBUTION BOARD	STANDARD / HENSEL/LEGRAND / INDOASIAN / HAVELLS
18	MULTI FUNCTION DIGITAL METER FOR MAIN LT DISTRIBUTION PANELS/DIGITAL KWH METERS	L&T/ENERCON/SECURE/L&G/ RISHABH
19	ANALOG VOLT/AMPARE METER FOR DISTRIBUTION PANELS AND FEEDER PILLERS	RISHABH/AE/ENERCON/L&T
20	SLECTOR SWITCH FOR VOLTMETER/AMPARE METER	L&T/SIEMENS/C&S
21	POWER CONTACTOR & OVER LOAD RELAYS	L&T/SIEMENS/ABB
22	QUARTZ TIME CLOCK SWITCH	L&T/INDOASIAN/SIEMENS
23	PVC WIRE WITH COPPER CONDUCTOR	RR KABEL / KEI / POLYCAB/MILEX/GUJCAB/ STANDARD / FINOLEX / ANCHOR
24	FLUSH TYPE SWITCHES, SOCKETS, HOLDERS AND CEILING ROSES & ELECTRONIC REGULATORS	ANCHOR/MK/NORTHWEST/VINAY /PANAMA / HAVELLS
25	DOOR BELLS/CALL BELLS	ANCHOR/LEGEND/MK/NORTHWEST

26	MODULAR SWITCHES, SOCKETS, PLATES & BOXES	ANCHOR / MK / NORTHWEST / LEGRAND /HAVELLS / INDOASIAN / SIMENS.
27	PVC CONDUIT/OVAL CONDUIT & CASSING CAPPING AND ACCESSORIES	PRECISION/VULCAN/FINOLEX/ GARWARE/ RESTOPLAST/ SWASTIK / BPI
28	GLS LAMPS & FLUORESCENT LAMPS	PHILIPS / BAJAJ / WIPRO / CROMPTON GREAVES / OSRAM / SURYA ROSHNI / GE
29	HPSV, HPMV & METAL HELIDE LAMPS	PHILIPS / BAJAJ / WIPRO / CROMPTON GREAVES / OSRAM / SURYA ROSHNI / GE
30	IGNITORS FOR HPSV, METAL HELIDE LAMPS	PHILIPS / BAJAJ / WIPRO / CROMPTON GREAVES / OSRAM / SURYA ROSHNI / GE
31	LUMINARIES	PHILIPS / BAJAJ / WIPRO / CROMPTON GREAVES / OSRAM / SURYA ROSHNI / GE/C&S
31a	LED LUMINARIES	Philips /Bajaj/Wipro/CG/Surya/Pyrotech/Syska/Nessa/C&S having surge Protection $\geq 10KV$ for fittings & internal Surge Protection for Driver of $\geq 4KV$, LED Chip only OSRAM/CREE/Philips Lumileds/Citizen/ with LM-79,80 CERTIFICATION
32	CEILING FANS	BAJAJ/ORIENT/USHA/CROMPTON GREAVES / ALMONARD/GEC
33	WALL MOUNTING FANS	BAJAJ/ORIENT/USHA/CROMPTON GREAVES / ALMONARD/GEC
34	EXHUAUST FANS	BAJAJ/ORIENT/USHA/CROMPTON GREAVES / ALMONARD/GEC
35	HEAVY DUTY INDUSTRIAL WALL MOUNTING FANS	BAJAJ/ORIENT/USHA/CROMPTON GREAVES / ALMONARD/GEC or its equivalent
36	WATER COOLER	VOLTAS/SHRIRAM USHA/BLUE STAR

37	AIR CONDITIONERS	VOLTAS/CARRIER/BLUESTAR/USHA/ HITACHI/LG/ SAMSUNG/ONIDA
38	REFRIGERATORS	VOLTAS / CARRIER / BLUESTAR / USHA / HITACHI / LG / SAMSUNG / WHIRLPOOL
39	VOLTAGE STABILIZER	VEELINE / CAPRI
40	INVERTERS	SUKAM / MICROTEK
41	D.G. SETS	
	A) ENGINE	CUMMINS/GREAVES/KIRLOSKAR/ CATERPILLAR /ASHOK LEYLAND /VOLVO
	B) ALTERNATOR	STAMFORD/CROMPTON GREAVES /JYOTI/ KIRLOSKAR ELECTRIC
42	ELECTRIC MOTOR	ALSTOM/CROMPTON GREAVES /SIEMENS/ KIRLOSKAR/ABB
43	WATER PUMPS	SWASTIK / KSB
44	WATER GEYSER	BAJAJ/USHA / CROMPTON GREAVES / SPHEREHOT / RACOLD
45	LUGS & CABLE GLANDS	DOWELLS / JAINSON / BRACO

Note:

In case of supply of Make of material for Overhead Line only which is not in the DPA approved Make list, the said material should be supplied as per the latest GETCO /PGVCL/MGVCL/UGVCL approved Make list.

Before procurement of material, the Make of the material should be approved by EIC in writing along with relevant document & Technical Data Sheet & Certificate.

**Seal & Sign of
Contractor**

**Executive Engineer (E)
Deendayal Port Authority**

Name of Work: “” Construction of Administrative office building at Kandla -HVAC PART

SPECIAL CONDITIONS

1. Notwithstanding the below method statements/ installation procedure, the execution of project shall, in general, conform to relevant Codes & standards, guidelines/ compliance issued by the authority having jurisdiction, standard industrial practice and OEM's recommendation over and above the method statement/ installation procedure.

2. **HEALTH & SAFETY**

Contactor must follow Safety norms as per Deendayal port authority safety guide.

2.1 WORK PERMIT

- All Workers have valid Gate Pass till project completion.
- Proper induction of all workers shall be completed before starting their defined work.
- Necessary JRA and work permit shall be issue before starting the work.
- All welders shall be certified welder and need to submit their certificate.

2.2 BARRICADE AND WORK AT HEIGHT

- Temporary barricades shall be provided around the working area prior to commencement of site work.
- Safety signboards, warning tape and signs, cones shall be provided around the working area confirming the safety of working area.
- The fabrication area shall be neat and tidy at all times. Fabrication should be done above MS sheet to protect the flooring.
- All unwanted materials / debris shall be transported to approve dumping site on daily basis.
- Only approved scaffoldings & safety belts should be use whenever working at heights exceeding 1.5Mtrs.
- Ladders must be checked to ensure correct length, type and condition before use.
- The ground base for the ladder must be firm and level. Damaged ladders will be broken up or removed from site.
- The ladder must be of sufficient length to extend 1m above the step-off point when used as access to scaffold.

2.3 ELETRICAL TOOLS

- All Electrical tools shall be tag as per safety standard before starting work. Tag shall be renewing time to time.
- All hand and portable power tools to be used shall be of good order and be used by approved industrial sockets.
- Ensure that all tools and equipment are thoroughly inspected, and all are in proper working conditions.
- Power tools must be 230 V with socket and insulated cables. DEENDAYAL PORT AUTHORITY METHOD STATEMENT 7 GEO DESIGNS & RESEARCH PVT. LTD.

2.4 LIFTING MATERIAL

- Lifting of any material or equipment should be done only by means of approved chain / Electric hoists /Jacks with appropriately support.

2.5 FIRE EXTINGUISHERS

- Application of Paints, primers, thinners varnishes etc. should be carried out at ventilated places only.
- Fire extinguisher shall be positioned at Material Store Area and in the event where welding work is in progress on workplace.
- Ensure adequate lighting and ventilation whenever working in confined spaces.
- Ensure that working is have provision of entrance and exit

2.6 PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Wear Goggles of adequate visibility, whenever using gas torches, grinders, cutting machines, or doing chipping, drilling etc. Do not use goggles with scratched glasses or of poor visibility.
- During manual handling of Material all workers have to wear safety gloves and make sure they are protective against trip hazards and sharp edges.
- All appropriate safety personal protective equipment shall be worn by workmen such as
 - Earing protection, Earmuff or Plugs
 - Helmet, Hand Gloves (Leather or Cotton)
 - Face Shield (for grinding/cutting activities), Dust Mask respiratory protection.
 - Safety Glasses, Safety Shoes

3. INSTALLATION PROCEDURE

3.1 PRE-INSTALLATION PROCEDURE FOR PIPE LAYING

- Permit to Work (PTW) shall be raised before starting the work.
- Check the Welding Work area is enough far away from other utilities i.e. Gas Line, Electrical Cables, Water Line or other Utilities.
- Ensure the working area at any confined space is free from any Hazardous Gas by proper Gas testing using the Gas testing instrument.
- Ensure that the work area is ready and safe to start the installation of Piping Work.
- Check and ensure that approved drawings, the correct size and type of Pipe & accessories are ready with Pipe Installation / Fabrication team.
- Assign sufficient banks men, helpers and supervisors at the site prior to start of work.
- Ensure that M.S Pipe and its accessories received from site store for the installation are free from rust, corrosion & damages.

3.2 PIPE HANGER / SUPPORT INSTALLATIONS

- Make piping Installation Route / layout as per the approved shop drawings, combined services drawings and site coordination with other services.
- Piping Route will be the as per most advantageous manner possible with respect to headroom, valve access, opening and equipment clearance, and clearance for other work.
- The Line layout should be verified from Site in charge.
- After marking the pipe routes, the anchoring points will be drilled according to the required support spacing as shown on the approved shop drawings.
- Mark out the location of hanger thread rods for pipe installation as per the approved construction drawing.
- Fasteners and fully threaded rods shall be used for installing the pipe supports. The size of pipe supports and installation shall be in accordance with manufacturer's recommendations.

Pipe Diameter (mm)	Maximum Hanger Spacing (mm)	Rod Size (mm)
25	2000	8
32	2500	8
40	2500	8
50	2500	8
65	2500	10
80	2500	10
100	2500	12
150	3000	12
200	3000	12

- For Single pipes of size 100 mm and above, with the prior approval 50x50x6 mm MS Angle iron and for Double Pipe 75x75x6mm with U Clamp with Fastener may be used for Supporting horizontal Pipe from ceiling.
- Drill the marked position for hangers and supports by using the drill bit of appropriate size.
- Fix the unfixed anchor at drilled position by gentle and uniformly hammering.
- Fix the threaded rod of appropriate diameter and size & length in the anchor by twisting by turning.
- After fixing the threaded rod, insert a washer of appropriate size into the rod.
- Finally fix the washer near to the slab by tightening a nut over it, this will improve the strength and load bearing capacity of threaded rod.
- For installing pipes vertically or horizontally inside the building standard pipe supports of reputed make shall be used. Following supports shall be used.

a. MS Chancel for horizontal supports to adjust varying heights.

The Pipe route should be min 500mm away from wall. Supports will be arranged as near as possible to pipe joints and any change in direction.

b. Vertical Riser Support:

Risers shall be supported by pipe clamps or by hangers located on the horizontal connections within 24 inches (0.6 Meter) of the centre line of the riser.

3.3 PIPE WELDING /FABRICATION

3.3.1 WELDING MACHINE

- Welding machines shall be in good working condition and shall have proper control for regulating current.
- Location of welding machines and the distribution boards to be connected with them shall be verified by site electrical Team to avoid overloading of the distribution boards, cables and electrical power sources.
- All welding Machine, other Electrical Tools, the electric cables, distribution boards and connections for machines shall be carefully checked once a Month to maintained it in a good working condition.
- Welding cables used shall have proper insulation throughout the length. The cables shall be carefully examined and repaired as necessary every day.

3.3.2 WELDING ELECTRODES

- Electrodes used for welding should comply with IS:814, 1991.
- Generally, all welding shall be performed using Shielded metal arc welding (SMAW) process using cellulosid-coated electrode (E6013 type) for root run and subsequent passes.

3.3.3 STORING OF WELDING ELECTRODES

- Welding electrodes shall be stored in indoors free from moisture.
- Qualified and certified welders only shall do welding.
- No welding shall be done if there is impingement of any rain, or high winds

3.3.4 FABRICATION OF PIPE (BUT WELDING)

- The welding of pipes in the field should comply with IS:816, 1969.
- All pipes and fittings shall be cleaned of Dust, Mud from inside and outside before Welding.
- All pipe, fittings shall be smooth, clean and free from blisters, loose mill scale, sand and dirt prior to the installation.

3.3.5 EDGE PREPARATION

- Before welding, the ends shall be cleaned by wire brush, filing or grinding and making "V" on edge of both pipes.

3.3.6 WELDING OF ROOT RUN

- Primary Welding shall be done by E6013, 2.5mm Welding Rod (90 to 90A, 18 to 25V) of approved make.

3.3.7 CHIPPING AND CLEANING OF ROOT RUN

- Each weld- Root run shall be thoroughly cleaned to remove the slag, irregularities and any defects, before the next run is deposited.

3.3.8 FINAL WELDING RUN

- Final Welding shall be done by E6013, 3.5mm Welding Rod (80 to 140A, 20 to 25V) of approved make.
- Chipping and Cleaning of Final Run: Each Final weld shall be thoroughly cleaned to remove the slag, irregularities and any defects.

3.4 PIPING AND WATER DISTRIBUTION SYSTEM

- Steel piping with welded or flanged/coupled joints should be used for water recirculation and distribution in central air conditioning system.
- Dielectric coupling shall be used to avoid corrosion when choosing different material combinations.
- The system design should achieve the following main objectives:
 - A good distribution of water to the various heat exchangers/cooling coils at all conditions of load, matching with temperature, humidity and pressure control strategies.
 - Adequate provision should be made for balancing, measuring flow rates and maintaining pressure differentials.
 - Pipe sizing shall be based on a balance between capital cost and operating cost.
- Excessive water velocities should be avoided, as they lead to higher energy consumption and noise at pipe junctions and at bends
- In a large system when multiple water-chilling packages have to be used, control of the machines and the arrangement of the water circulation should be considered as an integrated whole.
- Expansion tank shall be provided to cater for volume changes due to changes in temperature of the large volume of water filled within the system.
- System connection to expansion tank shall never be shut off. To maintain positive pressure during pump off situation, the open-type expansion tank shall be located at the highest point. Alternately, an inert gas pressurized closed expansion tank may be installed at a lower level.
- Air separator shall be provided in the chilled water system to improve the life and efficiency of chilled water piping and heat exchange equipment.

- Soft water shall be used for central chilled water air conditioning system, as the heat transfer medium to convey heat from the air-handling units to the primary refrigerant in the evaporator.
- Spacing of pipe supports shall not exceed the following:
- Up to 12 mm : 1.5 m
- 15 mm to 25 mm : 2.0 m
- 30 mm to 150 mm : 2.0 m
- 150 mm and above : 2.5 m

3.5 TESTING OF REFRIGERANT PIPES:

- All completed systems will be strength and leak tested with dry nitrogen as per manufacturer's recommendation. If the system is found to be leak free, the final pressure readings for both strength and leak testing are to be witnessed and entered.

3.5.1 PRESSURE TESTING PROCEDURE:

- The high side and low side of each completed refrigeration piping system must be pressure tested at a pressure not less than the lower of the system test pressure or the setting of the pressure-relief device protecting the high side or low side of the system as per approved specs. And manufacturer recommendation.
- The testing media must be dry nitrogen. The Contractor must perform the leak test before insulating the pipes.
- Isolate the compressor from the leak test by firmly closing the suction and discharge valves.
- Where pressure-relief valves are installed, position the three-way dual shutoff valves so that full test pressure is applied to both relief valves.

3.5.2 TESTING MEDIUM-NITROGEN:

- Do not attempt to repair any leak while the system is pressurized. If any leaks are found, relieve the test pressure and perform repairs.
- The piping will be checked with soap and water solution.
- The pressure will be held for a period of 24 hours. If there is no visible loss of pressure after 24 hours, the line will be deemed to be gas tight.
- If a pressure gauge indicated the pressure drop, the testing operations connection and shut-off valve be first rechecked for leak and tightened as necessary.
- If a pressure drop is still evident, then all joints and lastly the piping itself will be checked with soap and water solution.
- Recharge the system, as previously described, and allow it to remain under pressure for 24 hours' maximum pressure at least 1.5 times the operating pressure.

- Raise WIR for witnessing the Leak Testing for Refrigerant Copper Pipework.

3.5.3 INSULATION OF THE REFRIGERANT PIPES:

- Chilled Water piping buried directly in ground shall be insulated with fire retardant quality expanded polystyrene moulded pipe section, of thickness as per the BOQ and after a thick coat of cold setting adhesive (CPRX compound) wrapping with 500g polythene faced hessian and finally applying sand cement plaster and tar felt sheet as elaborated in particular specification.
- Chilled water piping running on wall / floor or through flexible closed-cell elastomeric thermal insulation (in tubular form) made of elastomeric foam based on synthetic rubber (NBR / PVC) with UV resistant metal finishing on one side, having thermal conductivity $\lambda \leq 0.035 \text{ W/mK}$ at mean temperature $\theta_m = 0^\circ\text{C}$ as per EN 12667, moisture diffusion resistance factor $\mu \geq 7000$ as per EN 12086 for the base foam, water absorption by volume $\leq 0.2\%$ as per ASTM C 209 / C1763 for the base foam, flame spread index (FSI) Class 1 as per BS476 Part 7 for surface spread of flame and 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, density of base foam between 40- 55 kg/m³, density of laminated insulation material between 50 to 70 kg/m³, tensile strength of the base foam with covering $> 1.5 \text{ MPa}$ (32 mm) in MD & $> 0.4 \text{ MPa}$ (32 mm) in CD, elongation of the base foam with covering $> 40\%$ (32 mm) in MD & $> 38\%$ (32 mm) in CD, tear strength of the base foam with covering $> 35 \text{ KN/m}$ (32mm) in MD & 25 KN/m (32 mm) in CD with covering material of multiple layered laminate of polymeric material reinforced with scrim with a special UV protection with necessary accessories complete all as specified and directed by the engineer-in-charge.

3.5.4 PHASE I TEST:

- The installation shall be taken over after the plant has been and after completion of successful completion of Phase-I test constituting the following points:
- That the plant equipment and accessories provided are as per contract specifications.
- That all plants equipment and accessories are mechanically sound and other related items of the air conditioning works are of adequate structural strength and the installation is in conformity with the specifications embodied in the contract.
- That the finish and the general appearance of the work is as per contract specifications.
- That all duct pipes, fittings etc., are of specified type, quality design and workmanship and are neatly laid, fixed and painted to match the surrounding work.
- That inside design conditions are achieved and maintained during a test taken for 24-hour continuous running irrespective of any variation in specified equipment and occupancy loads

and irrespective of any variation in the ambient condition. Test will be recorded. This initial takeover shall be deemed as provisional and without prejudice to phase-II test.

3.5.5 PHASE II TEST:

- The phase-II tests for summer, monsoon and winter seasons be carried out by the Accepting officer or his authorized representatives in the presence of contractor. Each test shall last continuously for 3 days [72 hour]. The contractor shall afford all facilities and make all necessary arrangements for this test. The Phase II tests shall be carried out as soon as the stipulated load and weather conditions are available but not later than a year after Phase-I test. In case the required load is not available arrangement will be made by the GE to provide artificial load. These tests comprise of following:
- Hot weather test to be conducted in summer month of May/June. The performance of plant as a whole will be recorded.
- Monsoon test to be conducted during monsoon month of Jul/Aug and performance recorded.
- Winter test to be conducted during winter month of Dec/Jan and performance recorded.
- During the Phase I and Phase II tests the units shall be uniformly brought into operation by alternatively changing the working unit every unit every 8 hours or earlier.
- The contractor shall submit a graph showing progressively the time taken by the plan to get the desired temperature and humidity conditions.
- If any of the phase II test does not show satisfactory results the contractor shall at his own expense rectify/replace the defective installation or any part as directed by the Accepting officer or his authorized representative immediately. The installation will be subject to retest after such rectification of defects. However, no re-test will be insisted upon minute rectification and adjustment so long as the original test shows acceptable performance in terms of maintaining design condition.
- The installation shall be finally taken over after the contractor has given satisfactory.
- Phase-II test as certified by the Accepting officer or his representatives. Artificial heat load for testing of AC plant shall be provided by the contractor

3.6 INDOOR UNIT INSTALLATION

- Where it is out of direct sunlight.
- Where the airflow is not blocked.
- Where an optimum air distribution is ensured.
- Where the condensate can drain correctly and safely.
- Install the indoor unit on a wall/ceiling that prevents vibration and is strong enough to hold the product weight.
- Maintain sufficient clearance around the indoor unit for maintenance and servicing.

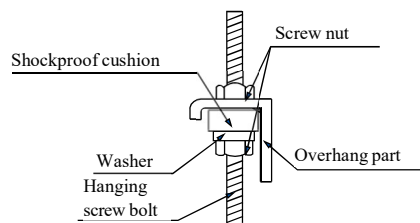
- Where the air filter can be removed and cleaned easily.
- Install the indoor unit as far away as possible from fluorescent and incandescent lights so that the remote control can be operated well.

3.6.1 INSTALL THE SUSPENSION BOLTS:

- Mark the spots on the ceiling where to be indoor unit installed.
- Drill holes at the marking spots and then insert bolt anchors. Use existing ceiling supports or construct a suitable support.
- Install the suspension bolts (use W3/8 or M10 suspension bolts) depending on the ceiling type.

3.6.2 HANGING THE INDOOR UNIT:

- Screw double nuts to each suspension bolts making space for hanging the indoor unit.
- Hang the indoor unit to the suspension bolts between two nuts.



- Adjust level of the unit by using level vial to make sure horizontal level of the main body within $\pm 1^\circ$.

3.6.3 INSTALL THE DRAIN PIPE:

- The drain pipe should be installed within 200mm from the flexible hose and then install horizontal drainpipe with a slope of 1/100 or more and fix it by hanger space of 1.0~1.5m.
- flexible hose should not be installed upward position; it may cause water flow back to the indoor unit.

3.7 INSTALLATION & COMMISSIONING OF WATER-COOLED CHILLER

- The chiller shall be microprocessor-controlled, water-cooled type, designed of full load (100%) to part load (10%) operation, with low noise operating level not exceeding 75 dB at 1.00 m distance from the unit in free field.
- The Chiller shall be factory assembled, single piece as package type, consisting of compressor/s, motor, heat exchangers, interconnecting refrigerant piping, lubricating system, flooded type cooler, condenser, initial oil and refrigerant operating charges, microprocessor control panel system and all other necessary accessories as specified herewith.

3.7.1 PREPARATION OF WORKS

- The Chiller shall be mounted with on a robust, fabricated, steel frame with anti-vibration mountings. Required set of bolts, nuts, washers shall be supplied with the unit.
- Exposed metal surface shall be painted with air dry being colour direct to metal single component paint prior to shipment. Unit shall be factory tested and shall meet the ARI standards.
- The foundation surface shall be even and clean.

3.7.2 SAFETY

- All safety precautions shall be followed as per established project safety plan and procedure.
- Only experienced and skilled technicians shall be engaged for carrying out chiller installation work.
- The people involved in the installation work shall use PPE such as safety helmets, safety shoes, harness, hand gloves etc. as required.
- Safety Officer shall check and ensure that all safety precautions.

3.7.3 CONNECTIONS

- Install piping adjacent to chiller to allow service and maintenance.
- Connect to evaporator inlet with shutoff valve, strainer, flexible connector, thermometer and plugged tee with pressure gauge and drain with valve. Make connections to chiller with a union and flanges.
- For water chillers installed indoors, extend vent piping to the outside without valves or restrictions.
- Connect each drain connection with a union and drain pipe, and extend pipe, full size of connection, to floor drain.

3.7.4 INSPECTION

- Inspection including witnessing of test will be carried out by purchaser or his authorised representative, if required. However, test certificate shall be submitted and clearance obtained before dispatch of the assembled unit.
- The vendor shall submit a quality assurance plan.

3.7.5 PAINTING

- The chiller complete with all components shall be supplied duly painted with two (2) coats of zinc chromate primer and two coats of finish paint as per standard code for intended service after final inspection of unit for dispatch.

3.7.6 INSTALLATION

- The Chiller shall be mounted on a suitable concrete sub-base or isolation pads separated from the main floor and isolated from it through vibration mounting.
- After completion of unit erection, whole system with interconnected refrigerant piping and associated control shall be proof tested at minimum 25 kg/cm² pressure and leak with a nitrogen/ helium gas mixture at 21 kg/cm² pressure. The water side of cooler shall be hydrostatically tested at 1.5 times the rated working pressure.
- All controls, control wiring and necessary interlocking shall be carried out and checked prior to commissioning the system. Pressure switches of differential type shall be provided in chiller lines and suitably interlocked with the starter of the compressor motor, preventing compressor starting without condenser fans and chilled water flow being established.

3.7.7 TESTING & COMMISSIONING

- The chiller shall be tested for establishing the capacity and power consumption IKW/TR including all other standard parameters, applicable at different percentage capacity.
- Refrigeration capacity of the unit shall be computed from measurement of chilled water flow and entering and leaving water temperature and related tests shall be carried out generally in accordance with ARI 550-92.
- Computed results shall tally with the specified capacities. All meters, gauges, thermometers, watt meters and similar items shall be duly calibrated and shall be supplied by vendor. Calibration certificates for all instruments shall be given.

3.8 INSTALLATION & COMMISSIONING OF CHILLED / CONDENSER WATER PUMPS

- Pump shall be stored on a flat surface in well-ventilated storage area. Inlet and outlet flange blanks shall not be removed until ready for connection to pipe work.
- Manufacturer's instructions shall be strictly followed as applicable for storage of pumps.

3.8.1 PREPARATION OF WORKS

- The foundations designed to meet the vibration and sound control requirements shall be provided by main contractor. Check and ensure that the shop drawings used are latest and approved for construction.
- Concrete, (reinforced as necessary or required) is most widely used for the foundation of pumps, in most cases it provides rigid support, which minimizes deflection and vibration. It may be located on soil, structural steel or building floors, provided the combined weight of the pumping unit.
- While completing the civil works MEP contractor will co-ordinate the location of foundation as per Check the piping support locations and cable tray routing locations in co-ordination with pump and\ piping layout and ensure these are not obstructing the space around pump.

- Ensure availability of easy access and sufficient clearance for servicing and maintenance i.e. for replacement of pump, motor.
- Select a location for the pumping unit (pump, base plate, coupling and driver) that will be clean, well ventilated, properly drained and provide accessibility for inspection and maintenance (see outline drawing for dimension), outdoor installations may require protection from the elements particularly freezing.
- The suction supply system must provide the pump i.e. the suction tank location with its base or above the same elevation of the pump.

3.8.2 METHOD FOR CHILLED WATER / CONDENSER PUMP INSTALLATION

- Mark the locations of the pump base frame and hole locations. The pump and motor are assembled on the base frame by suitable flexible coupling arrangement.
- Check and ensure free rotation of the shaft. Position the pump frame assembly on the foundation and fix the anchor fasteners.
- Ensure proper coupling guards are provided. Complete the piping and valve package installation as per approved drawings. Remove the end caps fixed on the inlet flange.
- Install the electrical control panel and power connections as per approved drawings. Incoming and outgoing cables shall be tested for insulation resistance/continuity.
- Provide and connect earth wiring as per approved drawings/manufacturers instruction. After
- completion of the chilled / condenser water pump installation and piping connections, the same shall be checked and certified by the pump supplier.
- Inspection request for pump installation shall be raised for consultants' inspection and approval.

3.8.3 CHILLED / CONDENSER WATER PIPING

- All chilled water and condenser water pipes and fittings shall be of mild steel lass 'C' (heavy) conforming to applicable Indian standard.
- All joints in the pipe system shall generally be by welding, unless otherwise specifically mentioned or directed at site.
- All welding shall be done by qualified welder and shall strictly conform to applicable Indian code of practice for manual metal arc welding of mild steel.
- Pipes shall be new and of standard manufacturer. All pipes and their steel supports shall be treated with phosphate and given one coat of red oxide primer of an approved make before installation. All welded piping shall be subject to approval at site.
- All pipe fittings shall be new and of reputed manufacturer. Fittings shall be of malleable castings and their pressure rating shall be suitable for pressure of the piping system. Fittings used on welded piping shall be of compatible of being welded.

- Tee-off connections shall be through equal or reducing tees, otherwise ferules welded to the main pipe shall be used. Drilling and tapping of the walls of the main pipe shall not be resorted to. All valves shall be heavy duty and of approved make and shall conform to applicable Indian standards and following specifications:
- 15 mm to 25 mm : Gunmetal, Screwed
- 30 mm to 65 mm : Gunmetal, Flanged
- 80 mm and over : Cast Iron, Flanged Body; Spindle, Valve Seat, Nut, etc. of Gunmetal or Bronze
- Balancing and control valves shall be provided in the outlet of condenser/chiller/AHU water lines if specified in bill of quantities. The valves shall have built-in pressure drop measuring facility.
- Flanges shall be new and of reputed manufacturer. The supply of flanges shall also include supply of non-corrosive bolts and nuts and suitable asbestos fibre gaskets or neoprene rubber gaskets.
- Approved pot strainer and Y strainers with cast-iron/ MS body designed to test pressure of 21 kg/cm² shall be used. Strainers shall have removable bronze/brass screen with 3 mm perforations. Strainer shall be such that removal of accumulated dirt and replacement or removal of the screen is possible without disconnection of the main pipe

3.8.4 CHILLED / CONDENSER WATER PUMP MOUNTING ON FOUNDATIONS

- Use qualified personnel (riggers) to lift or move unit at any time. Do not lift the pump unit using hooks or slings on shafts.
- Never place eyebolts in tapped holes except for removal of a part to perform service work.
- When the unit is received with the pump and the driver mounted on the base plate, it should be placed on the foundation and the coupling halves disconnected.
- Coupling should not be reconnected until the alignment operations have been completed.
- The base plate should be supported on rectangular metal blocks and shims or on metal wedges having a small taper.
- Support pieces should be placed close to the foundation bolts on large units, small jacks made of cap screws and nuts are very convenient to use.
- In each case the supports should be directly under the part of the base plate carrying the greatest weight and spaced closely enough to give uniform support.
- Adjust the metal supports or wedges until the shafts of the pump and driver are level.
- Check the coupling faces as well as the suction and discharge flanges of the pump for horizontal or vertical position by means of a level.

- Correct the positions, if necessary, by adjusting the supports or wedges under the base plate as required. Chilled / condenser water Pumps and drivers mounted on a common base plate are accurately aligned before shipment.
- Realignment is necessary after the complete unit has been levelled on the foundation and again after the grout has set and foundation bolts have been tightened.
- The alignment must be checked after the unit is piped and rechecked periodically. To facilitate accurate field alignment, do not dowel the pumps or drivers on the base plates before shipment.

3.8.5 SUCTION & DISCHARGE PIPING CONNECTIONS

- The suction and discharge piping should be arranged for the simplest, most direct layout, to be of sufficient size and be internally free of foreign material.
- The piping must never be pulled into position by the flange bolts. It must be independently fixed and arranged.
- The suction piping, if not installed properly, is a potential source of faulty operation.

To achieve best pump performance:

- The suction lines, when operation must be kept absolutely free from air leaks.
- A strainer should be installed in suction line. The screen must be checked and cleaned periodically. The opening in the screen must be smaller than the sphere size allotted for the impeller.
- Piping should be cleaned mechanically and chemically and flushed prior to installing the pump. A large number of pump packing, mechanical seal and seizure troubles are due to improperly cleaned systems.
- The Pump should also be inspected internally for foreign matter that may have entered the pump.
- The suction pipe shall be sized such that pump capacity and minimum distance to be maintained from suction pump flange.

3.8.6 PRE-COMMISSIONING CHECKS

FOR CHILLED / CONDENSER WATER PUMP:

- Check and inspect the installation of Chilled/condenser water pump set is complete and as per drawings
- Ensure adequate clearance is available for service and maintenance of pumps and motors.
- Check all nuts, bolts, screws fasteners etc. fixed and tightened as required.
- Check alignment is OK (verification for any minor changes.).
- Rotate the pump manually and ensure free and smooth rotation.
- Ensure piping is pressure tested.

- Check and ensure piping are flushed and clean
- Adjust desired cut in and cut off pressure as per requirement.

FOR AC PLANT ROOM EQUIPMENTS:

- Ensure that all pressure gauges are installed.
- Ensure that power supply cables to all pump controllers are complete.
- All isolation valves, check valves / drain valves are installed and are in the normal operation position.
- Pressure relief valves are set to the required set pressure.
- Ensure that flow meters are installed
- Ventilation system for AC plant room is complete and is ready for operation.

ELECTRICAL CHECK'S

- Check all powers cabling and control wiring is completed and dressed neatly.
- Power isolator is fixed close to the pump motor for emergency stop and power isolation.
- Check all terminations are completed and tightened as required.
- Grounding connections are completed.

3.8.7 CHILLED / CONDENSER WATER PUMP TESTING & COMMISSIONING ACCEPTANCE TESTS

Controller Acceptance Test

- Chilled / condenser pump controller shall be tested in accordance with the manufacturer recommended test
- procedure. Ensure that the automatic operation sequence of the controller shall start the pump from all provided starting features this shall include the pressure switches.

The steps involved in field acceptance test of controller shall be as follows:

- Ensure suction gate valves are opened.
- Check and ensure that all air content in the pump has been allowed to escape through the air release valve.
- Compress packing evenly with gland (Gland nut should be finger tight)
- Pressure switch (senses discharge pressure) shall be set lower to prevent pump from starting.
- Place the main disconnect switch in on position.
- Place circuit breaker in on position and check if power on light is illuminated. Open the system valve gently and slowly.

Start the pump

- Slowly open the flow meter isolation valve
- Check the general operation of chilled / condenser water pumps unit, watch for vibration leaks unusual noise and general operation.

- Regulate the discharge valve to achieve various flow readings
- Important test points are at 150 % rated capacity and shut off, Intermediate points shall be taken to help to develop pump performance curve.
- Record the following data of each test point:
 - Pumps suction pressure
 - Pump discharge pressure
 - Flow
 - Pump RPM
 - Ampere's & Volts
- On completion of test, the calculated reading are used to plot a graph of the test points and are compared with the manufacturers pump characteristic curves a study of these curves will show the performance picture of the pump as it was tested. Field acceptance
- Authorized representative shall be present for the field acceptance test.
- Authorities having jurisdiction shall be notified as to the time and place of the field acceptance test.
- All the electrical wiring to the controllers intended shall be completed and checked by the electrical contractor prior to the initial start-up and acceptance test.
- A Copy of the manufacturers certified pump test characteristic curves shall be available for comparison of the results of the field acceptance test.
- The pumps as installed shall the performance as indicated on the manufacturers certified shop test characteristic curves within the accuracy limits of the test equipment.
- The pumps shall equal perform at minimum rated and peak loads without objectionable over heating of any components.

Name of Work: “Construction of Administrative office building at Kandla -FIRE FIGHTING PART

SPECIAL CONDITIONS

1. Notwithstanding the below method statements/ installation procedure, the execution of project shall, in general, conform to relevant Codes & standards, guidelines/ compliance issued by the authority having jurisdiction, standard industrial practice and OEM’s recommendation over and above the method statement/ installation procedure.
2. The Quantitative Risk Assessment of the Administrative Office Building at Kandla shall be carried out first by the Contractor which is mandatory as per National Building Code and then after the Installation of the Fire Fighting System is to be carried out by the Contractor.

3. HEALTH & SAFETY:

Contractor must follow Safety norms as per Deendayal port authority safety guide.

2.1 WORK PERMIT

- All Workers have valid Gate Pass till project completion.
- Proper induction of all workers shall be completed before starting their defined work.
- Necessary JRA and work permit shall be issue before starting the work.
- All welders shall be certified welder and need to submit their certificate.

2.2 BARRICADE AND WORK AT HEIGHT

- Temporary barricades shall be provided around the working area prior to commencement of site work.
- Safety signboards, warning tape and signs, cones shall be provided around the working area confirming the safety of working area.
- The fabrication area shall be neat and tidy at all times. Fabrication should be done above MS sheet to protect the flooring.
- All unwanted materials / debris shall be transported to approve dumping site on daily basis.
- Only approved scaffoldings & safety belts should be use whenever working at heights exceeding 1.5Mtrs.
- Ladders must be checked to ensure correct length, type and condition before use
- The ground base for the ladder must be firm and level. Damaged ladders will be broken up or removed from site
- The ladder must be of sufficient length to extend 1m above the step-off point when used as access to scaffold.

2.3 ELECTRICAL TOOLS

- All Electrical tools shall be tag as per safety standard before starting work. Tag shall be renewing time to time.
- All hand and portable power tools to be used shall be of good order and be used by approved industrial sockets.
- Ensure that all tools and equipment are thoroughly inspected, and all are in proper working conditions.
- Power tools must be 230 V with socket and insulated cables.

2.4 LIFTING MATERIAL

- Lifting of any material or equipment should be done only by means of approved chain / Electric hoists /Jacks with appropriately support.

2.5 FIRE EXTINGUISHERS

- Application of Paints, primers, thinners varnishes etc. should be carried out at ventilated places only.
- Fire extinguisher shall be positioned at Material Store Area and in the event where welding work is in progress on workplace.
- Ensure adequate lighting and ventilation whenever working in confined spaces.
- Ensure that working is have provision of entrance and exit

2.6 PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Wear Goggles of adequate visibility, whenever using gas torches, grinders, cutting machines, or doing chipping, drilling etc. Do not use goggles with scratched glasses or of poor visibility.
- During manual handling of Material all workers have to wear safety gloves and make sure they are protective against trip hazards and sharp edges.
- All appropriate safety personal protective equipment shall be worn by workmen such as
 - ☐ Earing protection, Earmuff or Plugs
 - ☐ Helmet, Hand Gloves (Leather or Cotton)
 - ☐ Face Shield (for grinding/cutting activities), Dust Mask respiratory protection.
 - ☐ Safety Glasses, Safety Shoes

3. INSTALLATION PROCEDURE

3.1 PRE-INSTALLATION PROCEDURE FOR PIPE LAYING

- Permit to Work (PTW) shall be raised before starting the work.
- Check the Welding Work area is enough far away from other utilities i.e. Gas Line, Electrical Cables, Water Line or other Utilities.
- Ensure the working area at any confined space is free from any Hazardous Gas by proper Gas testing using the Gas testing instrument.
- Ensure that the work area is ready and safe to start the installation of Piping Work.
- Check and ensure that approved drawings, the correct size and type of Pipe & accessories are ready with Pipe Installation / Fabrication team.
- Assign sufficient banks men, helpers and supervisors at the site prior to start of work.
- Ensure that M.S Pipe and its accessories received from site store for the installation are free from rust, corrosion & damages

3.2 PIPE HANGER / SUPPORT INSTALLATIONS

- Make piping Installation Route / layout as per the approved shop drawings, combined services drawings and site coordination with other services.
- Piping Route will be the as per most advantageous manner possible with respect to headroom, valve access, opening and equipment clearance, and clearance for other work.
- The Line layout should be verified from Site in charge.
- After marking the pipe routes, the anchoring points will be drilled according to the required support spacing as shown on the approved shop drawings.
- Mark out the location of hanger thread rods for pipe installation as per the approved construction drawing.

- Fasteners and fully threaded rods shall be used for installing the pipe supports. The size of pipe supports and installation shall be in accordance with manufacturer's recommendations.

Pipe Diameter (mm)	Maximum Hanger Spacing (mm)	Rod Size (mm)
25	2000	8
32	2500	8
40	2500	8
50	2500	8
65	2500	10
80	2500	10
100	2500	12
150	3000	12
200	3000	12

- For Single pipes of size 100 mm and above, with the prior approval 50xx50xx6 mm MS Angle iron and for Double Pipe 75x75x6mm with U Clamp with Fastener may be used for Supporting horizontal Pipe from ceiling.
- Drill the marked position for hangers and supports by using the drill bit of appropriate size.
- Fix the unfix anchor at drilled position by gentle and uniformly hammering.
- Fix the threaded rod of appropriate diameter and size & length in the anchor by twisting by turning.
- After fixing the threaded rod, insert a washer of appropriate size into the rod.
- Finally fix the washer near to the slab by tightening a nut over it, this will improve the strength and load bearing capacity of threaded rod.
- For installing pipes vertically or horizontally inside the building standard pipe supports of reputed make shall be used. Following supports shall be used.

c. Clevis Hangers or MS Chanel for horizontal supports to adjust varying heights.

The Pipe route should be min 500mm away from wall. Supports will be arranged as near as possible to pipe joints and any change in direction.

d. Vertical Riser Support:

Risers shall be supported by pipe clamps or by hangers located on the horizontal connections within 24 inches (0.6 Meter) of the centre line of the riser.

3.3 PIPE WELDING /FABRICATION

3.3.1 WELDING MACHINE

- Welding machines shall be in good working condition and shall have proper control for regulating current.

- Location of welding machines and the distribution boards to be connected with them shall be verified by site electrical Team to avoid overloading of the distribution boards, cables and electrical power sources.
- All welding Machine, other Electrical Tools, the electric cables, distribution boards and connections for machines shall be carefully checked once a Month to maintained it in a good working condition.
- Welding cables used shall have proper insulation throughout the length. The cables shall be carefully examined and repaired as necessary every day.

3.3.2 WELDING ELECTRODES

- Electrodes used for welding should comply with IS:814, 1991.
- Generally, all welding shall be performed using Shielded metal arc welding (SMAW) process using cellulosed-coated electrode (E6013 type) for root run and subsequent passes

3.3.3 STORING OF WELDING ELECTRODES

- Welding electrodes shall be stored in indoors free from moisture.
- Qualified and certified welders only shall do welding.
- No welding shall be done if there is impingement of any rain, or high winds

3.3.4 FABRICATION OF PIPE (BUT WELDING)

- The welding of pipes in the field should comply with IS:816, 1969.
- All pipes and fittings shall be cleaned of Dust, Mud from inside and outside before Welding.
- All pipe, fittings shall be smooth, clean and free from blisters, loose mill scale, sand and dirt prior to the installation.

3.3.5 EDGE PREPARATION

- Before welding, the ends shall be cleaned by wire brush, filing or grinding and making “V” on edge of both pipes.

3.3.6 WELDING OF ROOT RUN

- Primary Welding shall be done by E6013, 2.5mm Welding Rod (90 to 90A, 18 to 25V) of approved make.

3.3.7 CHIPPING AND CLEANING OF ROOT RUN

- Each weld- Root run shall be thoroughly cleaned to remove the slag, irregularities and any defects, before the next run is deposited.

3.3.8 FINAL WELDING RUN

- Final Welding shall be done by E6013, 3.5mm Welding Rod (80 to 140A, 20 to 25V) of approved make.

- Chipping and Cleaning of Final Run: Each Final weld shall be thoroughly cleaned to remove the slag, irregularities and any defects.

3.4 PIPE INSTALLATION

- Installation of pipe shall be co-ordinate with architectural, structural and MEP work for a fit for purpose installation. Any deviation shall be intimated to the engineer for approval.
- Cut all pipes accurately to measurement determined at the site. After cutting the pipe, ream it and remove all burrs.
- Run all piping as direct as possible, avoiding unnecessary offsets and conceal piping in finished rooms.
- Install all piping close to walls, ceilings and columns so piping will occupy the minimum space, but Proper space will be provided for covering and removal of pipe, special clearance, and for offsets and fittings.
- Pipe work will be installed not closer than 200 mm to electrical conduits, lighting, and power cables.
- Pipes will be spaced in ducts, ceilings, voids and plant areas, such as adequate access is permitted to any pipe for maintenance or removal without disturbance to the remaining pipe work and other services.
- Pipes will not be solidly built into walls or plaster. Pipe joints will not be positioned within the thickness of walls, floors or in any other inaccessible position. Pipes passing through walls and floors will be sleeved.
- Couplers, unions and fittings will be screwed up to the reduced depth of the thread, such that no more three-turns are showing when pulled up tight.
- All pipes, valves and fittings and connected equipment will be thoroughly cleaned of rust, sand and dust, scale and other foreign matter before erection and before any initial fill water for hydraulic testing.
- After completion of pipe end connection, fix / tight the support clamps properly to make the pipe straight and level as per the layout.

PIPE SUPPORT DETAILS			
Final pipe diameter	Spacing between supports	Anchor rod diameter	Anchor strip Size (thick X width)
(mm)	(m)	(mm)	(mm)
Up to 25 mm	2.0	8	1.5 X 25
32 to 50 mm	2.5	8	1.5 X 25
65 to 80 mm	2.5	10	2.0 X 30
100 mm *	2.5	12	2.0 X 30
150 mm *	3.0	12	3.0 X 30

200 mm & above *	3.0	12	3.0 X 30
* As per Site Requirement Fabrication Support may be used.			

- Check the levels of pipe work with spirit levels and measuring tape.
- The Spacing of fire pipe supports for sprinkler / clevis hanger shall not be more than that specified below
- All lines shall be suitably supported to provide rigidity and avoid vibrations.
- Proper lines and levels shall be maintained while installing exposed pipes.
- All lines less than 50 mm NB size can be socket welded to matching rating fittings.
- All lines above 50mm NB size shall be butts welded with full penetration welds.
- **All bolts, nuts and washers used shall be of GI.**

TYPE 'A' IS: 2016 TABLE II			
BOLT-SIZE (MM)	WASHER MATERIAL: MILD STEEL		
	INTERNAL - DIA MM	EXTERNAL - DIA MM	THICKNESS (MM)
M1.6	1.8	4	0.4
M1.8	2.1	5	0.4
M2.0	2.4	5	0.4
M2.2	2.6	6	0.5
M2.5	2.9	6.5	0.5
M3.0	3.4	7.0	0.5
M3.5	4.0	8.0	0.5
M4.0	4.5	9.0	0.8
M4.5	5.0	10.0	1.0
M5.0	5.5	10.0	1.0
M6.0	6.6	12.5	1.6
M7.0	7.6	14.0	1.6
M8.0	9.0	17.0	1.6
M10.0	11.0	21.0	2.0
M12.0	14.0	24.0	2.5
M14.0	16.0	28.0	2.5
M16.0	18.0	30.0	3.15
M18.0	20.0	34.0	3.15
M20.0	22.0	37.0	3.15
M22.0	24.0	39.0	3.15
M24.0	26.0	44.0	4.0
M27.0	30.0	50.0	4.0
M30.0	33.0	56.0	4.0
M33.0	36.0	60.0	5.0

- Extra supports shall be provided at the bends and at heavy fittings like valves to avoid undue stress on the pipes.
- Open ends of piping shall be blocked as soon as the pipe is installed to avoid entrance of foreign matter.
- Pipes must be of Heavy grade M.S. pipe conforming to IS 1239. The pipes, fittings and installation shall be hydraulically tested to a pressure of 15 Kg/Sq.cm. or 1.5 times the working pressure whichever is higher.

FLANGES

- Mild steel flanges shall be in accordance with Table - 17 of IS: 6392 i.e. "Plate Flanges for Welding" and flange thickness shall be as under. Gasket thickness shall not be less than 3 mm.
- Check the flange size and specification according to pump size and valve size,

FLANGE DETAILS		
PIPE DIA.	FLANGE THICKNESS	NO. HOLES
200 mm	24 mm	12
150 mm & 125 mm	22 mm	8
100 mm & 80 mm	20 mm	8
65 mm	18 mm	4
40 mm & below	16 mm	4

- All hardware items such as Nuts, Bolts, and Washers shall be of appropriate size.
- Washers shall be used on both sides of the bolt.

SLEEVES

- The branch lines will be hanged to the proper level and will be connected to the cross main. Where piping is embedded or passing through masonry or concrete, sleeves will be provided as per specification mostly of MS or GI material.
- Pipe sleeves of diameter larger than the pipe by least 50 mm shall be provided wherever pipes pass through walls and the annular spaces shall be filled with felt and finished with retaining rings.

SEALANT

- After the removal of the concrete forms and installation of the pipeline, the annular space between the sleeve and the pipe shall be filled with caulking material leaving enough space at both ends of the sleeve for sealing.

PAINTING

- All pipes & fittings above ground and in exposed locations shall be painted with two coat of zinc chromate primer and two or more coats of synthetic enamel of fire red colour paint.

(A) Clean the MS / GI Pipe

- Clean the black pipe with cotton rag to remove any dust or grease on the pipes before painting.

(B) Fabrication of Pipe:

- After Cleaning, fabrication work of Sprinkler network shall be completed on ground level.

(C) Paint the Pipe with 1st Coat Red Oxide (Before Fabrication)

- After Fabrication of MS Pipe, paint the black pipes with one coat of approved Red-oxide Primer will be applied as per Manufacture's film thickness or Microns measured as per Sample paint.
- Please ensure both sides (top & bottom) are painted evenly.
- Put the painted pipes in a good ventilation condition for 24 hours for the paint dry.

(D) Paint the Pipe with 2nd Coat Red Oxide

- After completion of 1st Coat apply, 2nd coat of Red oxide shall be applied of as per Manufacture's film thickness or Microns measured as per Sample paint.
- Put the painted pipes in a good ventilation condition for 24 hours for the paint dry.

(E) Install the Pipe

- After drying the 2nd Coat of Red Oxide Paint, install the pipes.

(F) Paint the Pipe with 1st Coat of Enamel Paint:

- After Installation of Pipe Networks, 1st Coat of Enamel Paint will be applied on Pipe with as per Manufacture's film thickness or Microns measured as per Sample paint.
- Please ensure both sides (top & bottom) are painted evenly.
- Put the painted pipes in a good ventilation condition for 24 hours for the paint dry.

(G) Paint the Pipe with 2nd Coat of Enamel Paint:

- After Completion of Hydro Test, 2nd Coat of Enamel Paint of Approved make of as per Manufacture's
- film thickness or Microns measured as per Sample paint.
- Please ensure both sides (top & bottom) are painted evenly.

3.4.1 VERTICAL RISERS

- Vertical risers shall be parallel to walls and column lines and shall be straight and in plumb. Risers passing from floor to floor shall be supported at each floor by MS angle with clamp as per specification of pipe support.

- The space in the floor cut outs around the pipes work may be closed using cement concrete (1:2:4 mix) or steel sheet, from the fire safety considerations, taking care to see that a small annular space is left around the pipes to prevent transmission of vibration to the structure.
- Riser shall have suitable supports at the lowest point.

3.4.2 DRAIN PIPING OF THE SYSTEM

- Fittings will be of the eccentric pattern to ensure proper drainage and the elimination of air pockets wherever necessary.
- In Sprinkler Network at far end Drainpipe shall be provided on last Sprinkler to remove Air from Sprinkler Network.

3.4.3 UNDERGROUND PIPING

- Where mild steel pipes are to be buried under ground the same shall be treated anti corrosion treatment. The top of the pipes shall be not less than 100 cm below the ground level.
- Where this is not practicable, permission of the Engineer-in-charge shall be obtained for burying the pipes at lesser depth.
- After the pipes have been laid, the trench shall be refilled with the excavated soil and rammed and any extra soil shall be removed from the site of work by the contractor.
- Underground pipe shall be laid at least 1 meter away from the face of the building preferably along the roads and foot paths.
- As far as possible lying of pipes under road, pavement and large open spaces shall be avoided.
- To facilitate detection of leak and isolation of defective portion of pipe, valves shall be provided in underground pipe at suitable locations.
- As far as possible such valves shall be provided over ground or at Basement. If the valves are to be provided below ground, suitable masonry chamber with cover plate shall be provided.
- Locations where vehicles can pass shall be avoided for provision of valve below ground

Anti-Corrosive Protection on Under Ground Pipe

- Corrosion protection tape shall be wrapped on M. S. Pipes to be buried in ground.
- 2 No's of corrosion protection tape minimum 4 mm thick shall comprise of coal tar/asphalt component supported on fabric of organic or inorganic fiber and conform to requirement of IS 10221 Code of practice for coating and wrapping of underground mild steel pipeline.
- Before application of corrosion protection tape all foreign matter on pipe shall be removed with the help of wire brush and suitable primer shall be applied over the pipe thereafter.
- The primer shall be allowed to dry until the solvent evaporates, and the surface becomes tacky.
- Both primer and tape shall be furnished by the same manufacturer. Corrosion protection tape shall then be wound around the pipe in spiral fashion and bounded completely to the pipe.

- There shall be no air pocket or bubble beneath the tape. The overlaps shall be 15 mm, and 250 mm shall be left uncoated on either end of pipe to permit installation and welding.
- This area shall be coated after the pipeline is installed. The tapes shall be wrapped in accordance with the manufacturer's recommendations.
- If application is done in cold weather, the surface of the pipe shall be pre- heated until it is warm to touch, and traces of moisture are removed and then primer shall be applied and allowed to dry.

3.5 FIRE HOSE REEL / FIRE HOSE CABINET INSTALLATION

- Check cabinets are approved size and dimension. Inspect for signs of damage.
- Locate exact location of these Cabinets as per approved shop drawings and with careful measure of elevation and plumb.
- Fix cabinet using recommended anchor and bolts. Proceed with installation of accessories, lock shield valve, landing valves, etc. taking in consideration of approval for these devices.
- Prior to the installation Foreman will read, understand and strictly follow the manufacturer's instructions.
- Examine the location of the hose reel cabinets and ensure that opening is sufficient for fixing all equipment and the mounting height of the hose valve and hose racks is as per the approved shop drawings and to the requirements. Hose reel, hose valves and fire extinguishers are of approved type and have the correct rating.
- The cabinet (without the equipment) will be installed where applicable. Branches to the hose rack (reel) / hose valve will be installed on site to ensure actual entry point to the cabinet. Location of Pipe sleeves shall be as per approved drawings.
- Hose reel & valve will be installed as per the manufacturer's instructions at the correct mounting height.
- Keep fire extinguisher inside the cabinet along with the hose rack. Ensure that the top of the wall mounted extinguisher do not exceed from the levels as per approved drawing and specification.

3.6 FIRE DEPARTMENT CONNECTIONS

Fire Brigade inlet (4 Way) to Hydrant Ring mains / Hydrant Riser:

- Gun Metal four-way fire brigade tank filling connection having 63 mm dia instantaneous type inlet and 150 mm dia flange outlet conforming to IS: 904 with blank cap and chain with necessary 150 mm dia MS (heavy duty pipe) and flanges, nuts and bolts etc.

- The inlet assembly shall be in glass fronted wall box and size of wall box shall be adequate to allow hose to be connected to the inlets, even if the door cannot be opened and the glass has to be broken.
- Each box shall have fall of 25 mm toward the front at its base and shall be glassed with wired glass with "FIRE SUPPLY" painted on the inner face of the glass in 50 mm size block letter.
- Each such box shall be provided with a steel hammer with chain for breaking the glass.

Tank Filling Connection:

- Gun Metal four-way fire brigade tank filling connection having 63 mm dia instantaneous type inlet and 150 mm dia flange outlet conforming to IS: 904 with
- blank cap and chain with necessary 150 mm dia MS (heavy duty pipe) and flanges, nuts and bolts etc.
- The inlet assembly shall be in glass fronted wall box and size of wall box shall be adequate to allow hose to be connected to the inlets, even if the door cannot be opened and the glass has to be broken.
- Each box shall have fall of 25 mm toward the front at its base and shall be glassed with wired glass with "FIRE SUPPLY TO TANK" painted on the inner face of the glass in 50 mm size block letter.
- Each such box shall be provided with a steel hammer with chain for breaking the glass.
- The inlets shall be provided with ABS quality plastic blank caps with chain.

3.7 INSTALLATION & COMMISSIONING OF FIRE FIGHTING PUMPS

- Pump shall be stored on a flat surface in well-ventilated storage area. Inlet and outlet flange blanks shall not be removed until ready for connection to pipe work.
- Manufacturer's instructions shall be strictly followed as applicable for storage of fire pumps.

3.7.1 PREPARATION OF WORKS

- The foundations designed to meet the vibration and sound control requirements shall be provided by main contractor. Check and ensure that the shop drawings used are latest and approved for construction.
- Concrete, (reinforced as necessary or required) is most widely used for the foundation of fire pumps, in most cases it provides rigid support, which minimizes deflection and vibration. It may be located on soil, structural steel or building floors, provided the combined weight of the pumping unit.
- While completing the civil works MEP contractor will co-ordinate the location of foundation as per Check the piping support locations and cable tray routing locations in co-ordination with pump and\ piping layout and ensure these are not obstructing the space around pump.

- Ensure availability of easy access and sufficient clearance for servicing and maintenance i.e. for replacement of pump, motor.
- Select a location for the pumping unit (pump, base plate, coupling and driver) that will be clean, well ventilated, properly drained and provide accessibility for inspection and maintenance (see outline drawing for dimension), outdoor installations may require protection from the elements particularly freezing.
- The suction supply system must provide the pump i.e. the suction tank location with its base or above the same elevation of the pump.

3.7.2 METHOD FOR FIRE PUMP INSTALLATION

- Mark the locations of the pump base frame and hole locations. The pump and motor are assembled on the base frame by suitable flexible coupling arrangement.
- Check and ensure free rotation of the shaft. Position the pump frame assembly on the foundation and fix the anchor fasteners.
- Ensure proper coupling guards are provided. Complete the piping and valve package installation as per approved drawings. Remove the end caps fixed on the inlet flange.
- Install the electrical control panel and power connections as per approved drawings. Incoming and outgoing cables shall be tested for insulation resistance/continuity.
- Provide and connect earth wiring as per approved drawings/manufacturers instruction. After
- completion of the fire pump installation and piping connections, the same shall be checked and certified by the pump supplier.
- Inspection request for pump installation shall be raised for consultants' inspection and approval.

3.7.3 FIRE PUMP MOUNTING ON FOUNDATIONS

- Use qualified personnel (riggers) to lift or move unit at any time. Do not lift the pump unit using hooks or slings on shafts.
- Never place eyebolts in tapped holes except for removal of a part to perform service work.
- When the unit is received with the pump and the driver mounted on the base plate, it should be placed on the foundation and the coupling halves disconnected.
- Coupling should not be reconnected until the alignment operations have been completed.
- The base plate should be supported on rectangular metal blocks and shims or on metal wedges having a small taper.
- Support pieces should be placed close to the foundation bolts on large units, small jacks made of cap screws and nuts are very convenient to use.
- In each case the supports should be directly under the part of the base plate carrying the greatest weight and spaced closely enough to give uniform support.

- Adjust the metal supports or wedges until the shafts of the fire pump and driver are level.
- Check the coupling faces as well as the suction and discharge flanges of the pump for horizontal or vertical position by means of a level.
- Correct the positions, if necessary, by adjusting the supports or wedges under the base plate as required. Firefighting Pumps and drivers mounted on a common base plate are accurately aligned before shipment.
- Realignment is necessary after the complete unit has been levelled on the foundation and again after the grout has set and foundation bolts have been tightened.
- The alignment must be checked after the unit is piped and rechecked periodically. To facilitate accurate field alignment, do not dowel the pumps or drivers on the base plates before shipment.

3.7.4 SUCTION & DISCHARGE PIPING CONNECTIONS

- The suction and discharge piping should be arranged for the simplest, most direct layout, to be of sufficient size and be internally free of foreign material.
- The piping must never be pulled into position by the flange bolts. It must be independently fixed and arranged.
- The suction piping, if not installed properly, is a potential source of faulty operation.

To achieve best pump performance:

- The suction lines, when operation must be kept absolutely free from air leaks.
- A strainer should be installed in suction line. The screen must be checked and cleaned periodically. The opening in the screen must be smaller than the sphere size allotted for the impeller.
- Piping should be cleaned mechanically and chemically and flushed prior to installing the pump. A large number of pump packing, mechanical seal and seizure troubles are due to improperly cleaned systems.
- The Pump should also be inspected internally for foreign matter that may have entered the pump.
- The suction pipe shall be sized such that pump capacity and minimum distance to be maintained from suction pump flange.

3.7.5 PRE-COMMISSIONING CHECKS

FOR ELECTRICAL FIRE PUMP & DIESEL PUMP:

- Check and inspect the installation of fire pump set is complete and as per drawings
- Ensure adequate clearance is available for service and maintenance of pumps and motors.
- Check all nuts, bolts, screws fasteners etc. fixed and tightened as required.
- Check alignment is OK (verification for any minor changes.).

- Rotate the pump manually and ensure free and smooth rotation.
- Ensure piping is pressure tested.
- Check and ensure piping are flushed and clean
- Verify the water levels in tanks O.K
- Adjust desired cut in and cut off pressure as per requirement.

FOR JOCKEY PUMP:

- Foundation bolts through the base plate into the concrete plinth for tightness.
- Mechanical seal for leaks when water has been supplied to the Jockey pumps.
- Check gland packing and adjust for correct leakage rate.
- Electrical motor wiring between control panel and motor that the correct phase connections have been made.
- Check all motor wires and control panel wires are tight.
- Control fuses in control panel are in working Condition
- Check panel lights in working condition.
- Ensure pressure switch is wired to control panel.
- Check pump suction valve is opened and water in pump.
- Auto start function by dropping the pressure on the initiation pipe work.
- Check emergency start on control panel.

FOR FIRE PUMP ROOM EQUIPMENTS:

- Ensure that all pressure gauges are installed.
- All accessions of firewater tanks [limit switches, overflow and vents] are complete.
- Ensure that power supply cables to all pump controllers are complete.
- All isolation valves, check valves / drain valves are installed and are in the normal operation position.
- Ensure that water is filled in the firewater tanks and are ready for operation.
- Pressure relief valves are set to the required set pressure.
- Ensure that flow meters are installed
- Ventilation system for fire pump room is complete and is ready for operation.

Electrical Check's

- Check all powers cabling and control wiring is completed and dressed neatly.
- Power isolator is fixed close to the pump motor for emergency stop and power isolation.
- Check all terminations are completed and tightened as required.
- Grounding connections are completed.

3.7.6 FIRE PUMP TESTING & COMMISSIONING ACCEPTANCE TESTS

Controller Acceptance Test

- Fire pump controller shall be tested in accordance with the manufacturer recommended test
- procedure. Ensure that the automatic operation sequence of the controller shall start the pump from all
- provided starting features this shall include the pressure switches.

The steps involved in field acceptance test of controller shall be as follows:

- Ensure suction gate valves are opened.
- Check and ensure that all air content in the pump has been allowed to escape through the air release valve.
- Compress packing evenly with gland (Gland nut should be finger tight)
- Pressure switch (senses discharge pressure) shall be set lower to prevent pump from starting
- Place the main disconnect switch in on position
- Place circuit breaker in on position and check if power on light is illuminated. Open the system valve gently and slowly.

Start the pump

- Slowly open the flow meter isolation valve
- Check the general operation of fire pumps unit, watch for vibration leaks unusual noise and general operation.
- Regulate the discharge valve to achieve various flow readings
- Important test points are at 150 % rated capacity and shut off, Intermediate points shall be taken to help to develop pump performance curve.
- Record the following data of each test point
- Pumps suction pressure
- Pump discharge pressure
- Flow
- Pump RPM
- Ampere's & Volts
- On completion of test, the calculated reading are used to plot a graph of the test points and are compared with the manufacturers pump characteristic curves a study of these curves will show the performance picture of the pump as it was tested. Field acceptance
- Test for Electrical Driven pump set
- Authorized representative shall be present for the field acceptance test.
- Authorities having jurisdiction shall be notified as to the time and place of the field acceptance test.

- All the electrical wiring to the controllers intended shall be completed and checked by the electrical contractor prior to the initial startup and acceptance test.
- A Copy Of the manufacturers certified pump test characteristic curves shall be available for comparison of the results of the field acceptance test.
- The fire pumps as installed shall the performance as indicated on the manufacturers certified shop test characteristic curves within the accuracy limits of the test equipment.
- The fire pumps shall equal perform at minimum rated and peak loads without objectionable over heating of any components.

Starting the Pump

Automatic start

- Isolate Jockey pump controllers
- Open the drain valve to start pump
- After 2-3 minutes close the drain valve and shut down the electric motor by (off) push button

Manual start

- Press manual start button on the controller
- Ensure that electric motor starts

SETTING OF PRESSURE SWITCHES / OPERATING CONDITIONS FOR FIRE PUMPS:

- The fire pumps shall operate on drop of pressure in the mains as given under clause below.
The pump operating sequence shall be arranged in such a manner to start the pump automatically but should be capable of being stopped manually by stop push buttons only.

OPERATING CONDITIONS FOR ELECTRICAL PUMPS:

The Pressure Switches mounted on the pressure vessel would be set as under, it is thus to be noted that;

- Jockey Pumps shall start and stop automatically through pressure switches.
- Jockey Pump shall stop when main pumps start.
- Main/Diesel Engine driven fire pumps shall start automatically when pressure falls below the above specified limits, but stopping shall be manual.

INTERLOCKING:

- The following inter- locking between the two main fire pumps (i.e. wet riser pump & sprinkler pump), the jockey pump and the diesel engine driven pumps will be followed.
- Only one category of pumps will work at a time i.e. either jockey pump or main fire pumps (Sprinkler/Hydrant pumps can come up at a time) and/or diesel driven pump.

No.	Jockey Pump	Main Electrical Pump	Diesel Pump
1	ON	OFF	OFF
2	OFF	ON	OFF
3	OFF	OFF	ON

3.7.7 TESTING OF FIRE FIGHTING SYSTEM

Flushing, Cleaning of Piping and Equipment:

- After piping is erected, all piping systems including main header line and branch line will be cleaned to remove all mill, welding scale, oil, corrosion, and other construction debris.
- Prior to hydraulic testing, all pipe work systems including valves, strainers and fittings will be washed thoroughly. Any washing of the piping systems will be carefully carried out where there are isolation valves or equipment are employing.
- Any stoppage due to foreign matter or air lock which is found to impede the flow of fluid will be removed, either before or after the systems are in operation.
- Do not operate pumps or equipment until debris has been removed from the respective system has been flushed out.
- Flushing of the system can be done from a pumping source with minimum flow rate to provide a velocity of 3 m/ sec.
- Flush the piping system until all debris is removed and clean water comes out.
- Automatic devices which can become clogged during the cleaning process will be disconnected and will not be connected permanently until the cleaning process is complete.
- Enough draining points will be left for this purpose. These points will be the lowest point of the area/zone and the water supply point.

Testing of Fire Fighting System:

(A) Initial Pressure Testing (24 Hour Test)

- After completion of the work, all valves/ fittings shall be installed in position and entire system shall be tested for 24 hours at a pressure of 1.5 times of operating pressure
- Plug all the openings
- Close all the drain valves.
- Fill complete pipeline with water avoiding any air column. (For this purpose, keep the drain valve at the highest elevation slightly open, while filling water when line is completely filled with water close the valve)
- By a pressure pump pressurize the line to an intermediate pressure 1.5 time of Operating pressure of Wait for 24 Hours.
- Check all major joints for any visible leak.
- The drop of pressure up to 0.5 kg/cm² shall be accepted.

(B) Hydrostatic Testing of Pipe Work

- Make available a highlighted drawing of area intended for hydrostatic pressure testing. Indicate on the

- drawing the location of vent/drain valve, plugged connections and water pressure pump connection.
- Make sure the test witness timing and pressure duration are agreed by the client/consultant.
- Place safety warnings at all points where personnel may pass through within the vicinity of testing.
- Make sure that all equipment item such as sprinklers; valves etc. are subjected to the pressure test.
- Attach the pressure pump to the desired location through an isolation valve, by pass valve and calibrated pressure gauge to indicate the pressure on the pipe work.
- The entire pipe work shall be hydrostatically tested for not less than 2 hours at 15 bars (or 1.5 times the working) pressure without leak.
- Physically check and ensure that all pipes undergoing test is strongly supported and addition of pipe work will not introduce undue stress on any support.
- Make sure that all pipe works are suitably plugged.
- Connect a calibrated and approved pressure gauge and fix an isolation valve just below the pressure gauge.
- Apply pressure gradually until it reaches the test pressure. The test pressure will be as per agreed terms and as per requirements.
- All piping shall be tested to hydrostatic test pressure of at least the 1.5 times of operating pressure, but not less than 15 kg./sq.cm. For a period not less than 24 hours. All leaks and defects in joints revealed during the testing shall be rectified to the satisfaction of the Engineer-in-Charge.
- Piping repaired subsequent to the above pressure test shall be re-tested in the same manner.
- The Engineer-in-charge shall take the first reading and mark the pressure gauge by signing on the masking tape. The engineer-in-charge shall open the masking tape and check the pressure drop.

(C) Final Testing (Automation of the system)

- After completion of Hydro Test, all operation checks shall be carried out for automatic operation of the systems. For this purpose, landing valves may be opens at different locations. The exercise shall be repeated couple of times to ensure trouble free operation of the system.
- Flow Test: The design flow of pumps shall be checked. The pump shall be operated after opening a number of landing valves at different locations. Design pressure is be maintained in the pump house.

- Water discharge is to be Measured by drop in level in UG tank for a certain period. All pumps shall be tested one by one. The flow rate shall be not less than as specified while maintaining the design pressure in pump house.

3.7.8 PIPE IDENTIFICATION INSTALLATION

- After the pipe layout hydrostatically tested and finally painted, install pipe identification as per Site Requirements.
- Background Colour –Red.
- Letter Colour –White.
- Lettering Size –as per Size of Pipe or Equipment.
- Flow –Direction Arrows –integral with piping-system

Name of Work: “Construction of Administrative office building at Kandla -FIRE ALARM PART

SPECIAL CONDITIONS

1. Notwithstanding the below method statements/ installation procedure, the execution of project shall, in general, conform to relevant Codes & standards, guidelines/ compliance issued by the authority having jurisdiction, standard industrial practice and OEM’s recommendation over and above the method statement/ installation procedure.

2. Health & Safety:

2.1 WORK PERMIT

- All Workers have valid Gate Pass till project completion.
- Proper induction of all workers shall be completed before starting their defined work.
- Necessary JRA and work permit shall be issue before starting the work.
- All welders shall be certified welder and need to submit their certificate.

2.2 Barricade and Work at Height

- Temporary barricades shall be provided around the working area prior to commencement of site work.
- Safety signboards, warning tape and signs, cones shall be provided around the working area confirming the safety of the working area.
- The fabrication area shall be neat and tidy at all times. Fabrication should be done above MS sheet to protect the flooring.
- All unwanted materials / debris shall be transported to the approved dumping site on a daily basis.
- Only approved scaffoldings & safety belts should be use whenever working at heights exceeding.
- 1.5Mtrs.
- Ladders must be checked to ensure correct length, type and condition before use.
- The ground base for the ladder must be firm and level. Damaged ladders will be broken up or removed from site.
- The ladder must be of sufficient length to extend 1m above the step-off point when used as access to scaffold.

2.3 Electrical Tools

- All Electrical tools shall be tag as per safety standard before starting work. Tag shall be renewing time to time.

- All hand and portable power tools to be used shall be of good order and be used by approved industrial sockets.
- Ensure that all tools and equipment are thoroughly inspected, and all are in proper working conditions.
- Power tools must be 230 V with socket and insulated cables.

2.4 Lifting Material

- Lifting of any material or equipment should be done only by means of approved chain / Electric hoists /Jacks with appropriate support.

2.5 Fire Extinguishers

- Application of Paints, primers, thinners varnishes etc. should be carried out at ventilated places only.
- Fire extinguisher shall be positioned at Material Store Area and in the event where welding work is in progress on workplace.
- Ensure adequate lighting and ventilation whenever working in confined spaces.
- Ensure that working is have provision of entrance and exit.

2.6 Personal Protective Equipment (PPE)

- Wear Goggles of adequate visibility, whenever using gas torches, grinders, cutting machines, or doing chipping, drilling etc. Do not use goggles with scratched glasses or poor visibility.
- During manual handling of Material all workers have to wear safety gloves and make sure they are protective against trip hazards and sharp edges.
- All appropriate safety personal protective equipment shall be worn by workmen such as
 - Earing protection, Earmuff or Plugs
 - Helmet, Hand Gloves (Leather or Cotton)
 - Face Shield (for grinding/cutting activities), Dust Mask respiratory protection.
 - Safety Glasses, Safety Shoes

3. Installation Procedure:

3.1 Preliminary Activities/Approvals

- Submit to the Engineer for approval the materials, equipment's and shop drawings to be used for the Installation, Termination and Testing of Fire Alarm System Submit for approval Method Statement & Risk Assessment.
- Identify quantity and ensure all risks are managed in this method statement and residual risks are acceptable.

3.2 Installation of Fire Alarm system

- Ensure approved documents like approved shop drawing, electrical room layout approved load schedules are available with the installation team.
- Fire Alarm Control Panel shall be installed as per the specification, approved shop drawing, manufacturer recommendations and Local Civil Defence requirement.
- Approved Model, Size & Type of Fire alarm Control Panel shall be installed as per approved shop drawings.
- Coordination with other MEP shall be done for installing Fire Alarm Control Panel.
- Check the Wall surface is ready to install Fire Alarm Control Panel.
- Orientation of Fire Alarm Control Panel shall be checked before and after installation.
- Fire Alarm Control Panel shall be installed directly inside the block wall as per approved shop drawing and site conditions.
- Fire Alarm Control Panel Height from finish floor shall be maintained as per approved drawings.
- Raise request for inspection for installation of Fire Alarm Control Panel, by consultant.
- Upon the inspection and approval of installation of Fire Alarm Control Panel, Cables shall be installed as per specification and manufacturer recommendations.
- Approved Trunking shall be installed above the false ceiling and Fire Alarm Cables will be drawn through concealed PVC conduits to the Fire Alarm Control Panel.
- All knockouts made on the panel covers shall be provided with PVC adaptor to avoid contact of cables with sharp edges of the knockouts.
- All Fire Alarm Control panel shall be provided with proper earthing connections as per manufacturer recommendations.
- Doors of all Fire Alarm Control Panel shall be earthed.
- Identification shall be done for Fire Alarm Control Panel as per specification with approved materials.
- Raise request for inspection for installation of Fire Alarm Control Panel along with termination, by consultant.

3.3 Installation of photo electronic smoke detector/ Multi sensor Detector

- Photo Electric Smoke Detectors shall be installed as per the specification, approved shop drawing, manufacturer recommendations and Local Civil Defence requirement.
- Approved Model & Type of Photo Electric Smoke Detectors shall be installed as per approved shop drawings and manufacturer recommendations.
- Coordination with other False Ceiling Layout shall be done for installing Photo Electric Smoke detectors.
- Check the False ceiling is ready to install Photo electric Smoke Detectors.
- Photo Electric Smoke Detectors shall be installed directly on the false ceiling tiles / Gypsum ceiling boards by using PVC butterfly rowel plug as per approved shop drawing.
- False ceiling tiles / gypsum board shall be marked and drilled with appropriate drill bit to suit the PVC butterfly rowel plug to match the Base of Photo Electric Smoke detector mounting holes.

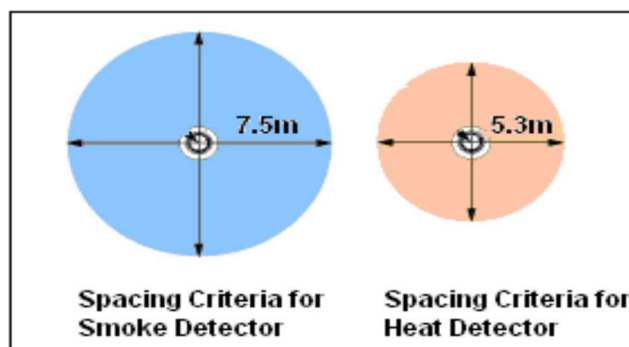
- Raise Request for inspection of installation of Photo Electric Smoke Detectors, by consultant.

3.4 Installation of Heat detector

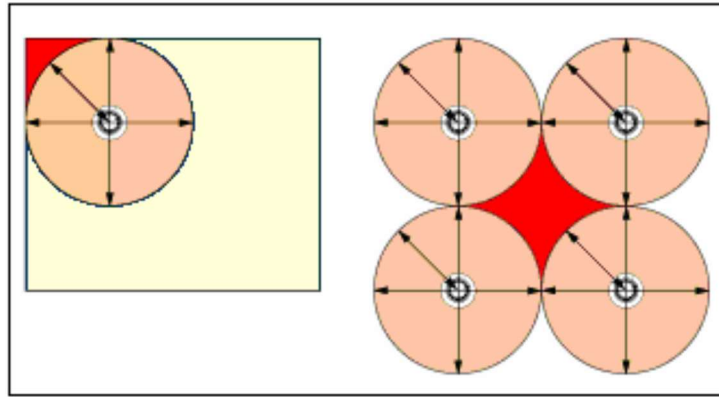
- Heat Detectors shall be installed as per the specification, approved shop drawing, manufacturer recommendations and Local Civil Defence requirement.
- Approved Model & Type of Heat Detectors shall be installed as per approved shop drawings and manufacturer recommendations.
- Coordination with other False Ceiling Layout shall be done for installing Heat detectors.
- Check the False ceiling is ready to install Heat Detectors.
- Heat Detectors shall be installed directly on the false ceiling tiles / Gypsum ceiling boards by using PVC butterfly rowel plug as per approved Shop Drawing.
- False ceiling tiles / gypsum board shall be marked and drilled with appropriate drill bit to suit the PVC butterfly rowel plug to match the Base of Heat detector mounting holes.
- Raise Request for inspection of installation of Heat Detectors, by consultant.

General Guidelines for smoke / heat detector:

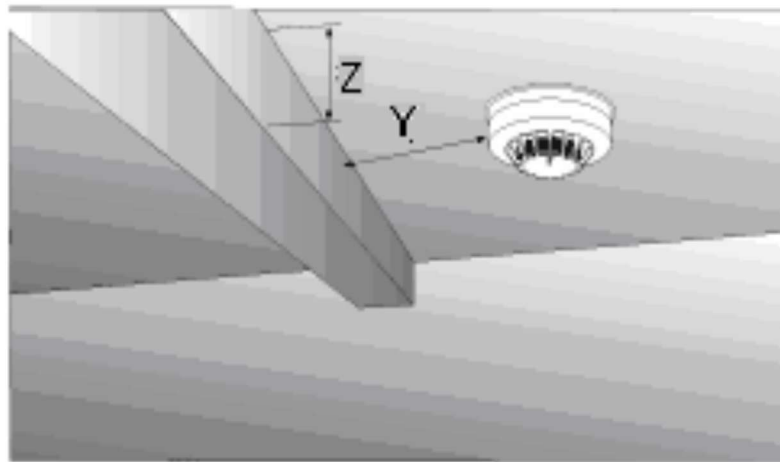
- For general areas, the spacing between any point in a protected area and the detector nearest to that point should not exceed 7.5 m for a smoke detector and 5.3 m for a heat detector. Please check with NFPA and mention the clause.



- The above are the maximum areas that can be covered by an individual detector. To ensure that coverage is provided into the corners of rooms and to ensure that there is no gap at the junction point of multiple detectors, spacing's must be reduced.



Beams and Other Similar Ceiling Obstructions: Fire detectors should be mounted at least 500 mm away from walls or ceiling obstructions greater than 250 mm deep and at least twice the depth of obstructions less than 250 mm deep. They should also be mounted at least 3 ft (1 m) away from any forced air inlet. Where the obstruction is greater than 10% of the height of an area, it should be considered as a wall. Similarly, a floor mounted obstruction (such as racking) should be considered a wall if it comes to within 300 mm of the height of the detector.



For obstructions of less than 250 mm Y should be at least $2 \times Z$

Lift Shafts: Where detection is required in vertical shafts, such as stairwells, a detector should be mounted at the top of the shaft and within 1.5 m at each level.

3.5 Installation of Manual Pull Station:

- Manual pull stations shall be installed as per the specification, approved shop drawing, manufacturer recommendations and local civil defense requirement.

- Approved model & type of manual pull stations shall be installed as per approved shop drawing and manufacturer recommendations.
- Coordination with other MEP services shall be done for installing manual pull station.
- Ensure location and elevation of manual pull station are as per approved shop drawing and site conditions.
- The back plate & covers of manual pull stations shall be installed using appropriate fasteners provided by the manufacturer.
- Raise request for inspection of installation of manual pull station, by consultant.

General Guidelines on the Manual Call points:

- The height of the manual fire alarm boxes shall be a minimum of 42 inches (1067 mm) and a maximum of 54 inches (1372 mm) measured vertically, from the floor level to the activating handle or lever of the box. Manual fire alarm boxes shall be red in colour.
- Manual call points should be located on escape routes, at all exits from each floor at the stair and corridors.
- Manual fire alarm boxes (pull station) should be located not more than 5 feet (1524 mm) from the entrance to each exit.
- Manual call points should be located at each door opening to the exterior of the building.

3.6 Installation of Alarm Speakers

- Fire alarm speakers shall be installed as per the specification, approved shop drawing, manufacture recommendation and local civil defense requirement.
- Approved model & type of fire ceiling layout shall be installed as per approved shop drawing and manufacturer recommendations.
- Coordination with false ceiling layout shall be done for installation fire alarm speakers.
- Check the false ceiling is ready to install fire alarm speakers.
- Fire smoke detectors shall be installed directly on the false ceiling / gypsum ceiling boards by using PVC butterfly rowel plug as per approved shop drawing.
- False ceiling tiles/ gypsum board shall be marked and drilled with appropriate drill bit to suit the PVC butterfly rowel plug to match the base of fire alarm speaker mounting holes.
- Raise request for inspection of installation of fire alarm speakers, by consultant.

3.7 Installation of Alarm Bells

- Fire alarm bells shall be installed as per the specification, approved shop drawing, manufacturer recommendations and local civil defense requirement.
- Approved model & type of fire alarm bells shall be installed as per approved shop drawings and manufacturer recommendations.
- Coordination with other MEP services shall be done for installing fire alarm bells.
- Fire alarm bells shall be installed directly on the walls after finishing the final paints.
- Ensure location & elevation of fire alarm bells are as per approved shop drawing & site conditions.
- Raise request for inspection of installation of fire alarm bells, by consultant.

3.8 PAYMENT TERMS FOR HVAC, FIRE FIGHTING, FIRE ALARM AND ELV PART

- All payments shall be made in Indian rupees unless specifically mentioned.
- Payment shall be release of 70% of Supply item rate against receipt of material at site in good condition after obtaining insurance cover as per tender condition and after inspection & acceptance of material by DPA & Certification by Third Party Inspection Agency (TPIA).
- 20% of supply item rate after completion of erection, installation, testing and commissioning, etc. and 90% of item rate for item covers only laying/fixing etc. & certification by Third Party Inspection Agency (TPIA).
- 10% will be released after successful completion of whole work and handing over to DPA & certification by TPIA.
- Name of Party NOTE: The payment shall be made through RTGS /NEFT and the Contractor should be furnished following details: - Bank Payment Agreement Form Account No. Branch Name Branch Station IFSC code of the bank MICR co Accepted for: - NEFT payment or RTGS payment Declaration by the party I/We hereby declare that the above information furnished by me is correct and DPA is requested to pay my / our dues to this account for this work is concerned. Signature of the party with the seal Declaration by the bank It is hereby informed that the details mentioned by the party is correct as per our records and any payment made by DPA to this account will be accepted either by RTGS/NEFT. Signature of the bank manager with the seal.

LIST OF APPROVED MAKE		
Sr.No.	Description	Approved Brand
1.	Paint, Primer,	Asian, ICI, Nerolac
2.	Putty	Birla, Asian
3.	Polish	MRF, Asian, ICI
4.	Hardware	Kitch, Durex, EPPW, Ebco, Palladium, Dorma
5.	Adhesive	Fevicol, Kitcol, Araldite, BAL
6.	Anchor fastener / bolts	Fischer Hilti
7.	Floor spring	Hemco, Hyper, Sterling, Godrej,
8.	Door closer	Efficient Gadget, Godrej,
9.	Aluminum sections	Jindal, Indal
10.	Aluminum Finish	25 micron colour anodized – contractor should provide the micron thickness measuring equipment at site throughout the work progress for checking the anodizing thickness, visibly should look uniform as per standards.
11.	All Aluminum anodised fittings	EP & PW or equivalent
12.	SANITARY WARES	CERA,DURAVIT,AMERICAN STANDARD,KOHLER
13.	CP FIXTURES AND ACCESSORIES	1) JAQUAR 2) HANSGROHE 3) GROHE 4) PARRYWARE – ROCA 5) AMERICAN STANDARD 6) KOHLER 7) ESCO
14.	GI PIPES	1) TATA 2) JINDAL
15.	APVC & CPVC PIPES & FITTINGS	1) FINOLEX 2) SUPREME 3) PRINCE 4) ASTRAL 5) ASHIRWAD
16.	STONEWARE PIPES AND FITTINGS	1) APPROVED MAKE ISI
17.	SS SINK	1) AMC 2) KRISHNA 3) NIRALI 4) FRANKE 5) JAYNA
18.	CEMENT	OPC/PPC Ambuja, Ultratech, Birla Plus, Sanghi,

19.	White Cement	Birla, J. K.
20.	TMT – Fe-500 D Ribbed bars	TATA, SAIL, VIZAG.
21.	Structural Rolled Steel sections – beams, channels, tee, flats, angles, bars, (round, square, hexagonal)	SAIL, RINL, JINDAL, ESSAR
22.	Structural Hollow steel sections (Square and Rectangular)	SAIL, Asian or equivalent
23.	Structural tubular sections	Tata, Sail, Asian
24.	Coarse Aggregates 6 mm to 40 mm sizes	Approved quarry by EIC
25.	Stone Rubbles & Garvels	Approved Quarry by EIC
26.	Shuttering plywood	Kitply, Anchor, Green, Pragati or equivalent
27.	Marine Grade plywood IS-710	Green, Kitply, Duro, Century, Anchor
28.	Commercial plywood – IS – 303	Green, Kitply, Duro, Century, Anchor
29.	Decorative ply (Veneer)	Green, Century, Kalachandra, Archid
30.	Prelam particle board	Novapan, Bhutan
31.	Laminate sheet	Greenlam, Alfa-Ica, Decolam, Neoluxe
32.	Cement bonded particle board	NCL (Bison board), Everest (Eternite)
33.	Calcium silicate board	Hilux
34.	Flush door – decorative / non decorative	Green, Anchor, Century
35.	Locks	Godrej, EPPW, Dorset,
36.	Float Glass/Mirror/Wired Glass	Modi Guard, Saint gobain, Ashahi
37.	Tiles	Kajaria, Nitco, Asian,
38.	Construction chemicals	Fosroc, M.C. Bauchemie, Fosroc, Pidilite, BAL, Krishna
39.	Bricks	NR/NK (Ahmedabad)

Note:- All the materials/makes listed above and other than as specified above shall be ordered and used after obtaining prior approval from the Engineer-in-charge.

Make List for Electrical Items		
Sr. No.	Description	Recommended Makes
1	HV VCB	SIEMENS / CROMPTON GREAVES/ABB/Schneider
1(a)	HV Gas Insulated Breakers	SIEMENS /Schneider/ABB
2	POWER TRANSFORMERS	VOLTAMP/CROMPTON GREAVES /BHARAT BIJLEE/ BHEL/ SIEMENS/ABB/ Schneider/T&R
3	DISTRIBUTION TRANSFORMERS	EMCO/KIRLOSKAR/PATSON/VOLTAMP/AB B/Schneider/T&R
4	RESIN CAST TRANSFORMERS	
	A) RESIN CAST IMPREGNATED	VOLTAMP / KIRLOSKAR / EMCO
	B) DRY CAST	VOLTAMP/KIRLOSKAR/EMCO
5	HT XLPE CABLES	POLYCAB/TORRENT/RPG ASIAN/NICCO/GLOSTER/ UNISTAR/ UNIVERSAL
6	LT XLPE CABLES	POLYCAB/TORRENT/RPG sASIAN/ NICCO/ RALLISON/PRIMECAB/ HAVELLS/ UNIVERSAL/ UNISTAR/AVOCAB
7	LT ACB	SIEMENS/L&T/SCHNEIDER/C&S
8	PROTECTION RELAYS	AREVA/L&T/SIEMENS/ABB/C&S
9	LT PANEL	CPRI APPROVED
10	CHANGE OVER SWITCH	SIEMENS/L&T/ABB/C&S/SCHNIDER/ LEGRAND / INDOASIAN
11	SFU FOR MAIN LT DISTRIBUTION PANELS	SIEMENS/L&T/ABB/C&S

12	SFU FOR DISTRIBUTION PANELS & FEEDER PILLERS	SIEMENS/L&T/ABB/C&S/ SCHNEIDER/ LEGRAND/ INDOASIAN/HAVELLS
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13	MCCB FOR MAIN LT DISTRIBUTION PANELS	SIEMENS/L&T/ABB
14	MCCB FOR DISTRIBUTION PANELS AND FEEDER PILLERS	SIEMENS/L&T/ABB/C&S/ SCHNIDER/ LEGRAND/ INDOASIAN/HAVELLS
15	MCB/ELCB/RCCB/ RCCBO FOR MAIN LT DISTRIBUTION PANELS	SIEMENS/HAGER L&T/ABB

16	MCB FOR DISTRIBUTION PANELS AND FEEDER PILLERS	SIEMENS/L&T/ABB/C&S/ SCHNEIDER/ LEGRAND/ INDOASIAN/ HAVELLS/ STANDARD
17	MCB DISTRIBUTION BOARD	STANDARD / HENSEL/LEGRAND / INDOASIAN / HAVELLS
18	MULTI FUNCTION DIGITAL METER FOR MAIN LT DISTRIBUTION PANELS/DIGITAL KWH METERS	L&T/ENERCON/SECURE/L&G/ RISHABH
19	ANALOG VOLT/AMPARE METER FOR DISTRIBUTION PANELS AND FEEDER PILLERS	RISHABH/AE/ENERCON/L&T
20	SLECTOR SWITCH FOR VOLTMETER/AMPARE METER	L&T/SIEMENS/C&S
21	POWER CONTACTOR & OVER LOAD RELAYS	L&T/SIEMENS/ABB
22	QUARTZ TIME CLOCK SWITCH	L&T/INDOASIAN/SIEMENS
23	PVC WIRE WITH COPPER CONDUCTOR	RRKABEL/KEI/POLYCAB/MILEX/GUJCAB/ STANDARD/ FINOLEX/ ANCHOR

24	FLUSH TYPE SWITCHES, SOCKETS, HOLDERS AND CEILING ROSES & ELECTRONIC REGULATORS	ANCHOR/MK/NORTHWEST/VINAY/PANAMA/HAVELLS
25	DOOR BELLS/CALL BELLS	ANCHOR/LEGEND/MK/NORTHWEST
26	MODULAR SWITCHES, SOCKETS, PLATES & BOXES	ANCHOR / MK / NORTHWEST / LEGRAND /HAVELLS/ INDOASIAN/ SIEMENS
27	PVC CONDUIT/OVAL CONDUIT & CASSING CAPPING AND	PRECISION/VULCAN/FINOLEX/GARWARE/ RESTOPLAST/

	ACCESSORIES	SWASTIK/ BPI
28	GLS LAMPS & FLUORESCENT LAMPS	PHILIPS / BAJAJ / WIPRO / CROMPTON GREAVES / OSRAM / SURYA ROSHNI /GE
29	HPSV, HPMV & METAL HELIDE LAMPS	PHILIPS / BAJAJ / WIPRO / CROMPTON GREAVES / OSRAM / SURYA ROSHNI /GE
30	IGNITORS FOR HPSV, METAL HELIDE LAMPS	PHILIPS / BAJAJ / WIPRO / CROMPTON GREAVES / OSRAM / SURYA ROSHNI /GE
31	LUMINARIES	PHILIPS/BAJAJ/WIPRO/CROMPTON GREAVES / OSRAM / SURYA ROSHNI /GE
31a	LED Luminaries	Philips /Bajaj/Wipro/CG/Surya/Pyrotech/Syska/Nessa having surge Protection $\geq 10KV$ for fittings & internal Surge protection for Driver of $\geq 4KV$, LED Chip only OSRAM/CREE/Philips Lumileds/Citizen/Nicia with LM-79,80 CERTIFICATION
32	CEILING FANS	BAJAJ/ORIENT/USHA/CROMPTON GREAVES / ALMONARD/GEC
33	WALL MOUNTING FANS	BAJAJ/ORIENT/USHA/CROMPTON GREAVES / ALMONARD/GEC

34	EXHUAUST FANS	BAJAJ/ORIENT/USHA/CROMPTON GREAVES / ALMONARD/GEC
35	HEAVY DUTY INDUSTRIAL WALL MOUNTING FANS	BAJAJ/ORIENT/USHA/CROMPTON GREAVES / ALMONARD/GEC
36	WATER COOLER	VOLTAS/SHRIRAM USHA/BLUE STAR
37	AIR CONDITIONERS	VOLTAS/CARRIER/BLUESTAR/USHA/ HITACHI/LG/ SAMSUNG/ONIDA

38	REFRIGERATORS	VOLTAS/CARRIER/BLUESTAR/USHA/ HITACHI/LG/ SAMSUNG/WHIRLPOOL
39	VOLTAGE STABILIZER	VEELINE / CAPRI
40	INVERTERS	SUKAM / MICROTEK
41	D.G. SETS A) ENGINE B) ALTERNATOR	CUMMINS/GREAVES/KIRLOSKAR/ CATERPILLAR/ ASHOK LEYLAND/VOLVO STAMFORD/CROMPTON GREAVES /JYOTI/ KIRLOSKAR ELECTRIC
42	ELECTRIC MOTOR	ALSTOM/CROMPTON GREAVES /SIEMENS/ KIRLOSKAR/ABB
43	WATER PUMPS	SWASTIK / KSB
44	WATER GEYSER	BAJAJ/USHA / CROMPTON GREAVES / SPHEREHOT / RACOLD
45	LUGS & CABLE GLANDS	DOWELLS / JAINSON / BRACO

Signature & Seal of Contractor

**Executive Engineer (E)
Deendayal Port Authority**

SECTION 6

FORMS OF SECURITIES AND OTHER FORMATS

Acceptable forms of securities are annexed. Bidders should not complete the performance and advance payment security forms at this time. Only the successful bidder will be required to provide performance and advance payment securities in accordance with one of the forms, or in a similar form acceptable to the employer.

BANK GUARANTEE

SPECIMEN BANK GUARANTEE SECURITY DEPOSIT

(To be executed on Rs.300/- or appropriate value of non-judicial Stamp Paper)

[The bank, as requested by the successful Tenderer, shall fill in this form in accordance with the instruction indicated]

In consideration of the Board of Deendayal Port Authority [insert name of port] incorporated by the Major Port Trusts Act , 2021 (hereinafter called "The Board" which expression shall unless excluded by or repugnant to the context or meaning thereof be deemed to include the Board of Deendayal Port Authority of the port of [insert name of port], its successors and assigns) having agreed to release advance payment to _____ (hereinafter called the "contractor")

(Name of the contractor/s)

under the terms and condition of the contract, vide from the demand under the condition of the contract, vide _____'s letter No _____

(Name of the Department)

Date _____ made between the contractors and the Board for execution of _____ covered under Tender No. _____

dated _____ (hereinafter called "the said contract") for the payment of Security Deposit in cash or Lodgment of Government Promissory Loan Notes for the due fulfillment by the said contractors of the terms and condition of the said contract, on production of

a bank Guarantee for Rs. _____ (Rupees _____) only we, the _____ (Name of the Bank and Address)

_____ (hereinafter referred to as "the Bank") at the request of the contractors do hereby undertake to pay to the

Board an amount not exceeding Rs. _____ (Rupees _____) only against any loss or damage caused to or suffered by the Board by reason of any breach by the contractors of any of the terms and conditions of the said contract.

2. We, _____, do hereby (Name of Bank) (Name of Branch)

Undertake to pay the amount due and payable under this guarantee without any demur merely on a demand from the Board stating that the amount claimed is due by way of loss or damage caused to or which would be caused to or suffered by the Board by reason of the contractors failure to perform the said contract. 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 any amount not exceeding Rs. _____ (Rupees _____) only.

3. We, _____, undertake to pay to
the (Name of Bank and Branch)

Board any money so demanded notwithstanding any dispute or disputes raised by the contractor(s) in any suit or proceeding pending before any Court or Tribunal relating thereto our liability under this present being absolute and unequivocal. The payment so made by us under this bond shall be a 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, _____ further agree with the Board that the (Name of Bank and Branch) guarantee herein contained shall remain in full force and effect during the period that would be taken for performance of the said contract and that it shall continue to be enforceable till all the dues of the Board under or by virtue of the said contract have been fully paid and its claims satisfied or discharged or till the

(Name of the user department)
of the said certifies that the terms and conditions of the said contract have been fully and properly carried out by the said Contractors and accordingly discharge this guarantee. PROVIDED HOWEVER that the Bank shall be the request of the Board but at the cost of the Contractors, renew or extend this guarantee for such further period or periods as the Board may require from time to time.

5. We, _____ further agree with the Board that the (Name of Bank and Branch)

Board shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said contract or to extend the time of performance by the said contract or to extend the time of performance by the said Contractors from time to time or to postpone for any time or from time to time any of the powers exercisable by the board against the said Contractors and to forebear or enforce any of the terms and conditions relating to the said contract and we shall not be relieved from our liability by reason of any such variation or extensions being granted to the contractors or for any forbearance, act or omission on the part of the Board or any indulgence shown by the board to the Contractors or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).

7. It is also hereby agreed that the Courts in Gandhidham would have exclusive jurisdiction in respect of claims, if any, under this Guarantee.
8. We, _____ Bank lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Board in writing.
9. Notwithstanding anything contained herein:
- (a) Our liability under this Bank Guarantee shall not exceed Rs. _____ (Rupees _____ only);
- (b) This Bank Guarantee shall be valid upto _____; and
- (c) We are liable to pay the guarantee 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)."
- Date _____ day of _____ 20

For (Name of Bank)

(Name)

Signature

SPECIMEN BANK GUARANTEE FOR ADVANCE PAYMENT

(To be executed on Rs.300/- non-judicial Stamp Paper)

[The bank, as requested by the successful Tenderer, shall fill in this form in accordance with the instruction indicated]

In consideration of the Board of Deendayal Port Authority incorporated by the Major Port Trusts Act, 1963 as amended by Major Port Trust (Amendment) Act 1974 (hereinafter called "The Board" which expression shall unless excluded by or repugnant to the context or meaning thereof be deemed to include the Board of Deendayal Port Authority, its successors and assigns) having agreed to release advance payment to (hereinafter called the "contractor")

(Name of the contractor/s)
from the demand under the terms and condition of the contract, vide from the demand under the condition of the contract, vide _____'s letter No _____

(Name of the Department)
Date _____ made between the contractors and the Board for execution of _____ covered under Tender No. _____
_____ dated _____ (herein after called "the said contract") for the payment of Advance Payment in cash or Lodgement of Government Promissory Loan Notes for the due fulfillment by the said contractors of the terms and condition of the said contract, on production of a bank Guarantee for Rs. _____ (Rupees _____)

only) we, the (Name of _____ the _____ Bank and _____ Address) _____ (hereinafter referred to as "the Bank") at the request of the contractors do hereby undertake to pay _____ to the Board an amount not exceeding Rs. _____ (Rupees _____) only against any loss or damage caused to or suffered by the Board by reason of any breach by the contractors of any of the terms and conditions of the said contract.

2. We, _____, do hereby
(Name of Bank) (Name of Branch)

Undertake to pay the amount due and payable under this guarantee without any demur merely on a demand from the Board stating that the amount claimed is due by way of loss or damage caused to or which would be caused to or suffered by the Board by reason of the contractors failure to perform the said contract. 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 _____ any _____ amount _____ not exceeding Rs. _____ (Rupees) only.

- 3 We, _____, undertake to pay to the
(Name of Bank and Branch)
Board any money so demanded notwithstanding any dispute or disputes raised by the contractor(s) in any suit or proceeding pending before any Court or Tribunal relating thereto our liability under this present being absolute and unequivocal. The payment so made by us under this bond shall be a 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, _____ further agree with the Board that the
(Name of Bank and Branch)
guarantee herein contained shall remain in full force and effect during the period that would be taken for performance of the said contract and that it shall continue to be enforceable till all the dues of the Board under or by virtue of the said contract have been fully paid and its claims satisfied or discharged or till the _____
(Name of the user department)
of the said certifies that the terms and conditions of the said contract have been fully and properly carried out by the said Contractors and accordingly discharge this guarantee. PROVIDED HOWEVER that the Bank shall be the request of the Board but at the cost of the Contractors, renew or extend this guarantee for such further period or periods as the Board may require from time to time.
5. We, _____ further agree with the Board that
the (Name of Bank and Branch)
Board shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said contract or to extend the time of performance by the said contract or to extend the time of performance by the said Contractors from time to time or to postpone for any time or from time to time any of the powers exercisable by the board against the said Contractors and to forebear or enforce any of the terms and conditions relating to the said contract and we shall not be relieved from our liability by reason of any such variation or extensions being granted to the contractors or for any forbearance, act or omission on the part of the Board or any indulgence shown by the board to the Contractors or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.
6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).
7. It is also hereby agreed that the Courts in [insert city] would have exclusive jurisdiction in respect of claims, if any, under this Guarantee.

8. We, _____ Bank lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Board in writing.

9. Notwithstanding anything contained herein:

(a) Our liability under this Bank Guarantee shall not exceed Rs. _____

(Rupees _____ only);

(b) This Bank Guarantee shall be valid upto _____; and

(c) We are liable to pay the guarantee 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)."

Date _____ day of _____ 20

For (Name of Bank)

(Name)

Signature

FORM-23 A
Specimen EMD
Format of Insurance Surety Bond for Earnest Money Deposit
(To be executed on Non-Judicial Stamp Paper of Appropriate value)

Insurance Surety Bond No.

Date :

(Name of Contract)

To : (Name and address of Employer)

WHEREAS (name of Bidder) (hereinafter called "the Bidder") has submitted its Bid dated (date of bid) for the performance of the above named Contract (hereinafter called "the Bid")

KNOW ALL PERSONS by these present that We (name of Insurance Company) of..... KNOW ALL PERSONS by these present that We (name of Insurance Company) of....(address of Insurance Company) (hereinafter called "the Surety"), are bound unto the Board of Deendayal Port Authority (hereinafter called "the Employer") for the sum of. (amount), for which payment well and truly to be made to the said Employer, the Surety binds itself, its successors and assigns by these presents.

THE CONDITIONS of this obligation are as follows :

1. If the Bidder (a) withdraws or modifies its Bid during the period of bid validity, or (b) adopts corrupt or collusive or coercive or fraudulent practices or defaults under Integrity Pact.
2. If the Bidder, having been notified of the acceptance of its Bid by the Employer during the period of bid validity.

(a) fails or refuses to sign the Contract Agreement when required, or

(b) fails or refuses to submit the performance security in accordance with the Tender Documents.

We undertake to pay to the Employer up to the above amount upon receipt of its first written demand, without the Employer having to substantiate its demand, provided that in its demand the Employer will mention that the amount claimed by it is due, owing to the occurrence of one or both of the two above-named CONDITIONS, and specifying the occurred condition or conditions.

The Surety declares that this Insurance Surety Bond is issued by the (name of Insurance Company) as per the applicable rules and regulations of Insurance Regulatory Development Authority of India (IRDAI).

This Insurance Surety Bond will remain in force up to and including (date 90 days after the period of bid validity), and any demand in respect thereof must reach the Surety not later than the above date.

For and on behalf of the Insurance Company

in the capacity of

Common Seal of the Insurance Company with complete address including Tel. Nos./e-Mail Id. Staff Authority No. of the officer of the Insurance Company/Signatory

INSTRUCTIONS FOR EXECUTION OF INSURANCE SURETY BOND FOR EARNEST MONEY DEPOSIT

1. Insurance Surety Bond for Earnest Money Deposit should be executed on non-judicial Stamp papers of requisite value in accordance with the stamp Act if applicable to that particular state of Indian Union country of executing Insurance Company, where executed. In case the same is issued by an International Insurance Company (it should be registered under insurance Act 1938 or as amended from time to time and approved by the Insurance Regulatory Development Authority of India (IRDAI)) the law prevalent in the country of execution shall prevail for the purpose of Stamp Duty on the Insurance Surety Bond. However, in such a case, the Insurance Surety Bond for Earnest Money Deposit shall be got confirmed by the Bidder through any Indian Scheduled/Nationalized Insurance Company.
2. The executing officers of the Insurance Surety Bond for Earnest Money/Bid Security shall clearly indicate in (block letters) his name, designation, Power of Attorney No./Signing Power No. as well as telephone/fax numbers with full correspondence address of the issuing Guarantee etc. Each page of the Insurance
3. Surety Bond for Earnest Money Deposit shall be duly signed/initialled by the executing officers and the last page shall be signed in full, indicating the particulars as aforesaid (sub-para 2) under the seal of the Insurance Company
4. Stamp paper shall be purchased in the name of Insurance Company counting the Insurance Surety Bond, after the date 'Notice Inviting Tender', not more than six months prior to execution/issuance of the Insurance Surety Bond. The name of the purchaser should appear at the back side of stamp paper in the Vendors Sing. The issuing insurance Company shall be requested independently for verification/confirmation of the Insurance Surety Bond issued, non-confirmation of which may lead to rejection of 'Insurance Surety Bond'.
5. Irrevocable, valid and fully enforceable Insurance Surety Bond in favour of the Employer (Name of Employer) issued by any Insurance Company registered under insurance Act amended from time to time and approved by the insurance Regulatory Development Authority of India (IRDA) in Indian currency (INR) only is acceptable to the Employer.

6. Insurance Surety and for Bid security in original shall be submitted along with the Bid. However, the issuing Insurance Company shall submit an unstamped duplicate copy of Insurance Surety Bond directly by registered post (A.D.) to the Employer (authority inviting tenders) with forwarding letter.

FORM-8 A

FORMAT FOR INSURANCE SURETY BOND FOR PERFORMANCE GUARANTEE

(To be execute on Non-Judicial Stamp paper of appropriate value)

Insurance Surety Bond No.

Date :

(Name of the Contract)

To :

**The Board of Authorities of the Port of Kandla,
Deendayal Port Authority,
A.O. Building,
P.O. Box No. 50.
Gandhidham – Kutch**

Dear Sirs,

In consideration of the Board of Deendayal Port Authority of the Port of DEENDAYAL PORT AUTHORITY (hereinafter called " The Board" which expression shall unless excluded by or repugnant to the context or meaning thereof be deemed to include the Board of Deendayal Port Authority of the Port of [DEENDAYAL PORT AUTHORITY], its successors and assigns) having awarded to M/s [Contractor's Name] with its Registered/Head Office at (hereinafter referred to as the 'Contractor', which expression shall unless repugnant to the context or meaning thereof, include its successors administrators, executors and assigns), a Contract by issue of Employer's Letter of Acceptance No. dated .and the same having been acknowledged by the Contractor, for [Contract sum in figures and words] for [Name of the work] and the Contractor having agreed to provide a Contract Performance Guarantee for the faithful performance of the entire Contract equivalent to.....(*)....of the said value of the aforesaid work under the Contract to the Employer.

We..... [Name & Address of the Insurance Company]..... having its Head Office at (hereinafter referred to as the 'Surety', which expression shall, unless repugnant to the context of meaning thereof, include its successors, administrators, executors and assigns) do hereby guarantee and undertake to pay the Employer, on demand any and all monies payable by the Contractor to the extent of (*) as aforesaid at any time upto..... (@).....[days/month/year] without any demur, reservation, contest, recourse or protest and/or without any reference to the Contractor. Any such demand made by the Employer on the Insurance Company shall be conclusive and binding notwithstanding any difference between the Employer and the Contractor or any dispute pending before any Court, Tribunal, Arbitrator or any other authority. The Surety undertakes not to revoke this guarantee during its currency without previous consent of the Employer and

further agrees that the guarantees herein contained shall continue to be enforceable till the Employer discharges this guarantee or til. (days/month/year] whichever is earlier.

The Employer shall have the fullest liberty, without affecting in any way the liability of the Insurance company under this guarantee, from time to time to extend the time for performance of the Contract by the Contractor. The Employer shall have the fullest liberty, without affecting this guarantee, to postpone from time to time the exercise of any powers vested in them or of any right which they might have against Contractor, and to exercise the same at any time in any manner, and either to enforce or to forbear to enforce any covenants, contained or implied, in the Contract between the Employer and the Contractor or any other course or remedy or security available to the Employer. The Insurance company shall not be released of its obligations under these presents by any exercise by the Employer of its liberty with reference to the matters aforesaid or any of them or by reason of any other act or forbearance or other acts of omission or commission on the part of the Employer or any other indulgence shown by the Employer or by any other matter or thing whatsoever which under law would, but for this provision have the effect of relieving the Insurance Company.

The Surety declares that this Insurance Surety Bond is issued by the (name of Insurance Company) as per applicable rules and regulations of insurance regulatory development authority of India (IRDAI), and also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Insurance Company as a principal debtor, in the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee the Employer may have in relation to the Contractor's liabilities.

- i) Our liability under this Insurance Surety Bond shall not exceed(*).....
- ii) This Insurance Surety Bond shall be valid up to(+).....
- iii) We are liable to pay the guaranteed amount or any part thereof under this Insurance Surety Bond only and only if Employer serve upon Insurance Company a written claim or demand on or before @.....

Dated thisday of 20..... at

WITNESS

**Signed for and on behalf of the
Insurance Company**

1.
(Signature)

.....
(Signature)

.....

.....

(Name)

(Name)

Notes :

1. (*) This sum shall be Five percent (5%) of the accepted tender value denominated in the types and proportions of currencies.

(@) The Performance Guarantee should be valid for a period of 60 days beyond the date of completion of all contractual obligations of the contractor, including Defect Liability Period.

(+) This date will be the date of issue of defect liability Certificate.

2. Insurance Surety Bond should be executed on appropriate stamp paper of requisite value, such stamp paper should be purchased in the name of Issuing Insurance Company, not more than six (6) months prior to execution / issuance of Insurance Surety Bond. The name of the purchaser should appear at the back side of stamp paper in the Vendors Stamp. Insurance Surety Bond should contain rubber stamp of the authorized signatory of the Insurance Company indicating the name, designation and signature/ power of attorney number as well as telephone numbers / e-Mail Id with full correspondence address of the Insurance Company. In case the same is issued by an International Insurance Company (it should be registered under Insurance Act 1938 or as amended from time to time and approved by the Insurance Regulatory Development Authority of India (IRDAI)), the law prevalent in the country of execution shall prevail for the purpose of Stamp Duty on the Insurance Surety Bond. However, in such a case, the Insurance Surety Bond shall be got confirmed through any Indian Scheduled/Nationalized Insurance Company.
3. Insurance Surety Bond is required to be submitted directly to the Employer by the issuing Insurance Company (on behalf of Contractor) under registered post (A.D.). The Contractor can submit an advance copy of Insurance Surety Bond to the Engineer.

The issuing Insurance Company shall write the name of Insurance Company's controlling branch/ Head Office along with contact details like telephone no., e-Mail Id and full correspondence address in order to get the confirmation of Insurance Surety Bond from that branch/ Head office, if so required

SPECIMEN BANK GUARANTEE
PERFORMANCE GUARANTEE / SECURITY DEPOSIT

(To be executed on Rs.300/- non-judicial Stamp Paper)

[The bank, as requested by the successful Tenderer, shall fill in this form in accordance with the instruction indicated]

In consideration of the Board of Deendayal Port Authority incorporated by the Major Port Authorities Act, 2021 (hereinafter called "The Board" which expression shall unless excluded by or repugnant to the context or meaning thereof be deemed to include the Board of Deendayal Port Authority of the port its successors and assigns) having agreed to release Performance Guarantee / Security Deposit to (hereinafter called the "contractor")

(Name of the contractor/s)

from the demand under the terms and condition of the contract, vide from the demand under the condition of the contract, vide 's letter

No

(Name of the Department)

Date _____ made between the contractors and the Board for execution of Covered under Tender No. _____ dated (hereinafter called "the said contract") for the payment of Security Deposit in cash or Lodgment of Government Promissory Loan Notes for the due fulfillment by the said contractors of the terms and condition of the said contract, on production of a bank Guarantee for Rs. _____ (Rupees) only we, the (Name of the Bank and Address)

_____ (here in after Referred to as "the Bank") at the request of the contractors do here by undertake to pay to the Board an amount not exceeding Rs. _____ (Rupees) only against any loss or damage caused to or suffered by the Board by reason of any breach by the contractors of any of the terms and conditions of the said contract.

We, _____, do here by

(Name of Bank) (Name of Branch)

Undertake to pay the amount due and payable under this guarantee without any demur merely on a demand from the Board stating that the amount claimed is due by way of loss or damage caused to or which would be caused to or suffered by the Board by reason of the contractor's failure to perform the said contract. 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 any amount not exceeding Rs. _____ (Rupees _____) only.

2. We, _____, undertake to pay to the

(Name of Bank and Branch)

Board any money so demanded notwithstanding any dispute or disputes raised by the contractor(s) in any suit or proceeding pending before any Court or Tribunal relating thereto our liability under this present being absolute and unequivocal. The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the Contractor(s) shall have no claim against us for making such payment.

3. We, _____ further agree with the Board that the (Name of Bank and Branch)

guarantee herein contained shall remain in full force and effect during the period that would be taken for performance of the said contract and that it shall continue to be enforceable till all the dues of the Board under or by virtue of the said contract have been fully paid and its claims satisfied or discharged or till the

(Name of the user department)

of the said certifies that the terms and conditions of the said contract have been fully and properly carried out by the said Contractors and accordingly discharge this guarantee. Provided however that the Bank shall be the request of the Board but at the cost of the Contractors, renew or extend this guarantee for such further period or periods as the Board may require from time to time.

4. We, _____ further agree with the Board that the (Name of Bank and Branch)

Board shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said contract or to extend the time of performance by the said contract or to extend the time of performance by the said Contractors from time to time or to postpone for any time or from time to time any of the powers exercisable by the board against the said Contractors and to forebear or enforce any of the terms and conditions relating to the said contract and we shall not be relieved from our liability by reason of any such variation or extensions being granted to the contractors or for any forbearance, act or omission on the part of the Board or any indulgence shown by the board to the

Contractors or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

5. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).

6. It is also hereby agreed that the Courts in Gandhidham would have exclusive jurisdiction in respect of claims, if any, under this Guarantee.

7. We, Bank lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Board in writing.

8. Notwithstanding anything contained herein:

(a) Our liability under this Bank Guarantee shall not exceed Rs. _____ (Rupees _____

only);

(b) This Bank Guarantee shall be valid up to ; and

(c) We are liable to pay the guarantee 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)."

Date _____ day of _____ 20

For (Name of Bank)

(Name)

Signature

DISPUTES REVIEW BOARD AGREEMENT

(To be executed on Rs. 100/- or appropriate value of non-judicial Stamp Paper)

THIS AGREEMENT, made and entered into this.....Day of
.....20 Between (“the Employer/ Board”) and
..... (“the contractor”), and the Disputes Review Board (“the
DRBoard”) consisting of one/three DRBoard Members, (Members from either party,
i.e. contractor and Employer/Board)

(1)

.....(2)

.....(3)

..... [Note: Delete
whatever is not applicable]

WITNESSETH, that

WHEREAS, the Employer/Board and the contractor have contracted for the
execution of Project
name).....(the “contract”) and WHEREAS, the contract provides for the
establishment and operation of the DRBoard NOW THEREFORE, the parties
hereto agree as follows:

1 .The parties agree to the establishment and operation of the DRBoard in accordance with
this DRBoard Agreement.

1. Expect for providing the services required hereunder, the DRBoard
Members should not give any advice to either party or to the Nodal Officer
or his nominee concerning conduct of the works.

The DRBoard Members:

- (a) Shall have no financial interest in any party to the contract or the Nodal Officer or his nominee, or a financial interest in the contract, except for payment for services on the DRBoard.
 - (b) Shall have had no previous employment by, or financial ties to, any party to the contract, or the Nodal Officer or his nominee, except for fee based consulting services on other projects, all of which must be disclosed prior to appointment to the DRBoard.
 - (c) Shall have disclosed in writing to the parties prior to signature of this Agreement any all recent or close professional or personal relationships with any director, officer, or employee of any party to the Nodal Officer or his nominee, and any and all prior involvement in the project to which the contract relates;
 - (d) Shall not, while a DRBoard Member be employed whether as a consultant or otherwise by either arty to the contract, or the Nodal Officer or his nominee, expect as a DRBoard Member.
 - (e) Shall not, while a DRBoard Member, engage in discussion or make any agreement with any party to the contract, or with the Nodal Officer or his nominee, regarding employment whether as a consultant or otherwise either after the contract is completed or after services as a DRBoard Members.
 - (f) Shall be and remain impartial and independent of the parties and shall disclose in writing to the Employer/Board, the contractor, the Nodal Officer or his nominee, and one another any fact or circumstances which might be such to cause either the Port or the contractor to question the continued existing of the impartiality and independence required of DRBoard Members.
3. Except for its participation in the DRBoard activities as provided in the contract and in this Agreement none of the Employer / Board, the contractor, the Nodal Officer or his nominee, and one another any fact or circumstances which might be such to cause either the Employer/Board or the contractor to

question the continued existence of the impartiality and independence required of DRBoard Members.

4. The contractor shall:
 - a) Furnish to each DRBoard Member one copy of all document which the DRBoard may request including contract document, progress report, variation orders, and other document, pertinent to the performance of the contract.
 - b) In co-operation with the Employer/Board, co-ordinate the site visits of the DRBoard, including conference facilities and secretarial and copying services.
5. The DRBoard shall serve throughout the operation of the contract. It shall begin operation following execution of this Agreement, and shall terminate its activities after issuance of the taking over certificate and the DRBoard's issuance of its Recommendation on all disputes referred to it.
6. DRBoard Member, shall not assign or subcontract any of their work under this Agreement.
7. The DRBoard Members are independent and not employees or agents of either the Employer/Board or the Contractor.
8. The DRBoard Members are absolved of any personal or professional liability arising from the activities and the Recommendations of the DRBoard.
9. Fees and expenses of the DRBard Member[s] shall be agreed to and shared equally by the Employer/Board and the Contractor. If the DRBoard requires special services, such as accounting, data research and the like, both the parties must agree and cost shall be shared by them as mutual agree.
10. DR Board's site visit:
 - a. The DR Board shall visit the site and meet with representative of the Employer/Both and the contractor and the nodal officer are his nominee at regular intervals, at times of critical construction events, and at the return request of either party. The timing of site filing agreement shall be fixed by the DRBoard

- b. Site meeting shall consist of an informal discussion of the status construction of the works followed by an inspection of the work, both attended by personal from the employer/Board, the contractor and the nodal officer or his nominee
- c. If request by either parties or the DR Board, the employer/Board will prepare minutes of the meeting and circulate them for comments of the parties and the nodal officer or his nominee.

11. Procedure for disputes referred to the DRBoard:

- a) If either party objects to any action or inaction of the other party or the Nodal Officer or his nominee, the objecting party may file a written Notice of Dispute to the other party with a copy to the Nodal Officer or his nominee stating that it is given pursuant to clause [number] and stating clearly and in detail the basis of the dispute.
- b) The party receiving the Notice of Dispute will consider it and respond in writing within 7 days after receipt.
- c) This response shall be final and conclusive on the subject, unless a written appeal to the response is filed with the responding party within 7 days of receiving the response. Both parties are encouraged to pursue the matter further to attempt to settle the dispute. When it appears that the dispute cannot be resolved without the assistance of the DRBoard either party may refer the dispute to the DRBoard by written Request for Recommendation to the Board, the other party and the Nodal Officer or his nominee stating that it is made pursuant to [insert relevant clause no.]
- d) The Request for recommendation shall state clearly and detail the specific issues of the dispute to be considered by the DRBoard.
- e) When a dispute is referred to the DRBoard, and the DRBoard is satisfied that the dispute requires the DRBoard's assistance, the DRBoard shall decide when to conduct a hearing on dispute. The DRBoard may request that written documentation and arguments from both parties be submitted

to each DRBoard Members before the hearing begins. The parties shall submit insofar as possible agreed statements of the relevant facts.

- f) During the hearing, the contractor, the Employer/ Board, the Nodal Officer or his nominee shall each have ample opportunity to be heard and to offer evidence.

The DRBoard's Recommendation for resolution of the dispute will be given in writing, to the Employer/ Board, the contractor and the Nodal Officer or his nominee as soon as possible, and in any event not more than 28 days after the DRBoard's final hearing on the dispute.

12. Conduct of Hearing:

- a) Normally hearing will be conducted at the sites, but any location that would be more convenient and still provide all required facilities and access to necessary documentation may be utilized by the DRBoard. Private sessions of the DRBoard may be held at any location convenient to the DRBoard.
- b) The Employer/ Board, the Nodal Officer or his nominee and contractor shall have representatives at all hearing.
- c) During the hearing, no DRBoard Member shall express any opinion concerning the merit of any facet of the case.
- d) After the hearings are concluded, the DRBoard shall meet privately to formulate its Recommendation. All DRBoard deliberation shall be conducted in private, with all individual views kept strictly confidential. The DRBoard's Recommendations, together with an explanation of its reasoning shall be submitted in writing to both parties and the Nodal Officer or his nominee. The pertinent contract provision, applicable laws and regulations, and the facts and circumstances involved in the dispute.

The DRBoard shall make every effort to reach a unanimous Recommendation. If this proves impossible, the majority shall decide, and the dissenting member any prepare a written minority report for submission to both parties.

[Notes: Delete if it is one member DRBoard]

13 If during the contract period, the Employer/ Board and the contractor are of the opinion that the Disputes Review Board is not performing its function properly, the Employer/ Board and the contractor may together disband the Disputes Review Board. In such an event, the disputes shall referred to Arbitration straightaway.

The Employer/Board and the contractor shall jointly sing a notice specifying that the DRBoard shall stand disbanded with effect from the date specified in the notice. The notice shall posted by a registered letter with AD or delivery of the letter, even if he refuses to do so.-

SPECIMEN FORMAT FOR DECLARATION

(To be executed on bidder's letter head)

To

(Project Title)

Ref:

The undersigned, having studied the pre-qualification submission for the above mentioned project, hereby states:

- (a) The information furnished in our bid is true and accurate to the best of my knowledge.
- (b) That in case of being pre-qualified, we acknowledge that the Employer may invite us to participate in due time for the submission of tender on the basis of provisions made in the tender documents to follow.
- (c) When the call for tenders is issued, if the legal, technical or financial conditions, or the contractual capacity of the firm or joint venture changes, we commit ourselves to inform you and acknowledge your sole right to review the pre-qualification made.
- (d) We enclose all the required pre-qualification data format and all other evaluation.
- (e) We also state that no changes have been made by us in the downloaded tender document and also understand that in the event of any discrepancies observed, the printed tender document No.____ is full and final for all legal/contractual obligations (delete if not required)].

Date:

Place:

Name of the Applicant:

Represented by (Name & Capacity)

**SPECIMEN LETTER OF AUTHORITY FROM
BANK FOR ALL BGs**

(To be executed on Bank's Letter Head)

Date:

To,
The Board of Deendayal Port Authority,

Dear Sir,

dated _____

Sub: Our Bank Guarantee No. _____

For Rs. _____ Favours
yourselves issued on a/c of M/s. _____ (Name of contractor)

.....

We confirm having issued the above mentioned guarantee

Favours yourselves, issued on account of M/s.
_____ validity for expiry upto
date _____ and claim expiry date upto _____

We also confirm 1) _____ 2)
_____ is/are empowered to sign such Bank Guarantee on
behalf of the Bank and his/their signatures is/are binding on the Bank.

Name of signature of Bank Officer

SPECIMEN LETTER OF AUTHORITY FOR SUBMISSION OF BID

(To be executed on Rs.100/- or appropriate value of non Judicial Stamp Paper)

To
The (PORT Address)

Dear Sir,

We.....
----- do hereby confirm that Shri.....(Name,
designation and Address) is/are authorized to represent us to bid, negotiate and
conclude the agreement on our behalf with you against tender no ----- and
his specimen signature is appended here to ..

We confirm that we shall be bound by all and whatsoever our said signatory shall
commit.

We understand that the communication made with him by the Employer/Board
shall be deemed to have been done with us in respect of this Tender.

[specimen signature]

Yours faithfully,

Signature:

Name& Designation:

For & on behalf

PROFORMA OF JOINT VENTURE/CONSORTIUM AGREEMENT

(To be submitted on Non-judicial Stamp Paper of appropriate value)

This Joint Venture /Consortium Agreement is made and entered into on this day of20... by and between (i) M/s**Name of the firm to be filled-in**....., (ii) M/s.....(**Name of the firm to be filled-in**)..... , primarily for the work under the Deendayal Port Authority.

All the partners of the Joint Venture /Consortium hereinafter individually referred to as the parties and collectively as the Joint Venture/Consortium'.

1. Formation of Joint Venture/Consortium

1.1. (i) M/s... (**Name of the firm to be filled in**) is engaged in
.....(**Details of the works undertaken by the party**)

(ii) M/s... (**Name of the firm to be filled in**) is engaged in
... ..(**Details of the works undertaken by the party**)

(iii)

1.2. On behalf of Board of Deendayal Port Authority (hereinafter referred to as Employer), the (Designation of HOD), Deendayal Port Authority has invited bids from the experienced, resourceful and bonafied Contractor with proven technical and financial capabilities of executing the work (**Name of work**).

1.3. The parties have been exploring together the ways and means of collaboration for the purpose of an offer to be made for the said project of the Deendayal Port Authority and have mutually agreed to enter into a Joint Venture/Consortium Agreement to submit a common bid for the project and to carry out the project works in the event of award of the contract, in association with each other and (**.....Name of Partner to be filled in**) shall be the Lead Partner and (i) (**.....Name of Partner to be filled in.....**), (ii) (**.....Name of Partner to be filled in**) shall be the other partner(s).

NOW THEREFORE IT HAS BEEN AGREED TO BETWEEN THE PARTIES AS FOLLOWS

1.4. The Joint Venture/Consortium will be known as.....(**...Name of JV to be filled in.....**)and shall consist of (i) (**.....Name of the firm to be filled in**), (ii) (**.....Name of the firm to be filled-in.....**),....., parties to the present agreement.

1.5. The recitals are true and correct and form an integral part of this agreement and are representations of the parties to which they relate and have been relied upon by the parties to enter into the present agreement.

1.6. Notwithstanding the date of signature of this agreement, its effective date will be the date of submission of bid.

1.7. All costs incurred by the parties before the date of award of contract will be borne by the parties concerned. All costs in implementation of this Joint Venture/Consortium Agreement after award of contract till the expiry of this agreement will be borne by the parties as hereinafter provided.

1.8. The Joint Venture/Consortium will be dissolved and this agreement will cease to have effect on completion of this project, maintenance and fulfilment of all other conditions under the contract, upon receipt of payment of all amounts from the Employer and on settlement of accounts between the parties as hereinafter provided.

1.9. The contract, if awarded by the Employer, Letter of Acceptance shall be issued in the name of (**....Name of JV/Consortium to be filled in.....**) and the Contract shall be signed by legally authorized signatories of all the parties.

1.10. All the parties of the JV/Consortium shall be jointly and severally liable during the bidding process and the bid document shall be signed by legally authorized signatory of all the parties.

1.11. The financial contribution of each partner to the JV/Consortium operation shall be:

(i) **M/s..... (Name of the partner to be filled-in)** -

(ii) **M/s..... (Name of the partner to be filled-in)** -

(iii)

1.12. All the parties of the JV/Consortium shall be jointly and severally liable for the execution of the project in accordance with the Contract terms, in the event of award of contract. The delineation of duties, responsibilities and scope of work shall be:

a) The Lead Partner shall provide suitable experienced personnel at site, for general planning, site management and equipment operations, during entire period of contract execution.

b) (.....**Name of Partner to be filled-in**.....) shall carry out the following works :-

c) (.....**Name of Partner to be filled-in**.....) shall carry out the following Works:-

d)

1.13. The parties hereto agreed that each of them shall duly and properly perform all the functions and all costs related to their respective works.

1.14. The parties hereto shall be at liberty to enter into liaison work/correspondence with statutory and local authorities as the circumstances warrant individually or collectively.

1.15. It is hereby agreed and undertaken that, all the parties are jointly and severally liable to the Board of Deendayal Port Authority for the performance of the contract.

1.16. Notwithstanding demarcation or allotment of work between JV/Consortium partners, JV/Consortium each partner shall be liable for non performance of the whole contract irrespective of their demarcation or share of work.

1.17. The Lead Partner shall be authorized to act on behalf of the JV/Consortium.

1.18. All the correspondences between the Employer and the JV/Consortium shall be routed through the Lead Partner.

1.19. The Lead Partner is authorized: (a) to submit bid, negotiate and conclude contract and incur all liabilities therewith on behalf of the partner(s) of the JV /Consortium during the bidding process; and (b) in the event of a successful bid, to incur liabilities and receive instructions for and on behalf of the partner(s) of the JV/Consortium and to carry out the entire execution of the contract including payment, exclusively through Lead Partner.

1.20. In the event of default of the Lead Partner, it shall be construed as default of the Developer/Contractor; and Employer shall be entitled to take action under relevant clause(s) of the Department Bid Document and/or Conditions of Contract.

1.21. All the parties of the JV/Consortium shall be jointly and severally liable for due performance, recourse/sanctions within the joint venture in the event of default of any partner and arrangements for providing the required indemnities.

1.22. The JV/Consortium shall have a separate JV/Consortium Bank account (distinct from the Bank account of the individual partners) to which individual partners shall contribute their share capital / or working capital. The financial obligation of the consortium shall be discharged through the said JV/ Consortium Bank account only and also all payment received by consortium from the Deendayal Port Authority shall be through that account only.

The parties hereto have mutually agreed to the terms and conditions set forth herein above and have assured each other to duly perform the reciprocal promises and obligations on either side for effective implementation of the JV/Consortium for proper and due completion of the works envisaged, in the event of award of contract to the JV/Consortium and have affixed their signature in this indenture on this theday of.....20...

(i) Signature Name

Designation seal &

Common seal of the firm

(ii) Signature Name

Designation

seal &

Common seal of the firm

Witness1

Witness2

PROFORMA OF POWER-OF-ATTORNEY FOR LEAD MEMBER OF JV/ CONSORTIUM
(To be submitted on Non-judicial Stamp Paper of appropriate value)

By this Power-of-Attorney **executed** on **this**day of(month) of 20..., we,

- (i) (.....*Name of legally authorized signatory of first partner to be filled in*.....),
(ii) (.....*Name of legally authorized signatory of second partner to be filled in*),

.....hereby jointly authorize and agree the Lead Partner, M/s (..... *Name of the lead partner to be filled in*), (a) to submit bid, negotiate and conclude contract and incur all liabilities therewith on behalf of the partner(s) of the JV /Consortium during the bidding process; and (b) in the event of a successful bid, to incur liabilities and receive instructions for and on behalf of the partner(s) of the JV /Consortium and to carry out the entire execution of the contract including payment for the work of (....*Name of work*...) exclusively through Lead Partner.

(i) Signature Name
Designation seal &
Common seal of the firm

(ii) Signature Name
Designation seal &
Common seal of the firm

.....

.....

Signature, name and seal of the certifying authority/Notary Public

STAGE PAYMENT

(To be executed on Rs.100/- non-judicial Stamp paper)

[The Bank as requested by the successful Tender, shall fill in this form in accordance with the instruction indicated.]

Date:[insert date (as day, month, and year) of Tender Submission] [Banks letterhead]

Beneficiary: [insert legal name and address of port]

Stage PAYMENT GUARANTEE No.: [insert stage payment Guarantee no.]

We [insert legal name and address of bank], have been informed that [insert complete name and address of contractor] (hereinafter called "the contractor") has entered into contract No. [Insert number] dated [insert data of agreement] with you, for execution of works viz., [insert title of contract] (hereinafter called "the contract").

Furthermore, we undertake that, according to the condition of the contract, an advance is to be made against an advance payment guarantee.

At the request of the contractor, we hereby irrevocable undertake to pay you any sum or sums not exceeding in total an amount of [insert amount(s) in figures and words] upon receipt by us of your first demand in writing declaring that the contractor is in breach of its obligation under the contract because the contractor has been paid the stage payment in realization of his invoice no. ----
----- dated -----towards execution of contract.

It is a condition for any claim and payment under this Guarantee to be made that the stage payment referred to above must have been received by the contractor on its account [insert number and domicile of the account] and that the contractor failed to execute the contract as per the contract.

This Guarantee shall remain valid and in full effect from the date of the stage payment received by the contractor under the contract until [insert date].

[signature(s) of authorized representative(s) of the bank]

[Authorisation letter from the issuing bank that the signatory of this BG is authorised to do so should also be enclosed]

The bank shall insert the amount(s) specified in the SCC and denominated, as specified in the SCC, either in the currency (ies) of the contract or a freely convertible currency acceptable to the Employer.

Insert the completion/ schedule data stipulated in the Contract Delivery Schedule. The Employer should note that in the event of an extension of an extension of the time to perform the contract, the Employer would need to request an extension of this Guarantee from the bank. Such request must be in writing and must be made prior to the expiration data established in the Guarantee. In preparing this Guarantee, the Employer might consider adding the following text to the form, at the end of the penultimate paragraph: "We agree to extend his Guarantee for a period not exceeding [six month]/[one year] at a time, in response to the Employer's written request for such extension, such request to be presented to be presented to us before the expiry of the Guarantee."

Specimen EMD (Bank Guarantee Format)

[The Bank shall fill in this Bank Guarantee Form in association with the instructions indicated. To be executed on Rs. 300/- non-Judicial Stamp Paper]

_____ (Bank's name and address of Issuing Branch or Office)
Beneficiary: _____ (Name and Address of Employer/Board) Board of
Deendayal Port Authority

Date: _____

Tender Guarantee No.: _____

We have been informed that [name of the Tenderer] (hereinafter called "the Tenderer") has submitted to you its Tender dated (hereinafter called "the Tenderer") for the execution of [name of contract] under Invitation for Tenders No.[Number]. Furthermore, we understand that, according to your conditions, Tenders must be supported by an EMD. At the request of the Tenderer, we [name of Bank] hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of [amount in figures] ([amount in words]) upon receipt by us your first demand in writing accompanied by a written statement stating that the Tenderer is in breach of its obligation(s) under the Tender conditions, because the Tenderer:

(a) Has withdrawn its Tender during the period of tender validity specified by the Tenderer in the Form of Tender; or **(b)** Having been notified of the acceptance of its Tender by the Employer/Board during the period of Tender validity, (i) fails or refuses to execute the Form of Agreement, if required, or (ii) fails or refuses to furnish the performance guarantee, in accordance with the Instructions to Tenderers.

This guarantee will expire unless otherwise extended or informed by the Employer/Board: (a) If the Tenderer is the successful Tenderer, upon our receipt of copies of the contract signed by the Tenderer and the performance guarantee issued to you upon the instruction of the Tenderer; or (b) If the Tenderer is not the successful Tenderer, upon the earlier of (i) Our receipt of a copy of your notification to the Tenderer of the name of the successful Tenderer; or (ii) Twenty-eight days after the expiration of the Tenderer's tender or any extended period thereof; Consequently, any demand for payment under this guarantee must be received by us at the office on or before that date.

_____ [Signature(s)] [Authorization letter from the issuing bank that the signatory of this BG is authorized to do so should also be enclosed]

FORMAT OF BID SECURITY DECLARATION FROM BIDDERS
(On Bidders Letter head)

Bid Security Declaration Form

Date: _____ Tender No. _____

To (insert complete name and address of the Employer/ Purchaser)

I/We. The undersigned, declare that:

I/We understand that, according to your conditions, bids must be supported by a Bid Securing Declaration.

I/We accept that I/We may be disqualified from bidding for any contract with you for a period of three year from the date of notification if I am /We are in a breach of any obligation under the bid conditions, because I/We

a) have withdrawn/modified/amended, impairs or derogates from the tender, my/our Bid during the period of bid validity specified in the form of Bid; or

b) having been notified of the acceptance of our Bid by the purchaser during the period of bid validity (i) fail or reuse to execute the contract, if required, or (ii) fail or refuse to furnish the Performance Security, in accordance with the Instructions to Bidders.

I/We understand this Bid Securing Declaration shall cease to be valid if I am/we are not the successful Bidder, upon the earlier of (i) the receipt of your notification of the name of the successful Bidder; or (ii) thirty days after the expiration of the validity of my/our Bid.

Signed: (insert signature of person whose name and capacity are shown) in the capacity of (insert legal capacity of person signing the Bid Securing Declaration)

Name: (insert complete name of person signing the Bid Securing Declaration)

Duly authorized to sign the bid for an on behalf of (insert complete name of Bidder)

Dated on _____ day of _____ (insert date of signing)

Corporate Seal (where appropriate)

Bank Payment Agreement Form : (to be collected from the Parties)

1. Name of Party :-
2. Account No. :-
3. Branch Name :-
4. IFSC Code of the Bank :-
5. MICR Code :-
6. Accepted for :- NEFT Payment or
RTGS Payment

DECLARATION BY THE PARTY :-

I / We hereby declare that the above information furnished by me is correct and DPA is requested to pay my / our dues to this Account for this Work / Supply Order is concerned.

Signature of the Party
With the seal

EXCEPTIONS AND DEVIATIONS

As pointed out in the Tender Call Notice, Bidder may stipulate here exceptions and deviations to the bid conditions, if considered unavoidable.

Sr. No.	Page No. of Bid Document	Clause No. of Bid Document	Subject Deviation

Note: however, the Bidders to note that unacceptable deviations, if any, the bid shall be liable for rejection. Bidder is discouraged to deviate from bid conditions, specifications, delivery schedules, commercial terms as per the tender document.

Duly authorized to sign this authorization on behalf of: [insert complete name of Tenderer]

Date on _____ day of _____, _____ [insert date]

INTEGRITY PACT**Between****Deendayal Port Authority (DPA)** hereinafter referred to as "**The Principal**"

and

..... (Name of The bidders and consortium members) hereinafter referred to as "**The Bidder / Contractor**"**Preamble**

The Principal intends to award, under laid down organizational procedures, contract(s) / concession(s) for Tender No. The Principal values full compliance with all relevant laws of the land rules, regulations, economic use of resources and of fairness / transparency in its relations with its Bidder(s) and / or Contractor(s).

In order to achieve these goals, the Principal will appoint Independent External Monitors (IEMs), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1 - Commitments of the Principal

- (1) The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-
 - (a) No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
 - (b) The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
 - (c) The Principal will exclude from the process all known prejudicial persons.
- (2) If the Principal obtains information on the conduct of any of its employees which is a criminal offence under the IPC / PC Act, or if there be a substantive suspicion in this regard, the Principal will inform the Chief Vigilance Officer and in addition can initiate disciplinary actions.

Section 2 - Commitments of the Bidder(s) / Contractor(s)

- (1) The Bidder(s) / Contractor(s) commits themselves to take all measures necessary to prevent corruption. The Bidder(s) / Contractor(s) commits themselves to observe the following principles during participation in the tender process and during the contract execution.

- a. The Bidder(s) / Contractor(s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal's employees involved in tender process or the execution of the contract or to any third person any material or other benefit, which he / she is not legally entitled to, in order to obtain in exchange of advantage of any kind whatsoever during the tender process or during the execution of the contract.
 - b. The Bidder(s) / Contractor(s) will not enter with other Bidders into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids, or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
 - c. The Bidder(s) / Contractor(s) will not commit any offence, under the relevant Prevention of Corruption Act / Indian Penal Code / PC Act; further the Bidder(s) / Contractor(s) will not use improperly, for purposes of competition, or personal gain, or pass on to others, any information or document provided by the Principal, as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
 - d. The Bidder(s) / Contractor(s) of foreign origin shall disclose the name and address of the Agents / Representatives in India, if any. Similarly, the Bidder(s) / Contractor(s) of Indian Nationality shall furnish the name and address of the foreign principals, if any. Further details as mentioned in the "Guidelines on Indian Agents of Foreign Suppliers" shall be disclosed by the Bidder(s) / Contractor(s). Further, as mentioned in the Guidelines all the payments made to Indian agent / representative have to be in Indian Rupees only. Copy of the "Guidelines on Indian Agents of Foreign Suppliers" is placed at (page Nos. 7-20)
 - e. The Bidder(s) / Contractor(s) will, when presenting their bid, disclose any and all payments made, is committed to or intends to make to agents, brokers or any other intermediaries, in connection with the award of the contract.
 - f. Bidder(s) / Contractor(s) who have signed the Integrity Pact shall not approach the Courts while representing the matter to IEMs and shall wait for their decision in the matter.
- (2) The Bidder(s) / Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

Section 3 - Disqualification from tender process and exclusion from future contracts.

If the Bidder(s) / Contractor(s), before award or during execution has committed a transgression through a violation of Section-2 above, or in any other form, such as to put their reliability or credibility in question, the Principal is entitled to disqualify the Bidder (s) / Contractor(s), from the tender process, or take action as

per the procedure mentioned in the "Guidelines on Banning of business dealings". Copy of the "Guidelines on Banning of business dealings" is placed at (Page No. 7-20).

Section 4 - Compensation for Damages

- (1) If the Principal has disqualified the Bidder(s), from the tender process prior to the award, according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit / Bid Security.
- (2) If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to Section 3, the Principal shall be entitled to demand and recover from the Contractor, liquidated damages of the Contract Value or the amount equivalent to Security Deposit / Performance Bank Guarantee, whichever is higher.
- (3) The Bidder(s) agrees and undertakes to pay the said amounts, without protest or demur, subject only to condition that, if the Bidder(s) / Contractor(s) can prove and establish that the termination of the contract, after the contract award has caused no damage or less damage than the amount of the liquidated damages, the Bidder/Contractor shall compensate the principal, only to the extent of the damage in the amount proved.

Section 5 - Previous transgression

- (1) The Bidder declares that, no previous transgressions occurred in the last three years with any other company in any country confirming to the anti-corruption approach or with any other Public Sector Enterprises in India, that could justify his exclusion from the tender process.
- (2) If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or action can be taken as per the procedure mentioned in "Guidelines on Banning of Business dealing".

Section 6 - Equal treatment of all Bidders / Contractors

- (1) In case of a Joint Venture, all the partners of the Joint Venture will enter into agreement with identical conditions as this on which all Bidders.
- (2) There is no provision of sub-contract in the tender, any violation of the same, Contractor shall be held solely responsible for the same.

Section 7 - Criminal charges against violating Bidders / Contractors

If the principal obtains knowledge of conduct of a Bidder or Contractor or of an employee, or a representative, or an associate of a Bidder or Contractor, which constitutes corruption, or if the Principal has

substantive suspicion, in this regard, the Principal will inform the same to the Chief Vigilance Officer (CVO) and the CVO will take further necessary action as deemed fit in accordance with the CVC Manual.

Section 8 - External Independent Monitor

- (1) The Principal appoints competent and credible Independent External Monitor for this Pact after approval by Central Vigilance Commission. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.
- (2) The Monitor is not subject to instructions by the representative of the parties and performs his / her functions neutrally and independently. The Monitor would have access to all Contact documents, whenever required. It will be obligatory for him / her to treat the information and documents of the Bidders / Contractors as confidential. He / she reports to the Chairperson of the Board of the Principal.
- (3) The Bidder(s) / Contractor(s) accepts that the Monitor has the right to access without restriction to all Project documentation of the Principal including that provided by the Contractor. The Bidder / Contractor will also grant the Monitor, upon his / her request and demonstration of a valid interest, unrestricted and unconditional access to the project documentation. The Monitor is under contractual obligation, to treat the information and documents of the Bidder / Contractor with confidentiality.
- (4) The Monitor is under contractual obligation to treat the information and documents of the Bidder(s) / Contractor(s) with confidentiality. The Monitor has also signed declaration on "Non-Disclosure of Confidential Information" and of "Absence of Conflict of Interest". In case of any conflict of interest arising at a later date, the IEM shall inform Chairman, DPA and recues himself / herself from that case
- (5) The Principal 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 Principal and the Bidder / Contactor. The parties offer to the Monitor the option to participate in such meetings.
- (6) As soon as the Monitor notices, or believes to notice, a violation of this agreement, he / she will so inform the Management of the Principal and request the management to discontinue, or take corrective action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.
- (7) The Monitor will submit a written report to the Chairperson of the Board of the Principal, within 8 to 10 weeks from the date of reference or intimation to him by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.
- (8) If the Monitor has reported to the Chairperson of the Board of the Principal, a substantiated suspicion of an offence under relevant IPC / PC Act and the Chairperson of the Board of the Principal has not, within reasonable time taken visible action to proceed against such offence or reported it to the Chief Vigilance Officer, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
- (9) The word "**Monitor**" would include both singular and plural.

Section 9 - Pact Duration

- 9.1 This Pact shall be operative from the date of signing of IP by both the parties till the final completion of contract of successful bidder and for all other bidders six months after the contract has been awarded. Issues like warranty, guarantee, etc. should be outside the purview of IEMs.
- 9.2 If any claim is made / lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact, as specified above unless it is discharged / determined by the Chairperson, DPA.

Section 10 - Other Provisions

- (1) This agreement is subject to Indian Law. Place of performance and jurisdiction is the Registered Office of the Principal, i.e. Gandhidham, Gujarat.
- (2) Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.
- (3) If the Bidder / Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.
- (4) Should one or several provisions of this agreement, turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.
- (5) Issues like Warranty / Guarantee etc. shall be outside the purview of IEMs.
- (6) In the event of any contradiction between the Integrity Pact and its Annexure, the Clause in the Integrity Pact will prevail.



(For & on behalf of the Principal)

Executive Engineer(Civil)
(Office Seal) Division



Signature of Witness:
(Name & Address)

G. SRINIVASA RAO

HYDROGRAPHIC SURVEYOR

DEENDAYAL PORT AUTHORITY

(For & on behalf of the
Bidder/Contractor)

(Office Seal)

Signature of Witness:
(Name & Address)

Place: Gandhidham

Date: ____/____/20____

Note: The bidder has to execute Integrity Pact agreement with Deendayal Part Authority (as per Bid Response Sheet No. 10 and Shri Amiya Kumar Mohapatra, IFoS (Retd.) and Dr. Gopal Dhawan, Ex-CMD MECL have been appointed by DPA as independent External Monitors and whose address are as under: -

Shri Amiya Kumar Mohapatra IFos
(Retd.)
Qrs. No. 5/9, Unit-9, Bhoi Nagar,
Bhubaneshwar- 751 022
Mobile No. 9437002530
Email: amiyaifs@gmail.com

Dr. Gopal Dhawan, Ex-CMD, MECL,
House No.120, Jal Shakti Vihar
(NHPC Society) P4, Builders Area,
Greater Noida Gautam Budh Nagar,
Uttar Pradesh – 201 315
Mobile No. 8007771467
Email: gdhawangeologist@gmail.com

GUIDELINES ON BANNING OF BUSINESS DEALINGS
(Effective from 01/01/2023)



DEENDAYAL PORT AUTHORITY
(Formerly known as Kandla Port Trust)
GANDHIDHAM - KUTCH - GUJARAT - 370 201.

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1. Introduction

- 1.1 "Board" of Deendayal Port Authority (DPA) constituted by the Central Government in accordance with sub-section (1) of section 3 of the Major Port Authorities Act, 2021, has to ensure preservation of rights enshrined under the above Act. DPA has also to safeguard its commercial interests. DPA is committed to deal with Agencies, who have a very high degree of integrity, commitment and sincerity towards the work undertaken. It is not in the interest of DPA to deal with Agencies who commit deception, fraud or other misconduct while participating in tenders/in the execution of contracts awarded/orders issued to them. In order to ensure compliance with the constitutional mandate, it is incumbent on DPA to observe principles of natural justice before banning the business dealings with any Agency.
- 1.2 Since banning of business dealings involves civil consequences for an Agency concerned, it is incumbent that adequate opportunity for hearing is provided and the explanation, if tendered, is considered before passing any order in this regard keeping in view the facts and circumstances of the case.
- 1.3 The objective of these guidelines is to have a common procedure for Banning of Business Dealings with Agencies across the Company.

2. Scope

- 2.1 These guidelines are applicable to the sale and procurement of goods & services including contracts / projects across all the Departments and Divisions of DPA.
- 2.2 The General Conditions of Contract (GCC) of DPA provide that DPA reserves the rights to keep on hold participation in tenders or to ban business dealings if any Agency has been found to have committed misconduct and also to suspend business dealings pending investigation. If such provision does not exist in any GCC, the same may be incorporated.
- 2.3 Similarly, in the case of sale of material, there is a clause in Sale Order to deal with the Agencies / customers / buyers, who indulge in lifting of material in unauthorized manner. This should also include all activities including unauthorized selling of the material. If such a stipulation does not exist in any Sale Order, the same may be incorporated.
- 2.4 However, absence of such a clause as mentioned at para 2.2 & 2.3 above does not in any way restrict the right of the Board (DPA) to take action / decision under these guidelines in appropriate cases.
- 2.5 The procedure for (i) Board wide Hold on participation of the Agency in Tenders (ii) Suspension and (iii) Banning of Business Dealings with Agencies, has been laid down in these guidelines.
- 2.6 It is clarified that these guidelines do not deal with the decision of the Management not to entertain any particular Agency due to its poor / inadequate performance or for any other reason.
- 2.7 The banning shall be with prospective effect, i.e., future business dealings.

3. Definitions

In these Guidelines, unless the context otherwise requires:

- i) 'Party / Contractor / Supplier / Purchaser / Customer / Bidder / Tenderer' shall mean and include a public limited company or a private limited company, a firm whether registered or not, an individual, partnership firm, Limited Liability Partnership, a cooperative society or an association or a group of persons engaged in any commerce, trade, industry, etc. Party / Contractor / Supplier / Purchaser / Customer / Bidder / Tenderer' in the context of these guidelines is termed as 'Agency.'
- ii) 'Inter-connected Agency' shall mean two or more companies having any of the following features:
 - a) If one is a subsidiary of the other;
 - b) If the Functional Director(s), Partner(s), Manager(s) or Representative(s) are common;
 - c) If management is common;
 - d) If one owns or controls the other in any manner;
 - e) If the agencies have same authorized signatory (ies)

- f) If they have the same address/same Permanent Account Number / same Bank Account Number / common email ID.

Note: This list is only illustrative in nature.

- iii) 'Competent Authority' and 'Appellate Authority' shall mean the following:

Area of Banning/ Suspension	Competent Authority	1st Appellate Authority	2nd Appellate Authority
Board-wide banning	HoD of the Board	Chairman, DPA	--
Banning / Suspension of business dealings with Foreign supplier of imported coal & coke	HoD's Committee	Chairman, DPA	DPA Board**
Board wide Suspension of business dealings with Agency	Officer nominated by Chairman of Board. For Department headed by HoDs, the respective HoDs will nominate the officer for this purpose.*	Chairman of the Board. For Departments headed by HoDs, the respective HoDs will be the Appellate Authority.	--
Board wide Hold on participation of the Agency in Tenders #	Officer nominated by Chairman of Board. For Departments headed by HoDs, the respective HoDs will nominate the officer for this purpose.*	Chairman of the Board. For Departments headed by HoDs, the respective HoDs will be the Appellate Authority.	--

* For Board – The nominated officer shall be a Direct Reporting Officer (DRO) not below the rank of Head of the Department for “Competent Authority” for the purpose of suspension of business dealings with the Agency as well as for Board wide Hold on participation of the Agency in tenders under these guidelines. For Corporate Office, in case of procurement of items / award of contracts to meet the requirement of Corporate Office only, Head of Department shall be the Competent Authority and HoD concerned shall be the Appellate Authority. The Management of Subsidiary shall define / appoint the “Competent Authority”, Appellate Authority & Standing Banning Committee in their respective cases.

This provision for Hold on participation of the Agency in tenders shall be applicable only in such case where Standing Banning Committee recommends for keeping on Hold the participation in tenders and which shall be limited to particular Department / Division.

** This would be applicable only in cases of banning of business dealings with Foreign Suppliers of imported coal and coke.

- iv) 'Investigating Department' shall mean any Department or Division investigating into the conduct of the Agency and shall include the Vigilance Department, Central Bureau of Investigation, the State Police or any other department set up by the Central or State Government having powers to investigate.

4. Initiation of Banning/Suspension

Action for banning/suspension of business dealings with any Agency should be initiated by the Concerned Department such as Indenting / Contracting / Executing Departments, etc. having business dealings with Agency or by the department which floated the tender (in case where the tenderer has committed deception, fraud or other misconduct) subsequent to noticing the irregularities or misconduct on their part.

5. Suspension of Business Dealings

5.1 If the conduct of any Agency (except Foreign Suppliers of imported coal and coke) dealing with DPA is under investigation by any department of any Department, the Concerned Department may consider whether the allegations under investigations are of serious nature and whether pending investigations, it would be advisable to suspend (temporarily discontinue) business dealings with the Agency. Recommendation in the matter shall be submitted to the Competent Authority for this purpose.

5.2 If the Competent Authority, after consideration of the matter including the recommendation of the Investigating Department, decides that it would not be in the interest of Department of DPA to continue business dealings pending investigation, it may suspend business dealings with the Agency. The Suspension Order to this effect shall be issued by the Head of Concerned Department or by his representative / concerned executive with the approval of the Head of the Concerned Department, indicating a brief of the charges under investigation and the period of suspension. If it is decided that inter-connected Agencies would also come within the ambit of the order of suspension, the same should be specifically stated in the order. Ordinarily, the order of suspension would operate for a period not more than six months and may be communicated to the Agency and also to the Investigating Department.

Further to the suspension, the investigation, recommendation by the Standing Banning Committee (SBC) and final decision by the Competent Authority to be completed within six months from order of suspension.

5.3 The order of suspension of business dealings with the Agency under investigation shall be communicated to all Departmental Heads within the Board. During the period of suspension, no fresh contract will be entered into with the Agency. Suspension would be valid only for the concerned Board.

5.4 As far as possible, the Agency under suspension should be allowed to complete the job of existing contracts, unless the Competent Authority, having regard to the circumstances of the case, decides otherwise. Once the order for suspension is issued, existing offers against

ongoing tenders (prior to issuance of contract)/ new offers of the Agency shall not be entertained during the period of suspension.

5.5 For suspension of business dealings with Foreign Suppliers of imported coal & coke, following shall be the procedure :-

- i) Suspension of the foreign suppliers shall apply throughout the Board including Subsidiaries.
- ii) The complaint against any foreign supplier shall be investigated by Board or by any other Investigating Department. If the gravity of the misconduct under investigation is found serious and it is felt that it would not be in the interest of DPA to continue to deal with such Foreign Supplier, pending investigation, the recommendation on such matter by Investigating Department (including Board) may be sent to Chairman, DPA to place it before a Committee consisting of the following:

- 1. Head of Finance Department,
- 2. Head of Department
- 3. Head of Law / Legal Division

The committee shall expeditiously examine the report; give its comments / recommendations within twenty one days of receipt of the reference by DPA.

- iii) The comments / recommendations of the Committee shall then be placed before DPA Board's Committee. If DPA Board's Committee decides that it is a fit case for suspension, Board's Committee shall pass necessary orders which shall be communicated to the foreign supplier by Head of Department.

5.6 If the Agency concerned asks for detailed reasons of suspension, the Agency may be informed that its conduct is under investigation. It is not necessary to enter into correspondence or argument with the Agency at this stage.

5.7 It is not necessary to give any show-cause notice or personal hearing to the Agency before issuing the order of suspension. However, if investigations are not complete in six months' time, the Competent Authority with approval of Head of the Department may extend the period of suspension by another three months, during which period the investigation must be completed.

6. Grounds on which Banning of Business Dealings can be initiated

6.1 If the security consideration, including questions of loyalty of the Agency to the State, so warrants;

6.2 If the Director / Owner of the Agency, proprietor or partner of the firm, is convicted by a Court of Law for offences involving moral turpitude in relation to its business dealings with the Government or any other public sector enterprises or DPA, during the last five years preceding

date of tender opening or during execution of contract, provided such information is known to DPA;

- 6.3 If there is strong justification for believing that the Directors, Proprietors, Partners, owner of the Agency have been guilty of malpractices such as bribery, corruption, fraud, substitution of tenders, interpolations, etc. during the last five years preceding date of tender opening or during execution of contract, provided such information is known to DPA;
- 6.4 If the Agency continuously refuses to return / refund the dues of DPA without showing adequate reason and this is not due to any reasonable dispute which would attract proceedings in Arbitration or Court of Law;
- 6.5 If the Agency employs a public servant dismissed / removed or employs a person convicted for an offence involving corruption or abetment of such offence, provided such information is known to DPA;
- 6.6 If business dealings with the Agency have been banned by the Central or State Govt. or any other public sector enterprise at the time of submitting his bid or on the date of tender opening or at the time of placement of order, provided such information is known to DPA;
- 6.7 If the Agency has resorted to Corrupt, fraudulent practices including misrepresentation of facts and / or fudging / forging / tampering of documents; **Ω**
- 6.8 If the Agency uses intimidation / threatening / misbehaves with DPA Official or brings undue outside pressure or influence on the Board (DPA) or its official in acceptance / performances of the job under the contract;
- 6.9 If the Agency indulges in repeated and / or deliberate use of delay tactics in complying with contractual stipulations / delayed the tendering process;
- 6.10 Wilful indulgence by the Agency in supplying sub-standard material irrespective of whether pre-dispatch inspection was carried out by Board (DPA) or not;
- 6.11 Based on the findings of the investigation report of Investigating Department against the Agency for mala-fide / unlawful acts or improper conduct on its part in matters relating to the Board (DPA) or even otherwise;
- 6.12 Established litigant nature of the Agency to derive undue benefit;
- 6.13 Continued poor performance of the Agency in several contracts;
- 6.14 If the Agency misuses the premises or facilities of the Board (DPA), forcefully occupies tampers or damages the Board's properties including land, water resources, forests / trees, etc.
- 6.15 If the Agency resorts to unauthorized sale of materials purchased from the Board.
- 6.16 If the Agency has committed a transgression through violation of any of its commitments under the Integrity Pact entered with DPA.

(Note: *The examples given above are only illustrative and not exhaustive. The Competent Authority may decide to ban business dealings for any good and sufficient reason).*

Ω *No experience certificate shall be issued by Engineer in Charge / Executing Authority against the contract to the Agency found to have submitted forged / fabricated documents / indulged in corrupt / fraudulent practices.*

7. Banning of Business Dealings.

- 7.1 A decision to ban business dealings with any Agency by any one of the Departments of DPA will apply throughout the Board including Divisions, i.e., Board-wide banning.
- 7.2 There will be a Standing Banning Committee (SBC) in each Department to be appointed by Competent Authority for processing the cases of “Banning of Business Dealings”. However, for procurement of items / award of contracts, to meet the requirement of Board only, the Committee shall be HoD each from Operations, Finance & Law Departments. The proposal of the Concerned Department for initiating action under the Guidelines for Banning of Business Dealings based on their own findings and / or upon receipt of advice of the Investigating Department shall be forwarded through respective Head of Department to the Standing Banning Committee for consideration.
- 7.3 The functions of the Standing Banning Committee shall, inter-alia include:
- i) To examine in detail the allegations / irregularities / misconduct mentioned in the proposal for banning forwarded by the Department, hold preliminary meeting and decide if a prima-facie case for banning under the guidelines exists. If during preliminary meeting, SBC is of opinion that prima facie no case is made out, it shall return the case to the Concerned Department.
 - ii) If it is decided to proceed for banning action, to recommend for issue of show-cause notice (as per para 9) to the Agency by the Concerned Department, as to why action should not be taken against the Agency, including its interconnected agencies, under the Guidelines for Banning of Business Dealings with them. Agency should be asked to submit its reply within 15 days of the show-cause notice.
 - iii) To examine the reply given by the Agency to show-cause notice and call the Agency for personal hearing, if required.
 - iv) To submit final recommendation to the Concerned Department for banning of business dealings with the Agency or Board wide Hold on participation of the Agency in tenders or exoneration.
- 7.4 If banning is recommended by the Standing Banning Committee of any Department / Division, the proposal containing the facts of the case, proper justification of the action proposed, relevant supporting documents along with the recommendation of the SBC and proposed banning period should be sent by the Concerned Department and duly forwarded by the Head of the Department / Division, to the Competent Authority. Based on this proposal, a decision for banning or otherwise shall be taken by the Competent Authority. At this stage if it is felt by the Competent Authority that there is no sufficient ground for banning, then the case with detailed reasons shall be sent back to the respective Department / Division for necessary action at their end. The Competent Authority may consider and pass an appropriate Speaking Order:
- a) For exonerating the Agency if the charges / allegations are not established;

- b) For banning the business dealings with the Agency or
- c) For putting on Hold the participation of the Agency in tenders in the concerned Department / Division.

7.5 If the Competent Authority decides that it is a fit case for banning of business dealings with the Agency, the Competent Authority shall pass necessary orders which shall be routed back to the Department concerned for issuance of banning orders to the Agency. However, in cases where there is a shortage of suppliers and banning may hurt the overall interest of DPA, endeavour should be to pragmatically analyse the circumstances, try to reform the Supplier and to get a written commitment from them that their performance will improve.

7.6 If the Competent Authority decides to ban business dealings, the period for which the ban would be operative shall be mentioned. If applicable, the order may also mention that the ban would extend to the interconnected agencies of the Agency. The Speaking Order for banning would be conveyed by the Concerned Department to the Agency concerned and copy circulated to all Departments of DPA.

7.7 The Banning period may range from 1 year to 3 years depending on the gravity of the case as decided by the Competent Authority. Ordinarily, the period of banning shall be in the range of 1-2 years from the date of issuance of order depending on the severity of the irregularities / lapses committed / termination of contract due to poor performance, etc. However, in case of fraud / forgery / corrupt / fraudulent practice or tampering of documents by the Agency as given in para 6.7 above, the period of banning to be imposed on the Agency would be three years. The period of suspension, if any, shall be accounted for up to a maximum of 6 months in the period of banning provided the banning order is issued within the period of suspension.

7.8 As far as possible, the Agency under banning should be allowed to complete the job of existing contracts, unless the Competent Authority, having regard to the circumstances of the case, decides otherwise. Once the order for banning is issued, existing offers against ongoing tenders (prior to issuance of contract) / new offers of the Agency shall not be entertained during the period of banning. In addition, if the Agency has been banned under provisions of Para 6.7, then the particular contract in which the irregularity has been proved will be

terminated with immediate effect. In exceptional cases, where it would not be prudent to terminate the said contract with immediate effect, the contract may be allowed to continue for such minimum period during which alternate arrangement(s) can be made. The same shall however require the approval of the Chairman / HoD where the exigency to continue the contract has been clearly brought out.

7.9 In case the Competent Authority has decided to exonerate the Agency, the Concerned Department will issue the exoneration letter to the Agency concerned as well as communicate to all Departmental Heads within the Department / Division. If the Agency has been suspended in the case under consideration, in the same letter to the Agency it must be clarified that the Suspension has also been revoked.

7.10 Procedure for Banning of Business Dealings with Foreign Suppliers.

- i) Banning of the Agencies shall apply throughout the Company including Subsidiaries.
- ii) The complaint against any Foreign Supplier shall be investigated by Head of Department of DPA or any other Investigating Department. After investigation, depending upon the gravity of the misconduct, Investigating Department may send their report to Head of Department of DPA to place it before a Committee referred at 5.5 (ii) above. The Committee shall examine the report and give its comments / recommendations within 21 days of receipt of the reference by Head of Department, DPA.
- iii) The comments / recommendations of the Committee shall be placed by Head of Department before DPA Board's Committee constituted for the above purpose. If DPA Board's Committee decides that it is a fit case for initiating banning action, it will direct Chairman of DPA to issue show-cause notice to the Agency for replying within a period of 15 days of receipt of the show-cause notice or reasonable time.
- iv) On receipt of the reply or on expiry of the stipulated period, the case shall be submitted by DPA Board's Committee to Chairman of DPA for consideration & decision.
- v) The decision of the Chairman of DPA shall be communicated to the Agency by DPA.

8. Department / Division wide Hold on participation of the Agency in Tenders

- 8.1 If the SBC recommends for Board wide Hold on participation of the Agency in Tenders on coming to a conclusion that the charge against the Agency is minor in nature, the Concerned Department shall put up a proposal to the Competent Authority containing facts of the case, proper justification of action proposed, relevant documents along with the recommendations of the Committee and proposed period for Hold from participation in tenders. If the Competent Authority decides that it is a fit case for Board wide Hold on participation of the Agency in tenders, the Competent Authority may pass necessary orders

which shall be communicated to the Agency by the Concerned Department. The period of Hold may range from 6 months to 1 year.

- 8.2 The effect of Board wide Hold on participation of the Agency in tenders would be that the Agency would not be considered for any type of Tenders for such period as mentioned in the order at any stage before issuance of contract. Other existing contracts with the Agency would continue unless otherwise decided by the Competent Authority. However, no repeat orders would be placed on the party for the period as mentioned in the order.
- 8.3 The modalities for effecting Hold on participation of the Agency in tenders and re-entry after completion of period of Hold shall be worked out by the concerned Department / Division as the Hold is Department / Division specific.

9. Show-cause Notice

- 9.1 In case where the Competent Authority decides that action against an Agency is called for, a show-cause notice shall be issued to the Agency by the Concerned Department. Statement containing the imputation of misconduct should be appended to the show-cause notice and the Agency should be asked to submit within 15 days a written statement in its defence. It must be clearly mentioned in the Show-Cause Notice that DPA hereby proposes to initiate action against the Agency in terms of the Guidelines on Banning of Business Dealings. Generally, all communication with the Agency shall be through email mentioned by Agency in contract or last known email and postal address.
- 9.2 If the Agency requests for inspection of any relevant document in possession of DPA, necessary facility only for inspection of documents may be provided.

10. Appeal against the Decision of the Competent Authority

- 10.1 The Agency may file an appeal against the order of Board-wide banning of business dealings / suspension / Board wide Hold on participation of the Agency in tenders. The appeal shall lie to the respective Appellate Authority only. Such an appeal shall be preferred within 30 days of receipt of the order.
- 10.2 Appellate Authority would consider the appeal and pass appropriate Speaking Order which shall be communicated by the Concerned Department to the Agency as well as the Competent Authority whose Order has been appealed.

11. Circulation of the names of Agencies with whom Business Dealings have been banned

- 11.1 The Board shall upload/update the list of banned agencies along with the period of banning immediately on issue of the banning order on the Board's website as well as DPA Tenders website for wider circulation. Other Boards would check the list of banned Agencies before proceeding on tenders at their respective Boards. Boards having SAP/SRM system shall

disable the banned vendors in SAP/SRM from issuance of further Enquiry/Purchase Order till the expiry of the banning period.
- 11.2 Depending upon the gravity of misconduct established, the Competent Authority may advise Head of Vigilance Department / HoD for circulating the names of Agency with whom business dealings have been banned, to the Government Departments, other Boards, Public Sector Enterprises, etc., for such action as they deem appropriate. The updated list of banned Agencies must be uploaded by Board on DPA Tenders website for wider circulation.
- 11.3 If Government Departments or a Public Sector Enterprise request for more information about the Agency with whom business dealings have been banned, a copy of the report of Investigating Department / Standing Banning Committee / DPA Board's Committee together with a copy of the order of the Competent Authority / Appellate Authority may be provided.

- 11.4 If business dealings with any Agency have been banned by the Central or State Government or any other Public Sector Enterprise, DPA may, on receipt of such information, without any further enquiry or investigation, issue an order banning business dealings with the Agency and its interconnected Agencies. In event of receipt of information, the procedure for banning in DPA will still have to be followed though no investigation will be called for, and the banning period proposed should be co-terminus with the period of banning in the organization which has issued the banning order but limited to the maximum period of banning as per the extant banning guidelines of DPA. On completion of the banning period as per DPA banning order, the Agency will be eligible for participating in any tenders in DPA irrespective of banning status in the other organization.
- 11.5 Based on the above, Departments / Divisions may take necessary action for implementation of the Guidelines for Banning of Business Dealings and same be made a part of the tender documents.

12. Saving

Any amendment to the guidelines shall require the approval of Chairman, DPA.

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DEENDAYAL PORT AUTHORITY



**BILL OF QUANTITY
(SCHEDULE-B)**

Construction of Administrative office building at Kandla

Executive Engineer (P)

Project Division

2nd floor, Nirman Bhawan, Kandla -370210 Kutch

District Gujarat State India

Email: kptprojectdivision@gmail.com