

DEENDAYAL PORT AUTHORITY



MECHANICAL ENGINEERING DEPARTMENT

ELECTRICAL DIVISION

TENDER NO. EL/WK/2803

Design, Manufacturing, Supply, Installation, Erection, Testing and commissioning of 66/11 KV GIS Sub-Station and Shifting of 11 KV Power Transformer to New GIS Sub-Station at DPA.

Executive Engineer (E)
Electrical Division
Deendayal Port Authority,
Ground Floor,
Nirman Building,
New Kandla – 370 210.
Phone No. (02836) 220636/98252 27048
Fax No. (02836) 270184/270475
Email:-
deepak.hazra@deendayalport.gov.in/
xenedpa@gmail.com

CONTENTS OF TENDER DOCUMENT

Bid Reference No. EL/WK/2803

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TENDER NOTICE NO. EL/WK/2803

Name of work	Design, Manufacturing, Supply, Installation/Erection, Testing and commissioning of 66/11 KV GIS Sub-Station and Shifting of 11 KV Power Transformer to New GIS Sub-Station at DPA.																										
Estimated cost put to tender	Rs. 48,95,01,682.00																										
Tender fee :	<p>Rs. 5000 + 900 (GST) Present rate of GST is 18% Through on line transfer in PNB bank Account no. 2177002100004628 - Deendayal Port Authority - (IFSC code PUNB0217700). Scanned copy of RTGS no. and date of transfer may be uploaded on (n) procure website.</p> <p>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 tender 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 along with Bid Securing Declaration Form (Form-6 in Section-IV) in preliminary bid.</p> <table border="1"> <tr> <th>Level</th><th>Description</th></tr> <tr> <td>Section – F</td><td>CONSTRUCTION</td></tr> <tr> <td>Division – 42</td><td>CONSTRUCTION</td></tr> <tr> <td>Group – 422</td><td>Construction of utility projects</td></tr> <tr> <td>Class – 4220</td><td>Construction of utility projects</td></tr> <tr> <td>Sub Class – 42202</td><td>Construction/erection and maintenance of power, telecommunication and transmission lines</td></tr> <tr> <td>OR</td><td></td></tr> <tr> <th>Level</th><th>Description</th></tr> <tr> <td>Section – D</td><td>ELECTRICITY, GAS, STEAM AND AIRCONDITION SUPPLY</td></tr> <tr> <td>Division – 35</td><td>ELECTRICITY, GAS, STEAM AND AIRCONDITION SUPPLY</td></tr> <tr> <td>Group – 351</td><td>Electric power generation, transmission and distribution</td></tr> <tr> <td>Class – 3510</td><td>Electric power generation, transmission and distribution</td></tr> <tr> <td>Sub Class – 35107</td><td>Transmission of electric energy</td></tr> </table>	Level	Description	Section – F	CONSTRUCTION	Division – 42	CONSTRUCTION	Group – 422	Construction of utility projects	Class – 4220	Construction of utility projects	Sub Class – 42202	Construction/erection and maintenance of power, telecommunication and transmission lines	OR		Level	Description	Section – D	ELECTRICITY, GAS, STEAM AND AIRCONDITION SUPPLY	Division – 35	ELECTRICITY, GAS, STEAM AND AIRCONDITION SUPPLY	Group – 351	Electric power generation, transmission and distribution	Class – 3510	Electric power generation, transmission and distribution	Sub Class – 35107	Transmission of electric energy
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EMD	<p>₹ 48,95,016/- (Rupees Forty Eight Lakhs Ninety Five Thousand Sixteen Only)</p> <p>Through the form of Bank Guarantees (as per enclosed format given in Section-VIII) to be uploaded on—(n)procure website.</p> <p>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 tender 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 along with Bid Securing Declaration Form (Form-6 in Section-IV) in preliminary bid.</p> <table border="1"> <thead> <tr> <th>Level</th><th>Description</th></tr> </thead> <tbody> <tr> <td>Section – F</td><td>CONSTRUCTION</td></tr> <tr> <td>Division – 42</td><td>CONSTRUCTION</td></tr> <tr> <td>Group – 422</td><td>Construction of utility projects</td></tr> <tr> <td>Class – 4220</td><td>Construction of utility projects</td></tr> <tr> <td>Sub Class – 42202</td><td>Construction/erection and maintenance of power, telecommunication and transmission lines</td></tr> </tbody> </table> <p>OR</p> <table border="1"> <thead> <tr> <th>Level</th><th>Description</th></tr> </thead> <tbody> <tr> <td>Section – D</td><td>ELECTRICITY, GAS, STEAM AND AIRCONDITION SUPPLY</td></tr> <tr> <td>Division – 35</td><td>ELECTRICITY, GAS, STEAM AND AIRCONDITION SUPPLY</td></tr> <tr> <td>Group – 351</td><td>Electric power generation, transmission and distribution</td></tr> <tr> <td>Class – 3510</td><td>Electric power generation, transmission and distribution</td></tr> <tr> <td>Sub Class – 35107</td><td>Transmission of electric energy</td></tr> </tbody> </table>	Level	Description	Section – F	CONSTRUCTION	Division – 42	CONSTRUCTION	Group – 422	Construction of utility projects	Class – 4220	Construction of utility projects	Sub Class – 42202	Construction/erection and maintenance of power, telecommunication and transmission lines	Level	Description	Section – D	ELECTRICITY, GAS, STEAM AND AIRCONDITION SUPPLY	Division – 35	ELECTRICITY, GAS, STEAM AND AIRCONDITION SUPPLY	Group – 351	Electric power generation, transmission and distribution	Class – 3510	Electric power generation, transmission and distribution	Sub Class – 35107	Transmission of electric energy
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Last date of downloading	27/12/2024 up to 15:00																								
Last date and time of submission of E-tender	27/12/2024 up to 15:30 only On Website https://tender.nprocure.com																								
Pre-bid meeting	09/12/2024 @ 12:00 Hrs. in the Old Board Room, A. O. Building, Gandhidham																								
Date and time for opening of E- tender	27/12/2024 at 16:00 hrs.																								
Downloading websites	https:// tender.nprocure.com , http://www.deendayalport.gov.in as well as http://www.eprocure.gov.in .																								
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Executive Engineer (E)
Deendayal Port Authority

NOTICE INVITING ON LINE TENDER

Details about tender:

Department Name	Mechanical Engineering Department
Circle/ Division	Electrical Division, Port & Customs Building, Ground Floor, New Kandla, Kutch - 370210
Tender Notice No.	EL/WK/2803
Name of Project	Design, Manufacturing, Supply, Installation/Erection, Testing and commissioning of 66/11 KV GIS Sub-Station and Shifting of 11 KV Power Transformer to New GIS Sub-Station at DPA.
Name of Work	Design, Manufacturing, Supply, Installation/Erection, Testing and commissioning of 66/11KV GIS Sub-Station and Shifting of 11 KV Power Transformer to New GIS Sub-Station at DPA.
Estimated Contract Value (INR)	Rs. 48,95,01,682.00
Period of Completion (in Months)	15 months from the date of issue of work order.
Bidding Type	Open
Bid Call (Nos.)	One
Tender Currency Type	Single
Tender Currency Settings	Indian Rupee (INR)
Integrity Pact	<p>The “Procedure for signing Integrity Pact” is as follow:</p> <p>(1) The Employer / Authorized Person of Employer has signed the IP in the presence of a witness from their side, who has also affixed his/her signature thereof and then the same IP has been uploaded on n-procure portal;</p> <p>(2) The potential bidders shall download and print the IP Agreement 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>(3) 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 if any potential bidder is unable to upload the IP Agreement, then he / she shall submit the Hard Copy 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</p>

	treated as disqualified.
Pre-Qualifying Criteria:	<p>PRE-QUALIFICATION CRITERIA FOR ELIGIBLE BIDDERS:</p> <p>The Bidders shall fulfill the following pre-qualification criteria:</p> <p>a) Average Annual financial turnover during the last 3 years, ending 31st March of the previous financial year, should be at least Rs. 1468.50 Lakhs Certified by Chartered Accountant along with UDIN mentioned on it.</p> <p>b) 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>i) Three similar completed works each costing not less than the amount equal to least Rs. 1958.00 Lakhs.</p> <p style="text-align: center;">Or</p> <p>i) Two similar completed works each costing not less than the amount equal to least Rs. 2447.50 Lakhs.</p> <p style="text-align: center;">Or</p> <p>ii) One similar completed work costing not less than the amount equal to least Rs. 3916.01 Lakhs.</p> <p>c) Bidders who meet the minimum qualification criteria will be qualified only if their available bid capacity is more than the total bid value.</p> <p>The available bid capacity will be calculated as under:</p> <p>Assessed Available Bid capacity = $A \times N \times 2 - B$, Where,</p> <p>“N” = Number of years prescribed for completion of the subject contract.</p> <p>“A” = Maximum value of works executed in any one year during last seven years (at current price level).</p> <p>“B” = Value at current price level of existing commitments and on-going works to be completed in the next ‘N’ years.</p> <p>The Bidder shall furnish statements showing the value of existing commitments and on-going 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.</p>

Financial Year	2023-24	2022-23	2021-22	2020-21	2019-20	2018-19	2017-18
Index	151.4	152.5	139.4	123.4	121.8	119.8	114.9
Multiplying Factor	1.00	0.99	1.09	1.23	1.24	1.26	1.32

IMPORTANT:

(i) The value of annual turnover is not to be considered towards — A as mentioned in the formula.

(ii) The information may be provided as per the format given at Section X.

(d) In Case the similar work has been issued for any private body, the bidder will be required to produce the tax deducted at source (TDS) certificate indicating the income tax deducted by the client for that work, which will form the basis for assessing the value of completed work.

Note:

(i) The particular row in the TDS certificate (Form 16A or Form 26AS), which indicates the credit of the payment received from the client, **should be highlighted.**

(ii) Along with the TDS certificate, a declaration on the letter head of a Chartered Accountant should be submitted giving details such as the name of bidder, the name of the client for which the bidder has carried out the work, name of work, work order no. and date, gross amount of the payment, net amount received from the client, TDS amount. **The statement should be signed by the Chartered Accountant.**

(iii) In case any discrepancies between the TDS (Form 16A or Form 26AS) and the declaration given by the Chartered Accountant with regard to payment received from the client, it should be explained.

(e) The contractor shall have valid electrical contractor's license and electrical supervisor license for carrying out electrical work of nature involved in this tender obtained from the competent authority of their respective states without which the tender shall not be accepted. Contractor shall submit certificate and copy of the license in lieu of the same for consideration.

(f) Upload duly signed document given at Section-IX towards evidence of site visit. (The bidder who has not physically visited the site and not uploaded document given at Section-IX, will be declared technically disqualified. The date of physical visit of site should be the date invariably prior to date of opening of preliminary bid.

	<p>(g) Similar works means having experience in “Supply, Installation, Testing and Commissioning of 66 KV or above GIS system with associated Sub-Station (Electrical installations at GIS substation includes 66 KV or above Circuit Breaker bays and Bus Bars) at Port Sectors/Central Govt./State Govt./PSU/other reputed organizations within India.</p> <p>Note : The value of each completed work (submitted by the bidder under one or two or three similar work category) shall be considered excluding GST.</p>
Similar Work Definition	<p><u>Similar works means:</u></p> <p>Similar works means having experience in “Supply, Installation, Testing and Commissioning of 66 KV or above GIS system with associated Sub-Station (Electrical installations at GIS Sub-Station includes 66 KV or above Circuit Breaker Bays and Bus Bars) at Port Sectors/Central Govt./State Govt./PSU/ other reputed organizations within India.”</p>
Joint Venture	<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 number of work orders executed by members of JV shall be merged to evaluate experience. 2. The Lead partner should have executed at least one similar work costing Rs. 1958.00 Lakhs as per the Minimum Eligibility Criteria. 3. The similar works reckoned 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. <p>If the similar work is executed as sub-contractor, it is mandatory to upload the sub-contract permission letter obtained from the Govt./Public Sector officer in case work belongs to the Govt./Public Sector, or from the owner of the project in case work belongs to private organization. Also, the completion certificate/form 3A authenticated by concern Govt./Public Sector officer or owner of the project shall be uploaded along with TDS certificate deducted for that particular work issued by the competent authority shall be submitted along with bid submission.</p> <ol style="list-style-type: none"> 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. The Bid Security, required, shall be furnished by the lead member of the JV.
Rebate	Not applicable
Bid Document Fee:	<p>Rs. 5000 + 900 (GST)= 5900/- Present rate of GST is 18% (non- refundable)/- (Five Thousand Nine Hundred Only)</p> <p>Through online transfer in PNB bank accounts no. 2177002100004628 -</p>

	<p>Deendayal Port Authority - (IFSC code PUNB0217700). Scanned copy of RTGS no. and date of transfer may be uploaded on— (n) procure website.</p> <p>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 tender 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 along with Bid Securing Declaration Form (Form-6 in Section-IV) in preliminary bid.</p>												
Bid Document Fee Payable To:	<p>Through on-line transfer in PNB bank account no. 2177002100004628 - Deendayal Port Authority - (IFSC code PUNB0217700), Kandla branch. Scanned copy of RTGS no. and date of transfer may be uploaded on (n) procure website. 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 tender 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 along with Bid Securing Declaration Form-6 failing which the bid shall be considered non-responsive in preliminary bid.</p>												
Bid Security/ EMD (INR) :	<p>₹ 48,95,016/- (Rupees Forty Eight Lakhs Ninety Five Thousand Sixteen only)</p> <p>Through the form of Bank Guarantees (as per enclosed format given in Section VIII) to be uploaded on— (n) procure website.</p> <p>In case of Micro and Small Enterprise (MSEs) holding valid certificate issued</p> <table border="1"> <thead> <tr> <th>Level</th><th>Description</th></tr> </thead> <tbody> <tr> <td>Section – F</td><td>CONSTRUCTION</td></tr> <tr> <td>Division – 42</td><td>CIVIL ENGINEERING</td></tr> <tr> <td>Group – 422</td><td>Construction of utility projects</td></tr> <tr> <td>Class – 4220</td><td>Construction of utility projects</td></tr> <tr> <td>Sub Class – 42202</td><td>Construction/erection and maintenance of power, telecommunication and transmission lines</td></tr> </tbody> </table> <p>by any agencies/organization under The Ministry of Micro, Small and Medium Enterprises indicating the list of activity related to the subject tender 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 along with Bid Securing Declaration Form (Form - 6 in Section - IV) in preliminary bid.</p>	Level	Description	Section – F	CONSTRUCTION	Division – 42	CIVIL ENGINEERING	Group – 422	Construction of utility projects	Class – 4220	Construction of utility projects	Sub Class – 42202	Construction/erection and maintenance of power, telecommunication and transmission lines
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OR

Level	Description
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Division – 35	ELECTRICITY, GAS, STEAM AND AIRCONDITION SUPPLY
Group - 351	Electric power generation, transmission and distribution
Class – 3510	Electric power generation, transmission and distribution
Sub Class - 35107	Transmission of electric energy

Bid Security/ EMD (INR) In Favor Of :

Through the form of Bank Guarantees (as per the enclosed format in the **Section - VIII**) to be uploaded on — (n) procure website. 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 tender 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 **along with Bid Securing Declaration Form (Form-6 in Section-IV)** in preliminary bid.

Level	Description
Section – F	CONSTRUCTION
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	Group – 351	Electric power generation, transmission and distribution	
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	Sub Class - 35107	Transmission of electric energy	
Bid Document Downloading Start Date	26/11/2024		
Bid Document Downloading End Date	27/12/2024 up to 15:00 Hrs.		
Date & Place of Pre Bid Meeting	09/12/2024@ 15:00 Hrs. at A.O. Building, Gandhidham		
Last Date & Time for Receipt of Bids	27/12/2024@ 15:30 Hrs.		
Bid Validity Period	120 Days		
Condition	<p>(1) Tender Fee : Rs. 5000 + 900 (GST)= 5900/- Present rate of GST is 18% (non- refundable)/-(Five Thousand Nine Hundred Only)</p> <p>Through on line transfer in PNB bank account no. 2177002100004628 - Deendayal Port Authority - (IFSC code PUNB0217700). Scanned copy of RTGS no. and date of transfer may be uploaded on—(n)procure website.</p> <p>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 tender 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 along with Bid Securing Declaration Form (Form-6 in Section-IV) in preliminary bid.</p> <p>(2) EMD: ₹ 48,95,016/- (Rupees Forty Eight Lakhs Ninety Five Thousand Sixteen Only)</p> <p>Through the form of Bank Guarantees (as per enclosed format given in Section VIII) to be uploaded on— (n) procure website.</p> <p>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 tender as per National Industrial Classification-2008 mentioned in the table</p>		

	<p>below only shall become eligible for exemption from payment of Tender fee/EMD. Such bidder shall upload the scanned copy of valid certificate along with Bid Securing Declaration Form (Form-6 in Section-IV) in preliminary.</p> <p>3) Integrity Pact agreement duly signed by the bidder and their witness in the format attached in Section-XI and as per the clause no. 10 given in Special Condition of contract. IP is required to be submitted in preliminary bid, failing which, the Technical bid will be considered as non-responsive.</p> <p>Accordingly, offer of those bidders shall only be opened whose EMD, Tender Fee and Integrity pact and along with Bid Securing Declaration (if MSE) Form (Form-6 in Section-IV) are received electronically.</p> <p>However, for the purpose of realization, bidder shall send the same in original to Executive Engineer (E) at the time of tender opening or send the same by hand/courier/RPAD/Speed post so as to reach the Executive Engineer (E), Electrical Division, Nirman Building, Ground Floor, New Kandla - (Kutch) - 370210 within 07 days from the last date of opening without fail, without which the bid shall be treated as non-responsive.</p>
Remarks	The hard copies should reach to the Electrical Division within 07 days from the date of opening of preliminary bid.
Bid Opening Date	Technical Bid will be opened on 27/12/2024 @ 14:30 Hrs. Date of opening of price bid shall be notified after scrutiny and evaluation of Technical Bid.
Documents required to be submitted by scanning through online	<ul style="list-style-type: none"> a. Documents in support of fulfilling Qualifying Criteria as indicated above. b. EMD -As indicated above. c. Tender fee - As indicated above. d. Integrity pact (duly signed by bidder and witness) e. Documents Mentioned in Eligibility Criteria. f. Bid Security Declaration form (In case of MSE).
Officer- Inviting Bids:	Executive Engineer (E), Electrical Division, Nirman Building, Ground Floor, New Kandla-(Kutch)-370210
Bid Opening Authority :	Executive Engineer (E)
Address:	Executive Engineer (E), Electrical Division, Nirman Building, Ground Floor, New Kandla-(Kutch)-370210
Contact Details :	<p>Executive Engineer (E), Electrical Division, Nirman Building, Ground Floor, New Kandla (Kutch)-370210 Phone: 02836-270209, 270342.</p> <p>Fax No. 02836 270184.</p>

Corrigendum, if any, will be placed on websites only.
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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 Info tower, S.G. Road, Bodakdev, Ahmadabad – 380054 (Gujarat)

Contact Details:

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

BSNL: +91-79-26854511, 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)

Section-I
Instruction to Bidder

A. General

1. Scope of Bid

1.1 The Executive Engineer (Electrical) Deendayal Port Authority invites bids by E-Tendering from the interested eligible bidder for the work as mentioned in the notice inviting online tender. All bids shall be completed and submitted on-line in accordance with instruction to the bidders.

1.2 The successful bidder will be expected to complete the works by the intended completion period.

2. Source of funds

2.1 The employer has arranged the funds from the internal resources and will have sufficient funds in India Currency for execution of the work.

3. Eligible Bidders

Only eligible bidders fulfilling all the requirements as mentioned in the Notice Inviting Online Tender may participate in the subject Tender. Successful completion of "Similar Works" only shall be considered for evaluation of eligibility criteria.

3.1 The invitation for Bids is open to all eligible bidders meeting the eligibility criteria as defined in clause regarding Eligibility Criteria.

3.2 All bidders shall fill the forms provided in Section – IV- Part – I "To be submitted by Bidders with their Bids".

3.3 Government-owned enterprises may participate if they are legally and financially autonomous, operate under commercial law and are not a dependent agency of the employer subject to fulfillment of Minimum Qualifying criteria.

3.4 Bidders shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by the employer.

4. Eligibility Criteria:

4.1 The Bidders shall fulfil the following pre-qualification criteria :-

Sr. No	Particulars	Supporting Documents
(A)	Average Annual financial turnover during the last 3 years, ending 31 st March of the previous financial year, should be at least ₹ 1468.50 Lakhs Certified by Chartered Accountant.	Certificate should be issued by the Chartered Accountant along with UDIN mentioned on it.

(B)	<p>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>(i) Three similar completed works each costing not less than the amount equal to ₹ 1958.00 Lakhs.</p> <p style="text-align: center;">Or</p> <p>(ii) Two similar completed works each costing not less than the amount equal to ₹ 2447.50 Lakhs.</p> <p style="text-align: center;">Or</p> <p>(iii) One similar completed work costing not less than the amount equal to ₹ 3916.01 Lakhs.</p> <p>Note: The cost of one/two/three similar work shall be excluding of GST.</p>	<p>(a) A copy of the completion certificate in respect of the successfully completed similar work.</p> <p>(b) A copy of detail work order should also be submitted for which the bidder is submitting the completion certificate.</p> <p>Such completion certificate should be issued on the letter head of the client and invariably reflect the following details:-</p> <ol style="list-style-type: none"> 1) Name of Contractor 2) Name of Work 3) No. of work order/agreement and date 4) Contract value 5) Contract period 6) Date of commencement of work 7) Date of completion 8) Value of Work executed during the contract period/original contract period 9) Date of issue of completion certificate. <p>c). In Case the similar work has been issued for any private body, the bidder will be required to produce the tax deducted at source (TDS) certificate indicating the income tax deducted by the client for that work, which will form the basis for assessing the value of completed work. Along with the TDS certificate, a statement should be submitted giving details showing the name of the client, gross amount of the work, TDS amount and net payment received. The statement should be signed by the Chartered Accountant.</p>
(C)	<p>Bidders who meet the minimum qualification criteria will be qualified only if their available bid capacity is more than the total bid value.</p> <p>The available bid capacity will be calculated as under: Assessed Available</p>	

Bid capacity = $A \times N \times 2 - B$, Where,

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

“A” = Maximum value of works executed in any one year during last seven years (at current price level).

“B” = Value at current price level of existing commitments and on-going works to be completed in the next ‘N’ years.

The Bidder shall furnish statements showing the value of existing commitments and on-going 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.

Financial Year	2023-24	2022-23	2021-22	2020-21	2019-20	2018-19	2017-18
Index	151.4	152.5	139.4	123.4	121.8	119.8	114.9
Multiplying Factor	1.00	0.99	1.09	1.23	1.24	1.26	1.32

IMPORTANT:

(i) The value of annual turnover is not to be considered towards —A as mentioned in the formula.

(ii) The information may be provided as per the format given at Section-X.

(iii) The value of each completed work shall be excluding the GST.

(D)

In Case the similar work has been issued for any private body, the bidder will be required to produce the tax deducted at source (TDS) certificate indicating the income tax deducted by the client for that work, which will form the basis for assessing the value of completed work.

Note:

(i) The particular row in the TDS certificate (Form-16A or Form-26AS), which indicates the credit of the payment received from the client, **should be highlighted.**

(ii) Along with the TDS certificate, a declaration on the letter head of a Chartered Accountant should be submitted giving details such as the name of bidder, the name of the client for which the bidder has carried out the work, name of work, work order no. and date, gross amount of the payment, net amount received from the client, TDS amount. **The statement should be signed by the Chartered Accountant.**

(iii) In case any discrepancies between the TDS (Form-16A or Form-26AS) and the declaration given by the Chartered Accountant with regard to payment received from the client, it should be explained.

(E)

The contractor shall have valid electrical contractor’s license and electrical supervisor license for carrying out electrical work of nature involved in this tender obtained from the competent authority of their respective states without which the tender

	shall not be accepted. Contractor shall submit certificate and copy of the license in lieu of the same for consideration.	
(F)	Upload duly signed document given at Section-IX towards evidence of site visit. (The bidder who has not physically visited the site and not uploaded document given at Section-IX, will be declared technically disqualified. The date of physical visit of site should be the date invariably prior to date of opening of preliminary bid.	
(G)	Similar works means	Similar works means having experience in "Supply, Installation, Testing and Commissioning of 66 KV or above GIS system with associated Sub-Station (Electrical installations at GIS substation includes 66 KV or above Circuit Breaker bays and Bus Bars) at Port Sectors/Central Govt./State Govt. /PSU/other reputed organizations within India.

4.2 All bidders shall scan and forward the following information and documents with their bids.

- 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 similar works performed for each of the last seven years ending last day of month previous the one in which applications are invited
- c. Experience in works of a similar nature and size for each of the last seven years, and details of works underway or contractually committed, and Employers who may be contacted for further information on those contracts.
- d. Reports on the financial standing of the Bidder, such as profit and loss statements and auditor's reports for the past three years ending 31st March of the previous financial year.
- e. Duly filled Forms mentioned in Section – IV- Part – I.
- f. PAN, Registration with GST & Provident Fund Authorities.
- g. Valid Electrical Contractor License issued by respective State / Central Govt. (without uploading of Valid Electrical Contractor License, the bid will be considered as irresponsive)
- h. EMD in form of Bank Guarantees (as per enclosed format given in Section-VIII)
- i. Tender fee in form of Digital Transfer only.
- j. Information regarding any litigation, current or during the last five years, in which the Bidder is involved, the parties concerned, and disputed amount.
- k. A certificate by the bidder that they have not been banned / black listed by any govt. Agency.

- l. Power of attorney (dully accompanied by resolution of Board in case of company).
- m. Qualifications and experience of key site management and technical personnel proposed for the contract.
- n. The proposed methodology and program of work, 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.
- o. The completion certification should invariably mention the reference no. of work order, the date of completion and contract value.
- p. The copy of the work order shall also be submitted for which the bidder is submitting completion certificate.
- q. In case the similar work has been executed for any private body, the bidder will produce the tax deducted at source (TDS) certificate indicating the income tax deducted by the client for that work, which will form the basis for assessing the value of completed work.
- r. Bidders should give an undertaking that the documents submitted by them in support of their credentials are genuine and DPA is at liberty to take any action against the bidder if the said documents are found to be non-genuine.
- s. Bidders should give an undertaking that they will comply to the specifications of the work including terms and conditions in total without any deviation.
- t. Duly signed Integrity pact agreement by the bidder and witness (also to be arranged by bidder) to be submitted in preliminary bid.

u. Bid Securing Declaration Form for MSE's (Form-6 in Section-IV)

4.3 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, non – completion of the contract.

5. One Bid per Bidder

5.1 Each bidder shall submit only one bid. A bidder who submits more than one Bid will be disqualified. The bidder can be disqualified from bidding for any contract with DPA for a period of three years from the date of notification.

6. Joint Venture (Allowed)

In case of association in the form of consortium or joint venture agreement, the members of the

association shall nominate one of the members as “lead partner” for participating in the tender and signing all the documents related therewith up to signing of agreement and execution of all the contractual obligations there after (in case of award of contract). All the partners of the association must also, jointly and severally, be responsible for satisfactory execution and performance of the contract. The firms with at least 26 % equity holding each are allowed to jointly meet the legibility criteria.

7. Cost of Bidding

7.1 The Bidder shall bear all costs associated with the preparation and submission of its Bid and employer will in no case be responsible and liable for those costs regardless of the conduct or outcome of the bidding process.

8. Site Visit

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

B. Bidding Documents

9. Content of Bidding Documents

9.1 The set of bidding documents comprises the documents listed in the below and addenda issued in accordance with clause-19:

Invitation for Bids (NIT)

Bid Reference No. EL/WK/2803

- | | | | |
|---|--------------|---|---|
| • | NIT | : | Invitation for Bids |
| • | Section-I | : | Instruction to Bidders |
| • | Section-II | : | General Conditions of Contract |
| • | Section-III | : | Special Conditions of Contract |
| • | Section-IV | : | Forms of Bid |
| • | Section-V | : | Approved Make List for Electrical Items |
| • | Section-VI | : | Scope of work & Technical specification |
| • | Section-VII | : | Bill of Quantities |
| • | Section-VIII | : | Bank guarantee format for EMD |
| • | Section-IX | : | Evidence towards site visit |
| • | Section-X | : | Information of bid capacity |
-

• **Section-XI** : **Integrity Pact**

9.2 The bidding documents shall be downloaded. The documents should be completely filled and submitted through on line E – Tendering process.

9.3 The bidder is expected to examine carefully all instructions, conditions of contract, forms, terms, technical specifications, bill of quantities, in the bid document. Failure to comply with the requirements of the bid document shall be at the bidder's own risk. Bids which are not substantially responsive to the requirements of the tender documents shall be rejected.

10. Clarifications of the Bidding Documents

10.1 A prospective bidder requiring any clarification of the bidding documents may notify the employer in writing. The employer may respond to any request for clarification which are received within seven days prior to date of pre-bid meeting. The clarifications shall be uploaded on Website <https://tender.nprocure.com>, www.deendayalport.gov.in, and www.eprocure.gov.in.

10.2 Pre-Bid meeting

10.2.1 The bidder or his official representative may attend pre-bid meeting to be held on **09/12/2024 @ 15:00 hrs.** at Old Board Room, A.O Building, Gandhidham. The bidders/representative of bidders who wish to attend the Pre-Bid meeting shall furnish the authority letter on the letter head of Bidder, for attending the Pre-Bid Meeting on behalf of bidder at the time of Pre-Bid Meeting.

10.2.2 The purpose of the meeting will be to clarify issues related to work and tender conditions.

10.2.3 Pre Bid clarifications will be uploaded in <https://tender.nprocure.com>, www.deendayalport.gov.in or www.eprocure.gov.in website without disclosing source of enquiry.

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

10.2.5 At any time prior to the deadline for submission of Bids, employer may, for any reason, whether at its own initiative or in response to a clarification sought by any prospective bidder, modify the bidding documents by amendment / addendum.

10.2.6 Those bidders who download the tender document from the website shall be solely responsible to check the web site for the amendment issued in shape of Corrigendum and/or Addendum.

11. Language of Bid

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

12. Documents comprising the Bid

The bid submitted by the bidder shall comprise the following:

A) Technical Bid:

i) Bid Security i.e. EMD and Tender Fees and Integrity Pact (Preliminary Bid) and along with Bid Securing Declaration Form for MSE's (Form-6 in Section-IV)

ii) Qualification information in accordance to clause of **Eligibility Criteria** shall be submitted.

B) Financial Bid :

(i) Bill of Quantities duly filled and digitally signed by bidder.

13. Bid Prices (This clause is modified and shall be read under Clause No. 2 of Special Condition of Contract)

13.1 The rates and prices quoted by the bidder shall be fixed for the duration of the contract and shall not be subject to adjustment on any account.

13.2 The prices shall be quoted inclusive of all Taxes, Duties, and other incidentals charges like

13.3 Transportation, Loading, Unloading, Boarding & Lodging etc. except GST and shall remain firm till completion of work. All other duties, taxes, cesses applicable if any, shall be borne by the contractor

14. Currencies of Bid and Payment

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

15. Bid Validity

15.1 Bids shall remain valid for a period of 120 days from the date of opening of the Technical 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 the bidders to extend the period of validity for additional period. The request and the bidders' responses shall be made in writing.

15.3 A bidder agreeing to the request will not be permitted to modify his bid.

16. Bid Security

16.1 Earnest Money Deposit (EMD)

The tender shall be accompanied by Earnest Money Deposit of ₹ **48,95,016/-** (Rupees Forty-Eight Lakhs Ninety Five thousand Sixteen only)

The tender not accompanied with EMD shall not be considered & their technical and price bid will be returned un-opened. EMD submit through Bank Guarantees (as per enclosed format given in Section - IV) may be uploaded on — (n) procure website.

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 tender 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 **along with Bid Securing Declaration Form (Form-6 in Section-IV)** in preliminary bid in order to become eligible for exemption from payment of EMD. It may be noted that exemption certificate issued by any other authority will not be entertained.

Level	Description
Section – F	CONSTRUCTION
Division – 42	CIVIL ENGINEERING
Group – 422	Construction of utility projects
Class – 4220	Construction of utility projects
Sub Class - 42202	Construction/erection and maintenance of power, telecommunication and transmission lines

OR

Level	Description
Section – D	ELECTRICITY, GAS, STEAM AND AIRCONDITION SUPPLY
Division – 35	ELECTRICITY, GAS, STEAM AND AIRCONDITION SUPPLY
Group – 351	Electric power generation, transmission and distribution
Class – 3510	Electric power generation, transmission and distribution
Sub Class – 35107	Transmission of electric energy

(a) EMD

- (i) The EMD of successful Bidder will be refunded on submission of performance guarantee (in Form 9 of Section - IV) as per the tender clause and executing the agreement (in Form 8 of Section - IV) as per tender clause. The EMD of unsuccessful bidders other than L1 & L2 be refunded immediately after ranking of Bids. Earnest Money of L2 bidder shall be refunded immediately after entering into agreement with L1 and acceptance of Performance Guarantee from L1.
- (ii) EMD will be refunded Suo-motto without any application from the Bidders.
- (iii) The EMD of successful bidder will be discharged (refunded) after he has signed the Agreement and furnished the required Performance Guarantee.
- (iv) Earnest Money Deposit will not carry any interest.

(b) Bid Security i.e. EMD will be forfeited if: Necessary action shall be taken to disqualify the bidder from bidding process of any contract with DPA for a period of 03 years, if:

- (i) The bidder withdraws the Bid after Bid opening during the bid validity;
- (ii) The bidder does not accept the correction of the Bid-Price, pursuant to any arithmetic errors;
- (iii) The successful Bidder fails within the specified time limit to
 - a) sign the Agreement or
 - b) furnish the required performance Guarantee
- (iv) The bidder submits more than one bid

17. Alternative Proposals by Bidders

17.1 Conditional offer or Alternative offers will not be considered 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.

19. Amendment of Bidding Documents

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

19.2 Any addendum thus issued shall be part of the bidding documents and shall be communicated in writing or by cable to all the purchasers of the bidding documents. Prospective bidders shall acknowledge the receipt of each addendum by cable to the Employer.

19.3 To give prospective bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer shall extend as necessary the deadline for submission of bids.

D. Submission of Bids.

20. Submission of Bids

Bidders who wish to participate in the tender will have to procure/should have legally valid Digital Certificate, as per Information Technology Act-2000, using which they can sign their electronic bids. The bidders can procure the Digital Certificate from (n) code solutions a division of GNFC Ltd, who are licensed certifying authority by Government of India. All bids should be digitally signed. For details regarding Digital signature certificate and related matters, the bidder may contact the following address:

(n)-code Solutions, A Division of GNFC, 301 GNFC Info tower,
Bodakdev, Ahmedabad. Tel.

91 79 26857316/17/18

Fax: 91 79 26857321

Mobile: 9327084190 / 9898589652.

E-mail: nprocure@gnvfc.net.

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 along with tender documents (except Price Bid), signed on bottom of each page in token of acceptance of Tender Conditions** and shall have to be forwarded subsequently so as to reach the office of Executive Engineer (Electrical) on same day & time of opening of the tenders.

20.1 The envelopes shall be addressed to:
(a) Executive Engineer (E)
Deendayal Port Authority,
Electrical Division, Ground Floor,
Nirman Building,
New Kandla – 370210
Gujarat-State
Mob. No. 9825227048

(b) Bear the following identification:

Accompaniments for “Design, Manufacturing, Supply, Installation/Erection, Testing and commissioning of 66/11 KV GIS system in Sub-Station and Shifting of 11 KV Power Transformer to New GIS Sub-Station at DPA”

Bid reference No. EL/WK/2803

Name and address of the bidder.

21. Deadline of Submission of the Bids

21.1 Bids must be received by the employer in On-Line System at websites <https://tender.nprocure.com> not later than **15:00 Hrs. on 27/12/2024**.

21.2 At the time of submission of the tender document, the Bidder shall give an undertaking that no changes have been made in document. The uploaded version of the Port Tender Document at [https:// tender.nprocure.com](https://tender.nprocure.com) websites will be treated as authentic tender and if any discrepancy is noticed at any stage between the Port’s tender document and the one submitted by the Bidder, the conditions mentioned in the Port’s uploaded document on [https:// tender.nprocure.com](https://tender.nprocure.com) websites shall prevail.

21.3 The employer may extend the deadline for submission of bids by issuing an amendment on DPA website as well as on [https:// tender.nprocure.com](https://tender.nprocure.com) 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.

21.4 In case of tender documents being downloaded from the web site, at the time of submission of (the hard copy of) the tender document, the tenderer shall give an undertaking that no change have been made in document. Any discrepancy is noticed at any stage between the port’s tender document uploaded on [https:// tender.nprocure.com](https://tender.nprocure.com) and the one submitted by the tenderer, the conditions mentioned in the port’s tender document uploaded on [https:// tender.nprocure.com](https://tender.nprocure.com) shall prevail. Besides, the tenderer shall be liable for legal action for the lapses.

22. Late Bids

22.1 After the deadline of submission of bid, the bids cannot be submitted in the On-Line System.

23. Modification and Withdrawal of Bids

- 23.1 Bidders may modify or withdraw their bids before the deadline of submission of bid or extension if any.
- 23.2 No Bid can be modified after the last date for submission of Bids.
- 23.3 Withdrawal or modification of a Bid between the deadline for submission of bids and the expiration of the original period of bid validity including extension, if any, the bidder can be disqualified from bidding for any contract with DPA for a period of three years from the date of notification.

E. Bid Opening and Evaluation

24. Bid Opening

- 24.1 On the due date and time, the employer will first open Technical bids of all bids received including modifications.
 - 24.2 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 on the next working day at the same time.
 - 24.3 If any Bid contains any deviation from the Bid documents and / or if the same does not contain Bid security i.e., EMD and tender fees in the manner prescribed in the Bid documents, then that Bid will be rejected and the Bidder will be informed accordingly.
- 24.4 The bids which are technically qualified, their financial bids will be opened. The date of opening of financial bid will be declared in the <https://tender.nprocure.com> and www.deendayalport.gov.in as well as www.eprocure.gov.in.
- 24.5 The price bid i.e. BOQ will be opened only those bids qualify technically.

25. Clarification of Bids

- 25.1 To assist in the examination and comparison of Bids, the employer may, at his discretion, ask any Bidder for clarification of his Bid, including breakup of unit rates. The request for clarification and the response shall be in writing, but no change in the price or substance of the Bid shall be sought, offered, or permitted.
- 25.2 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.
- 25.3 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.

26. Examination of Bids and Determination of Responsiveness

26.1 Prior to detailed evaluation of Bids, the employer will determine whether each Bid

- (a) Has been properly digitally signed,
- (b) Meets the eligibility criteria defined
- (c) Is accompanied by the required Bid security and tender fees;
- (d) Is responsive to the requirements of the Bidding documents.
- (e) GST to be quoted invariable by bidder.

26.2 A substantially responsive Technical and Financial Bid is one which conforms to all the terms, conditions and specification of the Bidding documents.

26.3 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. Evaluation and Comparison of Bids

27.1 The employer will evaluate and compare only the Bids determined to be responsive.

27.2 In evaluating the Bids, the employer will determine for each Bid the evaluated Bid price without adjusting discounts (as the discount is not applicable).

27.3 If in the opinion of Engineer-In-Charge, the rate quoted by successful bidder is abnormally high/low compared to the estimated cost of the work, the employer may ask the bidder to produce detailed price analysis for all items of the bill of quantities.

F. Award of Contract

28. Award Criteria

The employer will award the work to the bidder whose bid has been evaluated to be technically – commercially responsive and the lowest evaluated bid subject to submission of agreement and performance security.

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

However, prospective bidder(S) may raise query relating to bidding conditions, bidding process and/or rejection of its bids. The reasons for rejecting a tender or non-issuing tender to a prospective bidder will be disclosed where written enquiries are made by concerned bidder.

30. Letter of Award:

The Chief Mechanical Engineer will issue the Letter of Award (Form No. 7) intimating the successful bidder about the proposed pre-acceptance of tender.

31. Notification of Award and Signing of Agreement

- i) The Bidder whose Bid has been accepted will be notified for the award by the employer prior to expiration of the Bid validity period by confirmation in writing. In this letter (hereinafter and in the Conditions of Contract called the "Letter of Award") the contract
-

amount, completion period of the work, etc. will be mentioned in line with the tender conditions.

- ii) 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 tender condition.
- iii) The Agreement will be submitted by successful Bidder within 14 days (National Bid) 28 days (Global Bid) of issue of the notification of award (Letter of Award). The agreement will incorporate all correspondence between the employer and the successful bidder.

32. Contract Agreement:

32.1 The agreement on stamp paper shall be furnished by the Contractor as per the following guidelines within 14 days (National Bid) /28 days (Global Bid) from the date of issue of Letter of Award.

- i) The successful Bidder will be required to execute an agreement at his expense on three Hundred Rupees (Rs.300/-) Non-Judicial Stamp Paper in the proper departmental format (Form 9) for the due and proper fulfillment of the contract within 14 days (national Bid) 28days (Global bid) from the date of Letter of Award.

32.2 Pending preparation and execution of the contract agreement as above, the tender submitted by the Contractor together with Chief Mechanical Engineer's letter/fax accepting the tender shall constitute a binding contract between the Board and the Contractor.

32.3. The contract period shall be reckoned from the date of issue of work order to commence the work.

- i) The original agreement as per the format attached with the tender should be executed on a stamp paper of appropriate value (at present Rs.300/-)
- ii) The Agreement should be submitted in duplicate and the date of execution is to be kept blank.
- iii) Each page of the document is to be signed by the Contractor/ his authorized representative by indicating his full name.
- iv) If the Contractor is a partnership firm, then a copy of the Partnership Deed and in case it is a Company, a copy of Memorandum and Articles of Association along with Registration Certificate is to be submitted.
- v) If the agreement is signed by a Partner/ a Director/ an authorized person of the firm, in such case, a certified true copy of the power of attorney/ letter of authority given by the firm/ company to the signatory of the Contractor firm is to be submitted.
- vi) The entire agreement should be in type written form/ computer printed form.
- vii) Leaving blanks and insertion of some contents of the agreement with hand writing should be avoided.
- viii) All corrections/ additions made in the agreement are to be initialed.

33. Performance Security

Security deposit shall consist of two parts; a) Performance Guarantee to be submitted after issue

of LOI, and b) Retention money to be recovered from Running Bills.

- 1) Performance Guarantee shall be 10% of the contract price, of which 5% of contract price should be submitted as Performance Guarantee in form of BG/FDR/Digital Transfer within 21 days, on receipt of Letter of Award and balance 5% to be recovered as Retention Money from Running Bills. Recovery of 5% Retention Money to commence from the First RA Bill onwards @ 5% of the Bill Value from each Bill. Retention Money will be refunded within 14 days from the date of payment of final bill. Balance SD will be refunded immediately not later than 14 days from completion of defect liability period.
- 2) Successful Bidder has to submit the Performance security @ 5% of Contract price within 21 days of receipt of Letter of Award, failing which the work will not be awarded and the Bid Security i.e., EMD will be forfeited.
- 3) The Deendayal Port Authority will also be at liberty to deduct from performance guarantee or from any sums of money due or that may become due under any contract with the contractor that may become due to the employer. This is without prejudice to the rights of the employer under the terms of the contract. The Bank Guarantee is required to be dispatched by the issuing bank directly to The Employer by Registered AD Post.
- 4) The bank guarantee towards performance guarantee cum security deposit will be accepted in the form of BG/FDR/Digital Transfer from any nationalized bank/scheduled bank (Except co-operative bank) having its branch at Gandhidham.

(4.1) It is the responsibility of the concerned department to ensure that the BG should remain valid for a period of 60 (sixty) days beyond the date of completion of all contractual obligations of the concerned contractor, including Defect Liability Period.
- 5) The Deendayal Port Authority may at their option forfeit the Performance Guarantee cum Security Deposit if the contractor fails to carry out the work or perform or observe the conditions of contract.
- 6) The Performance Guarantee cum Security Deposit will be released after successful completion of guarantee period. **(Modified and can be read under the clause no. 53 of SCC, Civil Part)**
- 7) The documentary evidence (copy of paid challan in government 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.F

34. Issue of Work Order

(This clause is superseded by Clause No. 1 under Special Conditions, Section-III)

Work order will be issued indicating the Contract value, completion period etc. after submission of Performance Security Deposit and Contract Agreement on Non-Judicial Stamp Paper by the successful bidder as per Tender Conditions.

35. Time Schedule

The Contract shall be effective from the date of issue of Work Order and the work shall be completed within fifteen **(15) months** from the date of issue of Work Order. The contract period is extendable to a period of up to two months on the same rate, terms and condition on mutual consent.

36. Corrupt or Fraudulent Practices

36.1 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 the following for the purpose of these provisions :
 - (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 the 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.

**Signature & Seal
of Contractor**

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

Section – II

General Conditions of Contract

General Conditions

1. Definitions

In the Contract (as hereinafter defined), the definition of the following words and expressions shall have the meanings hereby assigned to them except where the context otherwise requires:

- a. **“Employer”** means “Board of Deendayal Port Authority, a body incorporated under Major Port Authority Act, 2021”
 - b. **“Chief Mechanical Engineer”** shall mean the Chief Mechanical Engineer of Deendayal Port Authority.
 - c. **“Work” or “Works”** shall mean the whole of the plant and materials to be provided and work to be done executed or carried out by the contractor under the contract.
 - d. The **“Site”** shall mean the whole of the premises, buildings and grounds in or upon which the system or works is or are to be provided, executed, erected, done or carried out.
 - e. The **“Schedule”** shall mean the schedule or Schedules attached to the specifications.
 - f. The **“Drawings”** shall mean the drawings, issued with the specification which will ordinarily be identified by being signed by the Chief Mechanical Engineer and any further drawing submitted by the contractor with his tender and duly signed by him and accepted or approved by the Chief Mechanical Engineer and all other drawings supplied or furnished by the contractors or by the Chief Mechanical Engineer in accordance with these contract conditions.
 - g. **“Trials” and “Tests”** shall mean such trials and tests as are provided for in these conditions of contract and described in the specification and shall include all other tests to be carried out as per the requirement of the ‘employer’.
 - h. **“Approved” or “Approval”** shall mean approval in writing.
 - i. **“Engineer-in-charge/Nodal officer”** shall mean any officer/Engineer authorized by Chief Mechanical Engineer for purpose of this contract.
 - j. **“Day”** are calendar days, **“months”** are calendar months **“Equipment”** is the contractor’s machinery and vehicles brought temporarily to the site to construct the works.
 - k. **“Material”** are all supplies, including consumables, used by the contractor for incorporation in the works.
 - l. **“Plant”** is any integral part of the works which is to have mechanical, electrical, electronic or chemical or biological function.
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2.0 Use of Contract Document:

The Contractor shall not, without prior consent, make use of any document except for the purpose of performing this contract.

2.1 CONDITIONS OF BID SUBMISSION BY JOINT VENTURE (JV)

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.

- 2.1.1 A legally binding Joint venture / Consortium Agreement signed by authorized signatories of all the partners of the JV/Consortium, as per the Performa at FORM NO. 14 shall be enclosed with the bid.
 - 2.1.2 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 Performa at FORM NO. 13, which shall be duly authenticated by a notary public or equivalent certifying authority, shall be enclosed with the bid.
 - 2.1.3 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.
 - 2.1.4 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.
 - 2.1.5 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.
 - 2.1.6 Bid Security as required shall be furnished by Lead Member of Joint venture.
 - 2.1.7 Performance Guarantee, as required, will be furnished by Lead Member of Joint venture.
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- 2.1.8 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.
- 2.1.9 Each partner must submit the complete documentation, or portions applicable thereto, required qualifying the firm forbidding.
- 2.1.10 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.
- 2.1.11 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.
- 2.1.12 The Lead Partner shall be authorized to act on behalf of the JV/Consortium.
- 2.1.13 All the correspondences between the Employer and the contractor shall be routed through the Lead Partner.
- 2.1.14 In the event of default by the Lead Partner, it shall be construed as default of the Advisor; and Employer will take action under relevant clause(s) of the Bid Document and/or General Terms and Conditions of Contract.
- 2.1.15 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.
- 2.1.16 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 Advisor and the Employer may take action under relevant clause(s) of the Bid Document and/or General Terms and Conditions of Contract.
- 2.1.17 The Advisor 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 Advisor and the Employer may take action under relevant clause(s) of the Bid Document and/or General Terms and Conditions of Contract.
- 2.1.18 One of the partners of JV/Consortium should have downloaded the bid documents.

3.0 Change Order:

At any time during the execution of the contract, by a written notice to the Contractor, changes may be made in the general scope of contract. The Engineer In-charge (EIC), with due approval of competent authority, may make any changes in the quality and/or quantity of the work or any part thereof that may, in his opinion, be necessary and for that purpose the Engineer In-

charge shall have the power to order the Contractor to do and the Contractor shall do any of the following:

- b.** Increase or decrease or split the quantity of work included in the contract,
- c.** Omit any such work,
- d.** Change the character, quality or kind of any such work,
- e.** Change the dimensions of any such work,
- f.** Change in Location
- g.** Execute additional work of any kind necessary for completion of the work under the contract, and no such change shall in any way vitiate or invalidate the contract but the cost, if any, arising out of all such changes shall be taken into account in ascertaining the total amount of the contract price. Where the rate is available in the contract and the same is applicable to the additional work, in the opinion of the EIC, the cost of the additional work shall be determined as per this available rate. But, if the rate for additional work is not available in the contract, the same shall be determined by the EIC taking into account the market rate and labour cost at the site for similar works and shall be final.
- h.** Deviations from the specifications as contained in the tender agreement including the make / model, shall not be accepted. In case of any such deviation, payment shall not be made for that part of the work / item, even if it is meeting the functional requirements and has been accepted by the purchaser. The payment for such portion of the work / item can only be released if the contractor makes good the deviations before the expiry of the warranty period so as to meet the specifications of the tender agreement in all respects.

4.0 Resolution of Dispute

- a)** The Board and the Contractor shall make every effort to resolve amicably by direct informal negotiations, any disagreement or dispute arising between them in connection with the contract. However, in case of failure of negotiation between the Board and the Contractor, the parties shall refer their present and future disputes relating to the contract itself or arising out of or concerning or in connection with or in consequence of the contract to the Chairman, DPA whose decision shall be final and binding on both the parties. The contract shall be governed by the Indian Contract Act, 1872.
- b)** Jurisdiction of Courts: All such disputes, which could not be settled at the intervention of Chairman, DPA, shall be subjected to the jurisdiction of the courts at Gandhidham.

5.0 Force Majeure:

- 5.1** In the event that the Contractor is delayed in performing its obligations in the contract, and such delay is caused by force majeure including war, civil resurrection, strikes (other than the strike solely by the Contractor's men), fire, flood, epidemics, earthquakes, extremely adverse
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climatic conditions, such delay may be excused and the period of such delay may be added to the time of performance of the obligations without any addition to the contract price.

5.2 If a force majeure situation arises, the Contractor shall promptly notify the Board in writing of such condition and the cause thereof, ***but not later than 7 days from its occurrence***. Unless otherwise directed by the Board in writing, the Contractor shall continue to perform its obligations under the contract as far as reasonably practicable. The Contractor shall demonstrate to the Board's satisfaction that it has used its best endeavor to avoid or overcome such causes of delay and the parties will mutually agree upon remedies to mitigate or overcome such causes of delay without having any right to any claim on account of such force majeure.

5.3 In any other situation, which is beyond the reasonable control of the Contractor in the opinion of the Engineer In-charge, and where the Contractor has promptly notified the Board in writing about such situation, it may be considered as "Force Majeure" situation.

6.0 Compliance with Statutes, Regulations:

The Contractor shall comply in all respects, with all statutes and regulations as may be necessary, including clearance from State / Central Govt. Authorities, Pollution Control Boards, labour enforcement and local authorities. The Contractor shall, at all times during the continuance of the contract, so far as it may be necessary, comply with all the existing enactments including Central and State legislation as well as any by-laws of any local authorities regarding labour, particularly the Minimum wages Act, Factories Act, Workmen's Compensation Act, Employees' Provident Fund and Family Pension Fund Act, Employees' State Insurance Act, Contract Labour (Regulation and Abolition) Act, Payment of Wages Act, Maternity Benefit Act, National and Festival Holidays Act, Shop and Establishment Act, The Apprentice Act and keep DPA indemnified against any loss or claim arising out of contravention of the provisions of the above said enactments by the Contractor. The price quoted by the Contractor in the Bill of Quantity shall be deemed to include all expenses whatsoever the Contractor may be required to incur for the compliance with the provisions of the above said legislation. The Contractor shall make necessary arrangements for DPA to witness the payment made by the Contractor to his staff and labour.

7 Payment Terms: (Modified as per Clause No. 3 under Special conditions, Section III)

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

In respect of tender for supply and installation (Changes to be made as per nature of the Work)

- i. 70% of above item rate against 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 Third Party Inspection Agency).
 - ii. 20% of item rate after completion of erection, installation, testing and commissioning, etc. (if TPI appointed then after inspection & certification of the same by Third Party Inspection Agency) and 90% of item rate for item covers only supply/laying/fixing (if any).
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- II) In respect of lump sum work (Changes to be made as per nature of the Work)**

- NOTE:** The payment shall be made through RTGS /NEFT and the Contractor should be furnished following details: -

8.1 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

- 8.2 Policies and certificates for insurance shall be delivered by the contractor to the engineer-in-charge or his nominee before the commencement of work. All such insurances shall provide for compensation to be payable to the types and proportions of currencies required to be rectify the loss or damage incurred.
- 8.3 Alterations to the terms of insurance shall not be made without the approval of the engineer in charge or his nominee,
- 8.4 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.
- 8.5 During erection and till the work is completed and satisfactory taken over by the D.P.A 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.

9.0 Time Extensions:

The Contractor may claim extension of the time limits in case of;

- i. Changes ordered by Deendayal Port Authority.
- ii. In case work is delayed on DPA's Account, i.e. due to delay in approval of drawings, non-availability of site clearance or any other reason, DPA will consider time extension of merit. However, no compensation will be paid to the Contractor if work is delayed on DPA's account. The Contractor shall submit the request for extension, within 30 days of occurrence of such delay, clearly indicating the justification for such extension.
- iii. Force Majeure.
- iv. All the incidents of delay should be entered in the hindrance register which will be base for granting any extension.

10 Time is the essence of the contract:

Time is the essence of the contract and the Contractor shall ensure that all the obligations under the contract are completed within the agreed time schedule. The Contractor shall be solely responsible for all the delays including the delays caused by its vendors. In case of delay in progress of the works, Deendayal Port Authority reserves the right to withhold the payment, cancel the contract unilaterally or complete the work departmentally.

11 Liquidated Damages:

- 11.1 In case of delay in completing the contract, liquidated damages (LD) may be levied at the rate ½ % of the contract value per week of delay or part thereof subject to a maximum of 10% of the contract price.
- 11.2 The employer, 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 LD. In the event of extension of time at its discretion with LD the employer will be entitled without prejudice to any other right or remedy available in that behalf percent (½ %) of the contract value of the works for each week or part of the week subject to the ceiling 10% of contract value.
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- 11.3 The employer, if not satisfied that the works can be completed by the contract, and in the event of failure on the part of the contractor to complete work within 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.
- 11.4 The employer, if not satisfied with the progress of the contract and in the event of failure of the contract to recoup the delays in the mutually agreed time frame, shall be entitled to terminate the contract.
- 11.5 In the event of such termination of the contract as described in clauses (11.3) or (11.4) or both, the employer shall be entitled to recover LD up to ten percent (10 %) of the contract value and forfeit the security deposit made by the contract besides getting the work completed by other means at the risk and cost of the contractor.
- 11.6 In case part/portion 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.

12.0 Variations:

12.1 Variation in Conditions of Contract:

In case of any variation in Instructions to Bidders (ITB), General Conditions of Contract (GCC) and the Special Conditions of Contract – if any special conditions of contract shall prevail. But in case of any requirement/condition specified in the Scope of Work, it shall prevail over all other conditions.

12.2 Variation in Quantities of Schedule – B:

The overall as well as individual variations shall be $\pm 30\%$ in quantity for which the rate quoted by the bidder and accepted by the employer shall be applicable.

13.0 Acceptance:

Upon completion of work under this contract, the Board may accept the works and/or services after installation, if defects or shortcomings are not considered essential and, the Contractor agrees to make good the deficiencies in confirmation with this contract. No work shall be accepted before the Contractor clears the site of scraps, unused materials, work shed, equipment and all such materials, which were used for execution of the work and not required any more at the work site. Also, the Contractor has to submit all the documents and final "as built" drawings as per the contract agreement without which no work shall be treated as complete.

Completion Certificate shall be issued by the employer after satisfactory completion of work as per tender and after taking trial.

14.0 Guarantee (Modified as per Clause No. 4 under Special Conditions, Section III):

- 14.1 The warranty period shall be valid up to twelve months with effect from the date of acceptance of the work and/or services, unless otherwise specified in the scope of work/Special Conditions of Contract (SCC).
- 14.2 The Contractor shall warrant 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.
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The Contractor shall further warrant the Board that all materials, equipment and the supplies furnished by him will be new and fit for their intended purposes.

14.3 The Board shall promptly notify the Contractor in writing of any claim arising under this Warranty. Upon receipt of such notice, the Contractor shall promptly repair or replace the defective goods and/or services at no cost to the Board.

14.4 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.

15 Taxes:

GST Clause:

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.

All other duties, taxes, cesses applicable if any, shall be borne by the contractor.

Deduction of Income Tax and GST:

Income-Tax deductions and surcharge and GST + TDS under GST Act as applicable thereon shall be made good while making payments due to the contractor for carrying out the work and only net amount shall be paid as directed by the Central Board of Direct Taxes, Ministry of Finance, Government of India.

Tax:

The rates quoted (except GST) by the contractor shall be deemed to be inclusive of the taxes, duties etc. (except GST) which 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.

16.0 Deduction:

16.1 Deduction of taxes/income tax at source shall be made from the any bill of the Contractor in accordance with the prevailing rules of Govt.

16.2 While performing under the contract, the damages caused by the Contractor or his workers to any of the Port Trust property shall be promptly made good by the Contractor at his own cost. In case the Contractor fails to repair/replace the damage, Deendayal Port Authority shall have the right to take steps to make good the damages and all the cost on this account shall be recovered from the bills of the Contractor or any money due to the Contractor from this contract or any other contract or any other transaction. In determination of the damage, the opinion of the Engineer-In-charge (EIC) shall be conclusive.

16.3 Any dues arising out of failure on the part of the Contractor to carry out any obligation under the contract shall be deducted from the bills of the Contractor or from any money due to the Contractor from this contract or any other contract.

17.0 Subcontracts:

The Contractor shall not be allowed to engage any sub-contract for all or any part of this contract.

18.0 Idle Charges:

All efforts shall be made for timely supply of materials and/or equipment where it is included in the scope of Deendayal Port. However, the Contractor shall not be entitled to any idle charges for delay in supply of materials and/or equipment by the Port Trust. Further, in case of any delay due to stoppage of work ordered by the Port Trust to avoid interruption in other important activities of Port Trust or any other reason, the Contractor shall not claim any idle charges.

19.0 Personal Protective Equipment: (PPE)

The Contractor shall be solely responsible, at his own cost, for the supply of required PPE to his workers and staff and he shall also ensure the use of PPE such as helmets, nose masks, hand gloves etc. by his staff at site.

20.0 Conduct:

The Contractor, at all times during the tenure of contract, shall take all measures to prevent any unlawful, riotous or disorderly conduct by or amongst his staff at the site and for the preservation of peace and protection of persons and property at the work site as well as in the enactment of the works.

21.0 Accident:

The Contractor shall, within 24 hours of the occurrence of any accident, at or about the work site or in connection with execution of the contract, report such accidents to the Engineer-In-Charge giving all the details in writing. He shall also provide additional information about the accident as requested by the EIC.

22.0 Watch and ward:

During the execution of the contract, it shall be the responsibility of the Contractor to arrange watch and ward of the work including the raw materials, machine/equipment/system used for the work at his own cost till the date of acceptance of the work by Deendayal Port Authority.

23.0 Termination:

23.1 The Board may, without any prejudice to any other remedy for breach of contract, by written notice of default sent to the Contractor, terminate the contract in whole or in part:

- (i) If the Contractor fails to execute the work within the period as specified in the contract or any extension granted by the Board;
- (ii) If the Contractor fails to perform any other obligation under the contract and if the contractor does not cure the same after receipt of a notice of default, the nature of default as well as the time within which the default has to be cured by the Contractor.

23.2 In the event of Board's termination of the contract in whole or in part, the Board may execute the remaining work or procure goods similar to those undelivered by the Contractor and the Contractor shall remain liable to the Board for any excess cost for such works or goods and risks, if any.

23.3 The Board will pay the Contractor, for all the items that are completed and ready for delivery, within 30 days after termination. The payment shall be made only after all the afore-mentioned goods are supplied to and accepted by Deendayal Port Authority. The amount so decided by the Engineer-in-Charge in this regard shall be final and binding.

23.4 In case of termination of contract for default by the Contractor, the Board may not permit the Contractor to participate in any of the future tender of Deendayal Port Authority for a period decided by DPA.

23.5 The employer may terminate the contract if Contractor causes a fundamental breach of the contract.

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

- (i) The contractor stops work for 28 days and the stoppage has not been authorized by the Engineer-in- Charge or his nominee.
- (ii) The contractor becomes bankrupt.
- (iii) The contractor has delayed the completion of works by the number of days for which the maximum amount of liquidated damages can be paid as defined in the contract data and
- (iv) 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.
- (v) For the purpose of this paragraph: "corrupt practice" means the offering, giving receiving or soliciting of anything of value to influence the action or 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".
- (vi) 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.
- (vii) Any material lying at site will not be removed without the prior written permission of Engineer In- Charge.

24. Arbitration Clause:

24.1 Except where otherwise provided in the contract, all questions and disputes relating to the meaning of the specifications, designs, drawings and instructions herein 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 whatsoever, in any way arising out of or relating to the contract, designs, drawings, specifications, estimates, instructions, orders, or to the conditions or otherwise concerning the work or regarding the execution or failure to execute the same whether arising during the progress of the work or after the completion thereof as described hereinafter shall be referred to the Chairman for sole arbitration by himself or by any officer appointed by him.

24.2 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 matters to which the contract relates and that in the course of his duties as an employee of the Board of the Government, he had expressed views on all or any of the matters in dispute or of difference.

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.

24.3 It is also a term of this contract that no person other than the Chairman himself or any officer appointed by him shall act as arbitrator.

- 24.4** It is a term of this contract that only such questions and disputes as were raised during the progress of other 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 the parties during the guarantee period after completion of the work.
- 24.5** It is a term of the contract that the party invoking arbitration shall give a list of disputes with amount of claim in respect of each said disputes along with the notice seeking appointment of arbitrator.
- 24.6** 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.
- 24.7** 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.
- 24.8** The award of the arbitrator shall be final, conclusive and binding on all the parties to Contractor.
- 24.9** The arbitrators from time to time, with the consent of both the parties, enlarge the time for making & publishing the award.
- 24.10** Arbitration shall be conducted in accordance with the provisions of Indian Arbitration Act, 1996 or any statutory modifications or enactment thereof and rules made there under and for the time being in force shall apply to the arbitration proceeding under this clause.
- 24.11** 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.
- 24.12** It is also a term of a contract that the arbitration shall be deemed to have been entered on the reference on the date he issues the first notice to both the parties calling them to submit their statement of claims and counter statement of claims.
- 24.13** Venue of the arbitration shall be such place as may be fixed by the arbitrator at his sole discretion.

25.0 Indemnification:

The Contractor shall indemnify, protect and defend at its own cost, Deendayal Port Authority its agents & employees from & against any/all actions, claims, losses or damages arising out of

- a) Any violation by the Contractor in course of its execution of the contract of any legal provisions or any right of third parties;
- b) Contractor's failure to exercise the skill and care required for satisfactory execution of the contract.

26 Engineer-in-Charge or his nominee's Decisions

Except where otherwise specifically stated, the Engineer-in-Charge or his nominee will decide contractual matters between the employer and the Contractor in the role representing the employer.

27 Delegation

The Engineer-in-Charge 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.

28 Communications

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).

29 Personnel:

29.1 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 Engineer-in-Charge. The Engineer-in-Charge 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.

29.2 If the Engineer-in-Charge 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.

30 Employer's Obligation

- (i) Electricity, water and land for execution of the work at site shall be provided on payment of applicable tariff of the employer subject to availability. If DPA is unable to provide electricity and water, the same will be arranged by the contractor at his own cost.
- (ii) The employer will not provide Port Trust Quarters, during the tenure of contract.
- (iii) Administrative support only, for obtaining clearance from any statutory authority, shall be provided by the employer.
- (iv) On successful completion of all the obligations under the contract and on the request of the Contractor, the employer shall issue a "Completion Certificate with the approval of the Chief Mechanical Engineer, the employer.

31 Queries about the Technical Data

The Engineer-in-Charge or his nominee will clarify queries on the Technical Data.

32 Approval by the Engineer-in-Charge or his nominee.

The Contractor shall submit the makes of material, equipment, specifications and drawings for proposed Work to the Engineer-in-Charge or his nominee, who is to approve them subject to compliance with the Technical specifications and drawings.

The Engineer-in-Charge or his nominee's approval shall not alter the Contractor's responsibility for the work.

All drawings prepared by the contractor for the work if any, are subject to prior approval by the Engineer In-Charge or his nominee before procurement/execution.

33 Discoveries

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 employer or his nominee of such discoveries and carry out the instructions of employer or his nominee for dealing with them.

34 Access to the site

The contractor shall allow the Engineer in charge or his nominee and any person authorised by him 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 work.

35 Instructions

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

36 Safety

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

Quality Control

37 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.

38 Correction of Defects

- 38.1 The Engineer-in-Charge or his nominee shall give notice to the Contractor of any Defects before the end of the Defects Liability Period (Guarantee 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.
- 38.2 Every time notice of a Defect is given the Contractor shall correct the notified Defect within the length of time specified by the Engineer-in-Charge or his nominee's notice.
- 39 Uncorrected Defects**
- If the Contractor has not corrected a Defect within the time specified, the Engineer-in-Charge or his nominee will assess the cost of having the Defect corrected, and the Contractor will pay this amount.

40 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.

41 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.

42 Use of Contract Document:

The Contractor shall not, without prior consent, make use of any document except for the purpose of performing this contract.

43 Memorandum of Settlement:

The Contractor shall not sign any memorandum of settlement with any agency such as Trade Unions etc. in any form at any level without the prior written permission of the employer in relation to any work under taken by him in the Port premises.

44 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.

45 Approvals:

The Engineer-in-Charge 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 Engineer-in-Charge for approval. Any corrections to be suggested by Engineer-in-Charge in drawings, the days taken for rectification in drawings shall be in account of the Contractor.

46 Third Party Inspection: (Modified as per Clause No. 5 under Special Conditions, Section- III)

- I. The Third Party Inspection Agency shall be arranged by DPA and cost of Third Party Inspection mentioned below shall be borne by DPA.
- II. The Third Party Inspection Agency will carry out approval of drawings if any, material inspection at manufacturer's works/site, dispatch clearance from manufacturer's work, certification for releasing stage payments as per payment terms of contract for all the material as per schedule/work till taken over by DPA.
- III. The Third Party shall carry out inspection of work as per tender specification/relevant standard.
- IV.** The above stage payment shall be released after certifying by the third party and copy of the same shall be produced by Contractor for releasing the stage payment as per **Payment Terms**.

47 Bar Chart

The Contractor shall submit a bar chart, before signing the agreement, clearly indicating the plan for timely execution of the work. The bar chart must indicate the individual activities and commencement and completion dates of each activity. The bar chart shall be used for monitoring the progress of the

work.

48 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.

49 Police verification of contract labour

The Contractor who has been awarded the job through Work Order shall furnish necessary Police Clearance Certificate in respect of character and antecedents of all Contract Labourers engaged by them, before commencing the work at site.

This will be a part of Contractual Agreement, as entire Cargo Jetty, Oil Jetty area has been declared as **"Prohibited Area"**. Contractor who would be awarded contract is required to comply with the above requirements.

Contractor shall obtain such Police Clearance Certificate from Police available against a nominal fee per Certificate and they will submit this Certificate giving Work Order reference on it, to the Office of the Engineer In Charge of respective Divisions, to be forwarded to Commandant, CISF which our Security Department along with request for issuance of Entry Passes.

The Contractor shall, if required by the Engineer-in-Charge, deliver to the Engineer-in-Charge a return in detail, in such form and at such intervals as the Engineer-in-Charge 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 Engineer-in-Charge may require.

a) Submission of Labour Reports by Every Fortnight:

The contractor shall submit, by the 4th and 19th of every month, to the Engineer-in-Charge a true statement showing, in respect of the second half of the preceding month and the first half of the current month respectively.

1. The number of labourers employed by him on the work.
2. Their working hours.
3. The wages paid to them.
4. The accidents that occurred during the said fortnight showing the circumstances under which they happened and the extent of damage and injury caused by them, and
5. The number of female workers who have been allowed Maternity Benefit, according to clause and the amount paid to them, failing which, the Contractor shall be liable to pay to Government a sum not exceeding Rs. 200/- for each default or materially incorrect statement. The decision of the Engineer-in-Charge shall be final in deducting from any bill due to the contractor the amount levied as fine and be binding on the contractor.

- b) **No Labour Below 14 Years:** No labour below the age of 14 (fourteen) years shall be employed on the work.

50 **Registers to be maintained at site**

i. **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.

ii. **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.

51 **No damage, hindrance or interference to the Port activities:**

The contractor shall be required to execute the work in such a manner as not to cause any damage, hindrance or interference to the Port activities and the work going on in the area. The contractor shall have to make good the loss at his own cost and risk all damages caused by his workmen to Port property and no extra payment shall be made to him on that account.

52 **Tools & Tackles:**

All the tools, tackles, bricks, cement, ladders etc. for executing the work will have to be arranged by the contractor at his own cost. Arrangement for storing the materials, tools etc. will also have to be made by him. THE EMPLOYER shall not be responsible for any theft/loss of any materials, tools, etc. stored/brought by the contractor for execution of work within the Port area.

53 **Hot work:**

In case of carrying out any hot work such as gas cutting and welding necessary regulations, prevailing at Deendayal Port Authority for such works shall be observed by the tenderer and necessary fire watch permit and No Objection Certificate shall be obtained from the concerned authorities of the port and necessary charges if any at the scale of rate prevailing in the port at that time shall be paid by the

contractor.

54 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.

**55 Valid Electrical Contractor License and Electrical Supervisor Certificate:
(Modified as per Clause No. 6 under Special Conditions, Section- III)**

The contractor shall have valid electrical contractor's licence for carrying out electrical work of nature involved in this tender obtained from the Commissioner of Electricity, Energy & Petrochemical Department, (Inspection wing), Block No.18, 6th floor, Sector No. II, Udyog Bhavan, Gandhinagar, Government of Gujarat without which the tender shall not be accepted. Contractor shall submit certificate and copy of the licence in lieu of the same for consideration.

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/central Govt.

56 Action where no Specifications are specified:

The work shall be carried out in all respects in accordance with the instructions and requirements of the Engineer-in- Charge.

57 Undertaking by the Contractor:

Having understood all the terms and conditions of the tender document and having assessed the site conditions, we hereby confirm that the price offered by us is a firm price and includes all the taxes (excluding GST), duties, fees, Cess etc. and all incidental charges.

58 Labour License.

The Contractor will have to obtain necessary 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.

59. Fraudulent documentation by bidders:

Submission of fraudulent documents shall be treated as major violation of the tender procedure and in such cases the Port shall resort to forfeiture of EMD/SD/BG of the bidder, apart from blacklisting the firm for the next 3 years.

**Signature & Seal
of Contractor**

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

Section –III
Special Conditions of Contract

(These special conditions will supersede the ITB and General Condition of Contract wherever applicable.)

1. Clause No. 6 of Instructions to Bidders (ITB), Section –I is applicable.
2. The Clause No. 13 of Instruction to bidder (ITB) Section - I, following is included:
 - The rates and prices quoted by the bidder shall be fixed for the duration of the contract and shall not be subject to adjustment on any account.
 - The prices shall be quoted inclusive of all Taxes, Duties, and other incidentals charges like
 - Transportation, Loading, Unloading, Boarding & Lodging etc. except GST and shall remain firm till completion of work. All other duties, taxes, cesses applicable if any, shall be borne by the contractor
 - The contractor shall have to provide all materials, labour, plant and other things necessary in connection with the contract, although everything may not be fully specified, and although there may be errors and omissions in the specifications. Storage, transport, handling, use, distribution & maintenance of all materials, equipment, machinery and tools, including all costs, charges, dues, demurrage or other outlays involved in transportation shall be in the scope of contractor.

Tools, Tackles, lifting machineries, scaffolding, temporary lighting, different vehicular transport etc. required for execution of the complete work will have to be arranged by the Contractor, at their own risk, cost.

3. **The Clause No. 7 of General Condition of Contract (GCC) Section - II, is modified and shall be read as under:**

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

A. Against Supply, Laying, Erection, Installation, testing and Commissioning:

- i. Payment for 60 % of the item rate against receipt of tested materials at site in good condition after acceptance by DPA and obtaining insurance cover as per tender condition and submission of bills.
- ii. Payment for 20 % amount of supply item and 70 % of the items consisting of laying, Erection, Installation etc. will be made against the respective item and submission of bills along with Installation Certificate.
- iii. Payment for 20 % amount of supply item and Payment for 30 % of the items consisting of laying, Erection, Installation etc. will be made against Testing, successful commissioning, taking over the commissioned job by DPA and submission of bills, along with Job Completion Certificate.

B. Against Consumables and mandatory spares as per Part -C of the BOQ-

- i. Payment for 100 % amount of each item will be made against receipt of tested materials at site in good condition after acceptance by DPA and obtaining insurance cover as per tender condition.

c. Against Civil Works:

- i. The payment towards Civil works will be released for the completed items of the work as per BOQ, through running account monthly bill on the basis of progress report submitted.

4. The Clause No. 14 of General Condition of Contract (GCC) Section - II, (is modified and shall be read as under:

Guarantee:

- I. "Guarantee Period" of the work shall be 24 months of the entire work including the electrical and Civil works from the date of completion of the work.
 - II. The Performance Guarantee / Security Deposit period shall be valid up to 24 months (with effect from the date of completion of the work.)
 - III. The Contractor shall warrant 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 warrant the Board that all materials, equipment and the supplies furnished by him will be new and fit for their intended purposes.
 - IV. The Board shall promptly notify the Contractor in writing of any claim arising under this Warranty. Upon receipt of such notice, the Contractor shall promptly replace the defective goods and/or services at no cost to the Board and during the period of Guarantee/liability, any portion of the work/equipment, is found defective and is rectified/replaced, the period of guarantee/liability for such equipment/portion of work shall be operative from the date such rectification/ replacement are carried out and Contract Performance Guarantee shall be furnished separately for the extended period of liability for that portion of work/equipment only.
 - During any defect, the Employer shall give the Contractor a notice stating the nature of any defect. promptly following the discovery thereof. The Employer shall afford all reasonable opportunity for the Contractor to inspect any such defect.
 - The Employer shall afford the Contractor all necessary access to the site to enable the Contractor to perform its obligations under Defect Liability. The Contractor may, with the consent of the Employer, remove from the Site any Plant and Equipment or any part of the Facilities that are defective if the nature of the defect, and/or any damage to the Facilities caused by the defect, is such that repairs cannot be expeditiously carried out at the Site.
 - If the repair, replacement or making good is of such a character that it may affect the efficiency of the Facilities or any part thereof, the Employer may give to the Contractor a notice requiring that tests of the defective part of the Facilities shall be made by the Contractor immediately upon completion of such remedial work, whereupon the Contractor shall carry out such tests. 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.
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- If the Contractor fails to commence the work necessary to remedy such defect or any damage to the Facilities caused by such defect within a reasonable time as agreed with Employer, the Employer may, following notice to the Contractor, proceed to do such work, and the reasonable costs incurred by the Employer in connection therewith shall be paid to the Employer by the Contractor or may be deducted by the Employer from any monies due the Contractor or claimed under the Performance Security.
- If the project or any part thereof cannot be used by reason of such defect and/or making good of such defect, the Guarantee Period of the Project or such part, as the case may be, shall be extended by a period equal to the period during which the Project or such part cannot be used by the Employer because of any of the aforesaid reasons. Upon correction of the defects in the Facilities or any part thereof by repair/replacement, such repair/replacement shall have the Guarantee Period extended by a period equal to Guarantee Period from the time of such replacement/repair of the facilities or any part thereof. Within Guarantee period, on occurrence of any emergency break down under subject package, the Owner reserve right to issue the spares to the contractor with a deemed promissory note by the contractor to deposited the same quality, quantity of material to the Owner's store within 15 days for the issues of the such spare/spares.

5. Clause No. 46 of General Conditions of Contract (GCC), Section –II is not applicable.

6. Clause No. 55 of General Conditions of Contract (GCC), Section –II Valid Electrical

Contractor License and Electrical Supervisor Certificate: (For Electrical Work Only):

The contractor shall have valid electrical contractor's license for carrying out electrical work of nature involved in this tender. The license should be issued by the competent authority from any State Govt. Contractor shall submit certificate and copy of the license in lieu of the same for consideration. Parties having the license applied for renewal/ awaiting renewal cannot be considered a valid license holder. The license must be valid on date of opening of tender, otherwise the bid is liable for rejection. The contractor shall also have a valid Electrical Supervisor's certificate of competency, issued from competent authority from any State Govt. Contractor shall submit certificate and copy of the license in lieu of the same for consideration.

7. All the statutory inspections/ approvals, shall be carried out/ obtained by the contractor at their cost.
8. The materials removed from the site, shall be handed over to the store or as directed by Engineer-In-charge. The site of work shall be cleaned after completion of the work before leaving the site
9. Contractor/Service Provider/Supplier etc. has to ensure timely and proper filing of GSTR1 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

10. Integrity Pact:

The "Procedure for signing Integrity Pact" is as follow:

(1) The Employer / Authorized Person of Employer has signed the IP in the presence of a witness from their side, who has also affixed his/her signature thereof and then the same IP has been uploaded on n-procure portal

(2) The potential bidders shall download and print the IP Agreement 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.

(3) 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 if any potential bidder is unable to upload the IP Agreement, then he / she shall submit the Hard Copy 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.

11. 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 the work done or as amended by Statutory Authority from time to time, paid to concerned authority is submitted for the previous bill."

**Signature & Seal
of Contractor**

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

Special Condition for Civil Part

1. The provision in special conditions, which form a part of contract, shall have precedence over those specified in other sections in case of diversity, if any.
 2. **Secured advances**
 - 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.
 - Secured advance shall be granted only for non-perishable/ non-breakable items like steel, Aluminum or steel frame works/doors/windows etc.
 - The Executive Engineers 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.
 - 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.
 - Payment of such advances should be made only on the certificate of an officer not below the rank of Assistant Engineer that:
 - (i) 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.
 - (ii) 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.
 - (iii) The quality of materials is as per the specifications.
 - Recoveries 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.
 3. The contractor shall strictly follow the instructions of Engineer-in-charge or his representative as regards to the execution of work.
 4. During the execution of job and during working hours at any time, contractor or his responsible representative shall be available for any instructions from the representative of the Engineer-in-charge.
 5. The Engineer-in-charge may delete, increase/decrease Qty. of any number of items included in this contract without assigning any reasons and no disputes/claims on this account shall be entertained.
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6. Contractor shall bring all the material in good condition and in seal pack condition. No loose material shall be allowed in any case.

7. 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.

The necessary staff for maintaining the office records like store keeper, office assistant (2 Nos.) has to be deputed by Contractor. Contractor shall also provide all office furniture, 2 Nos. Laptops, A.C on the work place/ site office. This staff shall work under the Nodal officer/ Site Engineer of department for carrying out necessary record keeping/ office work. The staff engaged shall have minimum qualification of Graduation with knowledge of operation of Computer.

Along with site office the QA Lab need to be established by contractor 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.

8. Materials arranged by the contractor

The contractor shall submit original bills for the cement, steel, asphalt etc. for verification, brought to site. In all contracts where issue of cement and steel is not stipulated, special conditions shall be incorporated as below:

Special conditions for Cement

The contractor shall procure ... (as specified in the tender) grade (conforming to IS ... (as specified in the tender)) 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.

- 1) 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 go-down of the capacity to store a minimum of 1000 bags of cement shall be constructed by the contractor at site of work for which no extra payment shall be made.
 - 2) 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.
 - 3) Double lock provision shall be made to the door of the cement go-down. The keys of one lock shall remain with the Engineer-in-Charge or his authorized representative and the
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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 go-down. The contractor shall facilitate the inspection of the cement go-down by the Engineer-in-Charge at any time.

- 4) 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 the excess consumption, no adjustment need be made.
- 5) 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.
- 6) The cement procured by the contractor should not have aged more than 12 weeks.
- 7) The cement should be supplied in Bags. However, the usage of loose cement in Silos will be allowed on prior approval of Engineer-in-charge.
- 8) In case concrete mixing with Batching Plant, Nodal Officer may allow Cement to be used Bags/Silos/Bulk etc.
- 9) The Batching Plant shall be capable of separately proportioning each type of material by weight. The Batching and Mixing shall be carried out preferably in a forced action central batching and mixing plant having necessary automatic controls to ensure accurate proportioning and mixing. Calibration of Batching Plant shall be carried out at regular intervals, as per relevant Indian Standard.
- 10) The Contractor shall also maintain a daily production record for that plant, including details of which mixes were supplied and which delivery dockets were dispatched.
- 11) There should be record of what materials were used for that day's production including Water and Admixtures.
- 12) The production of concrete at each plant shall be systematically controlled. This is to ensure that all the concrete supplied shall be in accordance with these requirements and with the specification.
- 13) Contractor to make quality manual and keep authenticated copy of all relevant Indian Standards. Work instructions, Process control chart, Applicable Forms / Formats shall be made maintained. Contractor shall also follow all applicable regulations like Environmental Laws, Weight & Measure Department etc. Records shall be maintained by the contractor to provide confirmation of the Quality and Quantity of concrete produced.

Special conditions for Steel

14) The contractor shall procure Thermo-Mechanically Treated bars of grade Fe500D/ Fe550D grade as per tender conditions and brand shall be **TISCO/VISAG/SAIL**.

- a) The grade of the steel such as Fe 500D/Fe 550D or other grade to be procured is to be specified as per BIS 1786-2008 or updated version after that.
- b) The TMT bars procured from primary producers shall conform to manufacture's specifications.
- c) The TMT bars procured shall conform to the specifications as laid by Tempcore, Thermex and Evcon Turbo & Turbo Quench as the case may be.
- d) 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.
- e) 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.
- f) 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.
- g) For checking Physical properties like nominal mass, tensile strength, bend test, re-bend test etc. and Chemical properties/tests the specimens of sufficient length shall be cut from each size of the bar at random, and at frequency not less than that specified below:

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

9. 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.
10. 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.

11. Deriving the Market rates :

12. 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.
 13. 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.
 14. 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.
 15. 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 Mixing of cement concrete works shall be on weigh batching basis as per approved design. The minimum cement content for M-30 grade shall be 400 kg/m³ of controlled cement concrete.
 16. The testing charges of concrete mix design will be borne by department.
 17. The cubes casted at site shall be brought to Port Laboratory, Kandla for testing 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.
 18. The Engineer-in-charge reserve the right to ask contractor to cast additional c.c. cubes at the different stages and 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.
 19. The steel plates or water-proof marine ply wood form work shall be used for the R.C.C. / C.C. works.
 20. 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.
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21. The contractor has to provide sufficient barricades with proper illumination in night and reflective sign boards 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.
 22. The stone metal 10 to 20 mm, 25 to 40 mm, crush metal and sand shall be from approved quarries.
 23. All batching material such as coarse aggregates, sand etc. shall be weighed in mechanical portable weigh batches conforming to I.S.2722 as per approved mix design.
 24. 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 as per the IS 456.
 25. 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.
 26. Proper arrangement shall be made for the protection of fresh concrete work.
 27. On completion of CC 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.
 28. Test cubes shall be cured and stored as provided in IS 516. The contractor shall send at his own cost, all the test cubes in the Port laboratory for testing. The cost of sampling, material, test cubes and testing shall be borne by the contractor for 28 days cube.
 29. The forms shall be jointed neatly and shall be set with exactness to the required grade and alignment.
 30. The form work shall be made up from water proof plywood of good quality. The rate shall include the cost of materials and labour for the operations involved such as
 31. 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.
 32. Filleting to form stop-chamfered edges or splayed external angles not exceeding 20 mm. width.
 33. Dressing with oil to prevent adhesion of concrete with shuttering.
 34. Raking or circular cutting.
 35. 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.
 36. The contractor shall have to make his own arrangement for water required for the work.
-

37. 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.
 38. The contractor shall carry out the work maintaining proper camber, slope and gradient to the road or parking area/berm as directed by the Engineer-in- charge.
 39. The contractor shall have to collect and stack the required materials from the approved quarry. These materials shall be free from foreign materials and should be got approved from the Engineer-in-charge before putting them into use. These materials shall be of required size and are to be duly screened. Unwanted or rejected materials shall not be stacked at the site of work and shall be removed by the contractor at his own cost.
 40. Contractor has to give samples of quarry materials and same shall be got approved before starting of work.
 41. As per site condition, the approach etc. will be required which the contractor shall provide at his own cost. Contractor shall consider these aspects while quoting the rates in tender. Nothing extra will be paid for the same.
 42. Stone metal shall be hard, durable and free from excess flat elongated soft and dis-integrated particles, dirt and other objectionable materials.
 43. The contractor has to provide sufficient barricades to the site of work in such a way that the traffic plying nearby the barricaded area should not damage the recently completed asphalt surface and plying of such vehicles during construction/repairs should be prevented strictly. If any damage is caused due to improper barricading and negligence of contractor to the recently completed surface, the contractor has to repair such damage at his own cost. Nothing extra will be paid for this.
 44. Wherever excavated / surplus stuff is to be deposited off, ground should be properly dressed as directed by Engineer-in-charge at no extra cost.
 45. The contractor shall have to do the chipping, chasing, hacking, cleaning etc. to provide proper bond between new work and old work, as directed and to the entire satisfaction of Engineer-in-charge without claiming any extra payment in this regard, the contractor shall consider this aspect while quoting the rates. No claims/disputes will be entertained thereafter on this account.
 46. The rubbish (obtained from demolition/dismantling/cleaning of road surface) will have to be disposed off by the contractor as directed.
 47. Minor dismantling, if required to be join new structure with old one shall have to be done by the contractor and make it good as per original, without any extra cost.
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48. The contractor shall produce the sample of all the materials and shall get it approved from Engineer-in-charge before staking at his site of work.
49. Payment/measurement of all items actually incorporated in the work, as per requirement shall be made. Nothing will be paid for extra/more quantity of work done by the contractor for the purpose of his working facility etc.
50. The contractor has to clear the civil material along the roads i.e. mud, sand, soil, murrum / earth, metal, boulders etc. including their berms which are to be removed and disposed off as directed without any extra cost.
51. 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 sand, earth, murrum, rubble etc.
52. All royalties of materials, quarry fees, etc., payable by the contractor directly to the authorities concerned and rates tendered shall be deemed to be inclusive of all charges. Before claiming refund of Security Deposit, the contractor shall produce 'No due certificate' from the Geologist, Geology and mining department Bhuj.
53. SD to be refunded immediately not later than 14 days from completion of defect liability period and NOC from Geology Department & Payment of welfare cess for final bill.
54. Making bench mark pillars and reference line pillars, etc., and maintaining them upto the completion of the work shall be the responsibility of the Contractor. No extra payment shall be made for these. The drawings enclosed with the tender documents to provide some idea of the job are preliminary for tender purpose only and are by no means complete and final, and do not show the full range of the work under the scope of the contract. Work shall be carried out only on the basis of drawings marked "Released for Construction" with addition, alteration, modifications, made to aforesaid drawings from time to time and also according to other drawings that would be supplied to the Contractor from time to time.
55. The services of fire watch for carrying out any hot works, as required by the Port Authority, shall be made free of cost by the department. However, all the necessary arrangements like obtaining a fire watch permit from the concerned Authority, transportation of man and materials, if any, for fire prevention etc. shall have to be done by the contractor at his own cost. No claim what-so-ever on account of delay in arrangements or arrival of fire watch services shall be entertained.
56. **Supply of water**
- (i) The contractor shall have to make his own arrangements for the water required for execution of work and for labours etc.
 - (ii) Water used for mixing and curing shall be clean and free from injurious amounts of oil, acids, alkalis, salts, sugar, organic materials or other substances that may be deleterious to concrete or steel.
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- (iii) Unfiltered potable water is generally considered suitable for mixing and curing. Mixing and curing with sea water shall not be permitted in any case.
- (iv) Periodically samples of water shall be tested as per IS-3025 and as a guide, the following concentrations represent the maximum permissible values :

- a) To neutralize 200 ml sample of water using Phenolphthalein as an indicator, it should not require more than 2 ml of 0.1 normal NaOH.
- b) To neutralize 200 ml sample of water using Methyl Orange as an indicator, it should not require more than 10 ml. of 0.1 normal HCL.
- c) The permissible limits for solids shall be as follows :

	Permissible limits [Max.]
Organic	200 mg/lit
Inorganic	3000 mg/lit
Sulphates [So]	500 mg/lit
Chlorides [Cl]	500 mg/lit
Suspended matter	2000 mg/lit

- d) The PH value shall not be less than 6".

57. 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.
58. Payment of Structural steel shall be made on actual weigh ment basis and theoretical calculation of sections whichever is less.
59. 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.
60. The paint shall be of first quality and shall be of Asian, Nerolac, Burger, Shalimar or equivalent make.
61. All materials like cement, steel etc. so produced by the contractor shall be tested for quality, as per relevant Indian Standards and frequencies of testing shall also be as per relevant Indian Standards.
62. **EXTRA SUBSTITUTED AND DEVIATED ITEMS OF WORK.**
Any changes in the contract are broadly classified as deviations. While No changes should be done with an intention to cause any undue benefit to the contractor but in the interest of the work for valid reasons or when situation so demands quantities of agreement items

can be increased or decreased, extra items can be executed , agreement items can be substituted materials/ T & P which was not stipulated can be issued and period of completion can be extended for which necessary provisions and unambiguous procedure should be incorporated in the contract to regulate rates/ payments for such deviations.

63. During execution of work, if any hindrance underneath/at ground level observed / encountered is to be removed manually or mechanically. So bidder has to visit the proposed site and acquaint himself completely and also bidder has to consider the same before submitting the offer.
 64. Contractor has to obey the instructions given by EIC during execution of the work including necessary testing / inspection etc. This work may also be inspect by any Government / Vigilance Department and they may order for certain testing / inspection of executed work etc. Contractor has to assist to them and also bear the expenses for such testing and results. The test results/observations are binding on the contractor. Such incidental costs are included in the quoted bid.
 65. 100 saplings (minimum 6 ft. height) other than Tender item have to be provided and planted by contractor. The plantation have to be made within 4 to 6 months from the date of award of work and has to be maintained till the completion period of Contract. After completion period of Contract, Contractor has to handed over the plantation to DPA. The cost of 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 above. In the event of failure by Contractor to execute the above work, it shall be done departmentally at the cost and risk of Contractor.
 66. The Contractor shall be registered under the Building and other contraction work (Regulation of employment and condition of services) Act 1996.
 67. The Contractor shall carry out work as per specifications & time line failing which notice will be issued and after three notices, if performance not found satisfactory, the contractor will be debarred for participating in new tenders of Civil Engineering department for period of two years.
 68. The payment to the workers deployed by the Contractor should be paid through their respective accounts only. The Contractor has to submit the bills along with documentary proof for payments made to the labourers through the bank.
 69. Site Order Book is to be maintained by the contractor at the site of work/office work site office. The orders and instructions issued from time to time by the Engineer-in-charge or his representative and written in order book shall be deemed to have legally issued to the contractor and the contractor shall sign each entry in the order book as a token of his having received such orders and instructions. The order book shall be returned to the Engineer-in-charge in good condition after the completion of work or whenever required by the Engineer-in-charge.
 70. All the labour acts, rules and regulations enforce from time to time shall strictly be followed by the contractor. The contractor has to obtain license from the Assistant Labour
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Commissioner(C), Gopalpuri prior to the commencement of the work, in case he intends to engage 19 or more labour on any day during the execution of work and he has to be registered with A.L.C., Gopalpuri, if he is intending engage more than 10 labours.

71. Admixtures shall be added to concrete, if required at no extra cost. Admixtures like plasticizers / super plasticizers of approved quality for improving workability of concrete if required shall be obtained only from the manufactures approved by the Nodal Officer or his nominee. The contractor shall obtain full details from the manufactures and shall carry out such filed test as the Nodal Officer shall require before any admixture is used in the works at the cost of the contractor. The admixture shall conform to IS9103. For achieving required strength, micro silica (silica fume) is to be added, and the same shall be done at no extra cost. The test for the admixture shall be conducted at IIT/NABL/Government/Govt. approved laboratory at the cost of contractor.
72. The proper care to be taken for the form work/ shuttering work to maintain the line, levels and finishing of the concrete. The concrete surface to be good finished. If any concrete to be found misaligned/ rough finished, same to be dismantled and recast without extra cost.
73. **Specifications & Conditions of Self Supported Roofing System**
- a) The Galvalume steel sheet materials to be brought by the contractor shall be in confirmation of the IS:15965-2012. The material of Grade 'D' with yield strength of 350 Mpa and Zinc coating 150 GSM.
 - b) The sheet materials to be procured from the imported manufactures viz. Dongbu Incheon Steel from Korea, ThyssenKrupp Steel from Germany, Blue Scope Steel from Australia or equivalent approved by engineer in charge.
 - c) The sheet shall be both side pre-painted with Regular Modified Polyester with Internal Lubricants Suitable for Roll Forming. The minimum thickness of the top coat shall be 22 micron and bottom coat shall be 10 micron.
 - d) Necessary tests to be conducted from the government approved laboratories to ascertain the characteristics/ properties of the materials as directed by the engineer in charge. All the expenditure shall be born by the contractor for the testing of the materials.
 - e) The execution work shall be done by the reputed agency who have experience of the similar job i.e. self-supported roof work as approved by the engineer in charge.
 - f) No any advance payment to be given without physical materials, its test certificates & invoice received at site of work.
 - g) The profile bending machine should be of American manufacture/ Technology, which shall produce correct profile/ bending of sheet as per design with minimum tolerance.
 - h) The overlaps shall be included in the rate quoted and no payments shall be made for the overlaps of the sheets. Only straight length including corrugation, bends, overlaps and curved width including corrugations, bends, and overlaps shall be measured to work out the area of the roof for payment.
-

- i) The Sheet edge connected with wall to be made water proof joint by embedding sheet in 25mm wide and 12 mm deep groove cut. The groove shall be filled with silicon putty or any other suitable material as approved by the engineer in charge.
- j) The anchor fasteners for fixing of the roof shall be Carbon Steel Zinc Plated of M12x130 of Hilty, Fisher or equivalent with S.S. 304 washers grouted with polymer based epoxy materials of Hilty, Fosroc, Sika, BASF or equivalent approved by engineer in charge.

74. Specifications & Conditions for Turbo Ventilator

- a) Neck dia: 24" (610mm)
 - b) Material: Aluminum
 - c) Shaft : 20 mm dia. of SS-304
 - d) Volume dispatched: 2400
 - e) CFM at 10 MPH
 - f) Bearing: Ball bearing of SS-304
 - g) Fan: Aluminum 1100 grade & 31" (788mm) dia.
75. The contractor shall provide good site office with sufficient office furniture, stationery, computer, printers etc. during the period of the execution for use of the Employer and his representatives. The contractor shall provide computer operator, store keeper, office boy at site of work, who will work as per the directions/ instructions issued by engineer in charge.
76. The contractor shall depute the required staff i.e. Engineers, Supervisors, Surveyors, Store keepers, with required survey instruments like Total Station, Level Machines, Measuring Taps, Survey Poles, Marking Pens, Staffs etc.
77. 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 & Engineer in-charge reserves right to cancel, no any correspondence shall be entertained in this regard.

**Signature & Seal
of Contractor**

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

Section IV
FORMS OF BID

PART – I

To be submitted by Bidders with their Bids

Form No.	Name of forms/format
1	Form of application
2	Pre-qualification of bidders
3	Format for declaration
4	Letter of authority for submission of bid
5	Exceptions & Deviations
6	Bid Securing Declaration Form

PART – II

To be used by successful Bidder

Form No.	Name of forms/format
7	Letter of Award
8	Agreement form
9	Specimen bank guarantee of Performance Guarantee/Security Deposit
10	Letter of authority from bank for all BGs
11	Format of Extensions (Part – I)
12	Format of Extension (Part-II)
13	Proforma of Power of Attorney For Lead Member of JV/Consortium
14	Proforma of Joint Venture / Consortium Agreement

SPECIMEN OF APPLICATION

(To be executed on bidder's letter head)

The Executive Engineer (Electrical)

Deendayal Port Authority (Address

_____))

Pin Code: _____

Dist. Kachchh (Gujarat)

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. **(EL/WK/2803)**
- (c) Our tender shall be valid for the period of 120 days, from the date fixed for the tender submission deadline and it shall remain binding upon us and may be accepted at any time before the expiration of that period or any extended period.
- (d) If our tender is accepted, we commit to submit a performance guarantee for the due performance of the contract, as specified in specimen form for the purpose.
- (e) No Joint Venture / Joint Venture.
- (f) 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.
- (g) 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.
 - i. We understand that you are not bound to accept the lowest evaluated tender or any other tender or you can also split the work that you may receive.
 - ii. We also make a specific note clause of [ITB, NIT] under which the contract is governed.

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)

Specimen format for 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 Tenderer.

1. Only for individual bidders

- 1.1 Constitution of 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

Description	Year	Turn over
(insert the year as per PQC)	2021-22	
i.e. last three financial years ending 31st march of the previous year	2022-23	
	2023-24	

Attachment: financial reports for the last three years: balance sheet, profit and loss statements, auditor's reports (in case of companies/corporation) etc. List them below and attach copies.

Attested Copy of Annual Turnover during Last Three Year Ending on **March 2024**

3. Similar works

Particulars	Year	No. of Woks	Value
Total value of completed Similar work as defined in the tender document during last 07 years.	2017-18		
	2018-19		
	2019-20		
	2020-21		
	2021-22		
	2022-23		
	2023-24		

Attachments: Supporting documents, viz., Successful completion certificate from clients, other documentations to substantiate the similarity of work as per definition of "Similar Work". Employer 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	Place	Contract	Name &	Value of	Stipulated	Value of	Anticipated
of work	& State	No. & Date	Address of Port or Dept.	Contract in Rs.	Period of Completion	remaining to be completed	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 in Rs.	Stipulated Period of Completion	Date when decision is expected	Remarks if any
1	2	3	4	5	6	7

Attach attested certificates.

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

Other party(ies)	Port	Cause of dispute	Amount	Remark involved showing present status.

6. 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)

SPECIMEN FORMAT FOR DECLARATION
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(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 opening of Price bid of the 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 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 documents and supplementary information required for the pre-qualification evaluation.
- (e) We also state that no changes have been made by us in the downloaded tender formats and understand that in the event of any discrepancies observed, the tender hoisted on website of procure is full and final for all legal/contractual obligations.
- (f)** We also declare that, our firm has not been banned / de-listed by any government or PSUs.
- (g) We also give an undertaking that, we have not made any payment or illegal gratification to any person / authority connected with the bid process so as to influence the bid process and have not committed any offence under the PC Act in connection with the bid.

Date: _____ Place: _____

Name of Applicant: _____

Represented by (Name & capacity) _____

SPECIMEN LETTER OF AUTHORITY FOR
SUBMISSION OF BID

(To be executed on ₹300/- non Judicial Stamp Paper)

To The
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 {copy of board
resolution attached (in case of company)} for tender no. ----- for the work of
_____ 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 of:

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 may note that unacceptable deviations, if any, the bid shall be liable for rejection. Bidder is discouraged to deviate from bid conditions, specifications, delivery schedules, and 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 of signing]

(Applicable for MSE's)

FORMAT FOR BID SECURING DECLARATION

(To be executed on bidder's Letter Head)

Bid Security Declaration Form

Tender No. EL/WK/2803

Date: __/__/2024

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)

LETTER OF AWARD FORMAT

No: _____

Date: _____

To _____

(Name and Address of the Contractor)

Sub: Tender No.

EL/WK/2803 (Name of
Work)

Ref: Your bid dated

And (list the correspondence with the Bidder)

Dear Sirs,

With reference to your above offer and subsequent correspondences on the subject, we are pleased to inform you that your offer has been accepted by the competent authority and you are hereby requested to initiate actions for fulfilment of all necessary formalities, as indicated in the tender document for the above said work, at the earliest.

The Engineer-in-Charge for this work shall be Mr. _____.
Agreed Schedule date of commencement of the work is _____ and Schedule
date of completion of the work is _____. Total Contract Price is ₹ _____.

You are requested to sign the Agreement and fulfil other formalities as per the Tender conditions.

Yours Faithfully,

(Signature of the controlling Officer)

**Chief Mechanical
Engineer Deendayal
Port Authority**

SPECIMEN CONTRACT AGREEMENT

(To be executed on Rs.300.00 non-judicial stamp paper)

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

This agreement made of this _____ day of _____ Two Thousand between the Board of Deendayal Port of Authority a body corporate under Major Ports Authorities Act, 2021 have its Administration Office Building at Gandhidham (Kutch) (hereinafter called the 'Board' which expression shall unless excluded by or repugnant to the context , be deemed to include their successors in office) of the one part and _____ (Name and address of all the partners if a partnership with all their address) hereinafter called the 'Contractor' which expression shall unless excluded by or repugnant to the context be deemed to include his / their heirs, executors , administration , representatives and assignees or successors in office of the other part.

WHEREAS the Board is desirous to carrying out the work of _____ And whereas the Contractor has offered to execute and complete such work.

WHEREAS

- 1) The Contractor has deposited a sum of Rs. _____ (Rupees _____ only) as security deposit in the form of BG/FDR/Digital Transfer for the due fulfilment of all the conditions of the contract.
- 2) Balance amount of Rs. _____ to be recovered from the work bills.

NOW THIS AGREEMENT WITHINNESS AS FOLLOWS:-

1. In this agreement words and expression shall have the same meaning as are respectively assigned to them in the general condition (including special conditions, if any) of contract hereinafter referred to.
2. The following documents shall be deemed to form and read as construed part of this agreement viz.:
 - i) Notice inviting tender.
 - ii) Technical specifications.
 - iii) Special conditions of contract.
 - iv) Tender submitted by the Contractor.
 - v) The Board's "Drawing".
 - vi) The schedule items of work with quantities and rates.
 - vii) Any correspondence made between the Executive Engineer (E) and the Contractor after opening of the cover-I—as regards to contain clarifications/details called for vice versa.
 - viii) Common terms and conditions offered to Contractor and their acceptance including confirmation to withdrawal of their own terms and conditions offered with the tender

i.e. 'Cover-I'.

ix) Bank Guarantee/Digital Transfer/FDR for security deposit.

3. The Contractor hereby covenants with the Board to complete the work of _____ in conformity in all respects, with the provisions of the contract.

4. The Board hereby covenants to pay the Contractor in consideration of such completion of the works, the contact price of Rs. (Rupees _____ only) at the time and in the manner prescribed of the contract.

IN WITNESS WHERE of the parties here unto have set their hands and seals the day and year first above written signed and sealed by the Contractor in the presence of:-

Witness

1. Name & Address _____
Seal

Signature of Contractor

2. Name & Address _____
Seal

Signed, sealed and delivered by Shri _____ on behalf of the Board in presence of

1. _____

2. _____

(Chief Mechanical Engineer)
Deendayal Port Authority

The common seal of the Board of Deendayal Port Authority in the presence of:

1. _____

2. _____

Secretary
Deendayal Port Authority

SPECIMEN**TOWARDS PERFORMANCE GUARANTEE/SECURITY
DEPOSIT**

(To be executed on non-judicial Stamp Paper of appropriate value)

To,
 The Board of Deendayal Port Authority,
 DEENDAYAL PORT AUTHORITY
 A.O. Building, P.O. Box No. 50,
Gandhidham-Kutch.

1. In consideration of the Board of Deendayal Authority of 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, its successors and assigns) having agreed to exempt _____ (hereinafter called the "contractor") (Name of the contractor/s) from the demand under the terms and condition of the contract, vide _____
 _____ (Name of the Department)'s letter No. _____ 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 fulfilment 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, _____ (Name of Bank) (Name of Branch), do hereby 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, _____ (Name of Bank and Branch), undertake to pay to the 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, _____ (Name of Bank and Branch), further agree with the Board that the 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 at 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, _____ (Name of Bank and Branch), further agree with the Board that the 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)."

10. (i) Name of Beneficiary's Bank is State Bank of India, Gandhidham.
(ii) IFSC No. of Beneficiary's Bank is SBIN0060239.
(iii) Bank Account No. of Beneficiary is 10316591671.

Date _____ day of _____ 20

For (Name of Bank)

(Name)

Signature

SPECIMEN LETTER OF AUTHORITY FROM BANK
FOR ALL BGs
(To be executed on Bank's Letter Head)

Date:

To,
The Board of Authority of Deendayal Port

Dear Sir,

Sub: Our Bank Guarantee No._____ dated_____ for
₹_____favoring yourselves issued on a/c of M/s._____(Name
ofcontractor)

We confirm having issued the above mentioned guarantee
favoring your selves, issued on account of M/s._____
_____Validity for expiry upto
date_____and claim expiry date up to_____ We also confirm 1)
_____ 2)_____is/are empowered to sign such
BankGuarantee on behalf of the Bank and his/their signatures is/are binding on the Bank.

Name of signature of Bank Officer

Deendayal Port Authority

Form of application by the Contractor for seeking

Extension of timePart – 1

1. Name of Contractor
2. Name of work as given in the agreement
3. Agreement No.
4. Estimated amount put to tender
5. Date of commencement of work as per agreement
6. Period allowed for completion of work as per agreement
7. Date of completion stipulated in agreement
8. Period for which extension of time has been given previously:
 - (a) 1st extension vide EE's No. Dated Month Days
 - (b) 2nd extension vide EE's No. Dated Month Days
 - (c) 3rd extension vide EE's No. Dated Month Days
 - (d) 4th extension vide EE's No. Dated Month DaysTotal extension previously given.
9. Reasons for which extensions have been previously given (Copies of the previous application should be attached)
10. Period for which extension is applied for
11. Hindrance on account of which extension is applied for with dates on which hindrances occurred and the period for which these are likely to last.
 - (a) Serial No.
 - (b) Nature of hindrance
 - (c) Date of Occurrence
 - (d) Period for which it is likely to last
 - (e) Period for which extension required for this particular hindrance
 - (f) Overlapping period if any, with reference to item.....
 - (g) Net extension applied for
 - (h) Remarks, if any.Total period on account of hindrance mentioned above.....
Month..... Days
12. Extension of time required for extra work
13. Details of extra work and amount involved:
 - (a) Total value of extra work
 - (b) Proportionate period of extension of time based on estimated amount put to tender on account of extra work.
14. Total extension of time required for 11 & 12
Submitted to the Sub-Divisional Officer.....

Signature of Contractor

Date: _____

DEENDAYAL PORT AUTHORITY
APPLICATION FOR EXTENSION OF
TIMEPART II

(To be filled in by the Sub-Divisional Office)

1. Date of receipt of application fromContractor for the work of in the Sub-Divisional Office.
2. Acknowledgement issued by S.D.O. vide his No dated
3. Remarks of S.D.O.
(on the reasons given by the contractor are correct and what extension, if any, is recommended by him. If he has not recommended the extension, reasons for rejections should be given.)

Signature of Divisional Officer

Dated:

**(To be filled in by the
Executive Engineer)**

1. Date of receipt in the Divisional Office.
2. Executive Engineers remarks regarding hindrances mentioned by the Contractor.
 - (1) Serial No.
 - (2) Nature of hindrance
 - (3) Date of occurrence
 - (4) Period for which hindrance is likely to last
 - (5) Extension of time applied for by the contractor
 - (6) Overlapping period, if any, giving reference to Items which overlap.
 - (7) Net period for which extension is recommended
 - (8) Remarks as to why the hindrance occurred And justification for extension recommended.
3. Executive Engineer's recommendations:
(The present progress of the work should be stated and whether the work is likely to be completed by the date up to which extension has been applied for. If extension of time is not recommended, what compensation is proposed to be levied under clause 2 of the agreement?)

Signature of Executive
EngineerDate

Dy. HOD/SE's recommendations

Signature of Superintending Engineer
Date

HOD's recommendations/approval.

Signature of Chief Mechanical Engineer Date
Deendayal Port Authority

**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 thisday of (month) of 2024, 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 Design, Manufacturing, Supply, Installation, Erection, Testing and commissioning of 66/11 KV
GIS Sub-Station and Shifting of 11 KV Power Transformer to New GIS Sub-Station at DPA.

(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

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 of2024 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 Trustees of Deendayal Port (hereinafter referred to as –Employer), the Chief Engineer, DEENDAYAL Port Authority has invited bids from the experienced, resourceful and bonafide Developers with proven technical and financial capabilities of executing the work **Design, Manufacturing, Supply, Installation, Erection, Testing and commissioning of 66/11 KV GIS Sub-Station and Shifting of 11 KV Power Transformer to New GIS Sub-Station at DPA.**
(Tender No._____)

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 ASFOLLOWS

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. Not with standing 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 herein after 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 Port of Deendayal 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 hereinabove 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 the..... day of.....20...

(i) Signature Name

Designation seal &
Common seal of the firm

(ii) Signature Name

Designation seal&
Common seal of the firm

Witness 1

Witness 2

Section -V

Make List for Electrical Items		
Sr. No.	Description	Recommended Makes
1	HV VCB	SIEMENS /ABB/GE
1(a)	HV Gas Insulated Breakers	SIEMENS / Schneider/GE/Hitachi/Crompton Grreves
2	POWER TRANSFORMERS	VOLTAMP /SIEMENS/ABB/ Schneider/PrimeMeiden/Hitachi
3	DISTRIBUTION TRANSFORMERS	VOLTAMP/ABB/Schneider/Kirloskar/Bhel/Bharat Bijlee/Prime Meiden
4	RESIN CAST TRANSFORMERS	
	A) RESIN CAST IMPREGNATED	VOLTAMP / KIRLOSKAR/Amex Impex
	B) DRY CAST	VOLTAMP/KIRLOSKAR/Amex Impex
5	HT XLPE CABLES	POLYCAB/TORRENT/RPG ASIAN/ NICCO/GLOSTER/ UNISTAR/ UNIVERSAL
6	LT XLPE CABLES	POLYCAB/TORRENT/RPG ASIAN/ NICCO/ RALLISON/RAVIN/ HAVELLS/ UNIVERSAL/ UNISTAR/AVOCAB
7	LT ACB	SIEMENS/ABB/SCHNEIDER
8	PROTECTION RELAYS	SIEMENS/ABB
9	LT PANEL	CPRI APPROVED
10	CHANGE OVER SWITCH	SIEMENS/ABB/GE/SCHNIDER/
11	SFU FOR MAIN LT DISTRIBUTION PANELS	SIEMENS/ABB/ Schneider
12	SFU FOR DISTRIBUTION PANELS & FEEDER PILLERS	SIEMENS/ABB/ SCHNEIDER
13	MCCB FOR MAIN LT DISTRIBUTION PANELS	SIEMENS/ABB/ Schneider
14	MCCB FOR DISTRIBUTION PANELS AND FEEDER PILLERS	SIEMENS/ABB/SCHNEIDER

15	MCB/ELCB/RCCB/ RCCBO FOR MAIN LT DISTRIBUTION PANELS	SIEMENS/ABB/ Schneider
16	MCB FOR DISTRIBUTION PANELS AND FEEDER PILLERS	SIEMENS/ABB/ Schneider
17	MCB DISTRIBUTION BOARD	SIEMENS/ABB/ Schneider
18	MULTI FUNCTION DIGITAL METER FOR MAIN LT DISTRIBUTION PANELS/DIGITAL KWH METERS	ENERCON/SECURE/L&G
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/ SIEMENS
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
31a	LED Luminaries	Philips /Bajaj/Wipro/CG/Surya/Pyrotech/Syska
32	CEILING FANS	BAJAJ/ORIENT/USHA/CROMPTON GREAVES
33	WALL MOUNTING FANS	BAJAJ/ORIENT/USHA/CROMPTON GREAVES
34	EXHUAST FANS	BAJAJ/ORIENT/USHA/CROMPTON GREAVES
35	HEAVY DUTY INDUSTRIAL WALL MOUNTING FANS	BAJAJ/ORIENT/USHA/CROMPTON GREAVES
36	WATER COOLER	VOLTAS/BLUE STAR
37	AIR CONDITIONERS	VOLTAS/CARRIER/BLUESTAR/HITACHI/SAMSUNG
38	REFRIGERATORS	VOLTAS/CARRIER/BLUESTAR/USHA/ HITACHI/LG/ SAMSUNG/WHIRLPOOL
39	INVERTERS	SUKAM / MICROTEK Note: Havells, ABB, SMA, Fronius, Delta or equivalent make Inverters are subject to submission of relevant documents ofsuccessful operation in various Government Organizations

40	D.G. SET A) HT/LT ENGINE B) ALTERNATOR	CUMMINS/GREAVES/KIRLOSKAR STAMFORD/CROMPTON GREAVES /JYOTI/ KIRLOSKAR ELECTRIC
42	ELECTRIC MOTOR	ALSTOM/CROMPTON GREAVES /SIEMENS/ KIRLOSKAR/ABB
43	EOT CRANE	CU-BUILT/KRISHNA/SAFAL
44	WATER PUMPS	SWASTIK / KSB
45	WATER GEYSER	BAJAJ/USHA / CROMPTON GREAVES / SPHEREHOT / RACOLD
46	LUGS & CABLE GLANDS	DOWELLS / JAINSON / BRACO
47	Computer System	HP, DELL, Lenovo or equivalent
48	UPS	Wipro, Emerson, Luminous, Microteck or equivalent
49	Printer + Scanner	Canon, HP or equivalent

LIST OF APPROVED MAKE FOR CIVIL ITEMS

1	CEMENT OPC / PPC		AMBUJA, ULTRATECH, BIRLA PLUS, SANGHI, JK LAXMI , JK
2	THERMO-MECHANICALLY TREATED BARS OF GRADE FE- 500D OR MORE.		TISCO, SAIL, RINL(VIZAG)
3	CONSTRUCTION CHEMICALS		SIKA, FOSROC, PIDILITE,
4	PAINT, PRIMER, PUTTY		ASIA, BERGER, BIRLA, ICI.
5	SANITARY WARES		HINDUSTAN, CERA, DURAVIT,, AMERICAN STANDERED, KOHLER, TOTO, PARRYWARE-ROCA
6	CP FIXTURES AND ACCESSORIES		JAQUAR, HANSGROHE, GROHE, ESS-ESS,PARRYWARE-ROCA, AMERICAN STANDERED, KOHLER, ESCO
7	CPVC PIPE & FITTINGS		FINOLAX, SUPREME, PRINCE, ASTRAL
8	Vitrified Floor/Wall Tiles		Nitco, Vermora, Restile, Simpolo, RESTILE, KAJARIA
9	CERAMIC Tiles, GLAZED TILES		Nitco, Vermora, Restile, Simpolo, KAJARIA
10	HARDWARE		KITCH, DUNEX, EPPW, EBCO, PALLADIUM, DORMA
11	DOOR CLOSER		EFFICIENT GADGET, GODREJ, YALE, DORMA
12	UPVC WINDOW, DOOR, VENTILATOR		FENESTA, DEHAU, ALLUPLAST, KOMMERLING, DENIQUE
13	ALLUMINIUM SECTION		JINDAL, INDAL

Section – VI
SCOPE OF WORK AND TECHNICAL SPECIFICATION

The scope of work will cover the supply of all the materials required to complete the project and installation/erection, testing & commissioning with all ancillary work to complete the entire project as an EPC contract. It also includes liaising with GETCO, CEA etc. as required. However, the required charges to all the authorities will be paid by DPA. The entire work shall be carried out as per IER. For all underground cables, i.e. HT, OFC & LT; proper Cable Route Marker with civil, as directed shall be done by the contractor.

This also envisages the construction of a new Substation Building, filling up the plot area identified for new 66 KV Substation. The items & their quantities in the BOQ and the Technical Specifications, mentioned in the tender are broad & indicative; however, the contractor should understand the requirements in details and complete the work in all respects within the quoted amount, being an EPC Project. The Supply of license copy of all necessary software, required for the project, is in the scope of the contractor. (Like Relay configuration, programming, parameterization tool and other software etc.)

It also covers the Design, Manufacturing, Supply, Installation, Erection, Testing and Commissioning of 66/11 KV New GIS Substation with latest state of art technology at DPA as per latest GETCO specifications.

Requirement :

- | |
|--|
| 1. Indoor type 66 KV GIS module (Two Incomer/Three Outgoing/One Bus Coupler) Supplying, Installing, Connecting, Tapping, Erecting, Making, Grouting and Commissioning of Galvanized Steel Structure & shall be as per GETCO
(All foundation drawings shall be submitted by contractor as per GETCO specifications). |
| 2. 02 Nos. of Power Transformers of 12.5 & 10 MVA respectively along with LAs, Metering CTs, PTs, Isolators and ABT Meters etc. shall be removed & shifted to New 66 KV GIS Substation with RTCC/NGR/CRP/FIRE System including their Installation/Connection/ Testing/Commissioning. |
| 3. Three Transformers' Installation & Connection with all Protection/Interlock/Relay/Meter/ Indicator. |

4. Supply of a new 12.5 MVA Transformer shall be purchased with RTCC/NGR/NIPS/FIRESystem with Installation/Connection/Testing/Commissioning.
5. 25 Ways 11 KV HT GIS Panel Board with Supply/Installation/Connection/Testing/ Commissioning consisting of latest Breakers & Protection Relays along with Meter/ Indicator/SCADA Monitor & Control.
6. All the Latest Feeder, Breaker, Relay, PT, CT, Isolator, Lighting Arrestor, Surge Arrestor with Installation/Connection/Testing/Commissioning for Line In/Out of 66 KV.
7. 01 No. DCDB Panel Supply/Installation/ Connection/Testing/Commissioning
8. Fire Alarm/ Smoke/ Gas/ Sprinkler/ System's Supply/ Installation/ Connection/ Testing/ Commissioning.
9. PLC, SCADA, RTU Panel Supply/Installation/ Connection/Testing/ Commissioning
10. 02 Nos. Battery Bank Panel (Battery Room) Supply/Installation/Connection/Testing/ Commissioning
11. 02 Nos. Battery Charger System's Supply/ Installation/ Connection/ Testing/ Commissioning
12. 03 Nos. C & RP Panel for GIS 66 KV with Diagram and TNC Switch, Indication, Meter, Protection Relay Supply/Installation/Connection/Testing/ Commissioning
13. 03 Nos. Capacitor Bank HT 400 KVAR Indoor Type Panel Installation/Connection/ Testing/Commissioning (HT Panel Room)
14. 01 No. EOT Crane 5 Ton Installation & Connection (GIS Room)
15. AHU Cooling or VRF System Provide all Electrical Room & Control Room Building Installation/ Connection/Testing/ Commissioning
16. Inverter/UPS Panel with Battery Bank Nos. 110 (2V/DC) Installation/Connection/ Testing/Commissioning
17. Lighting Panel installation (All Electrical Room /Control Room /DG Room)
18. Supply, Installation, Commissioning of CCTV system with 20 Nos. of Cameras with Server & Network unit
19. Supply of 1 No. DG Set of 150 KVA LT with Breaker & AMF Panel Installation/ Connection/Testing/Commissioning
20. LT Panel ACB 1000 A (No. 01)
21. Fire Fighting System with Hydrant Pipeline, Co2, Electrical & Sprinkler Transformer/DG Room
22. Construction of the Substation Building to accommodate 66 KV & 11 KV GIS, SCADA, Capacitor Bank, Charger, FCBC, DBDC, Battery, LT Panel, Cable, Air Conditioner, LT DGSet, Diesel Storage Room, Spares Room, Office, Operator's Room etc. as directed.
23. Development of 66 KV Yard as per IER and Room for ABT Meters.

1) Technical Specification of Item No. 1

This includes Design, Supply, installation, testing and commissioning of 66 KV Indoor GIS of approved make with double bus arrangement system with 6 Nos. Bays (Two Incomer and three outgoings and one Bus coupler) as under and conforming to specification enclosed & latest GETCO specifications as applicable.

2 Nos. of Double bus line bays for 66 KV, 2500 A, 31.5 KA for 3 Sec. SF-6 gas insulated line bay module comprising of 3 Nos. of single phase gas insulated voltage transformer

(66 KV /Sq. Rt.3 /110 /Sq. Rt.3 / 110 /Sq. Rt.3. This will be equipped with integrated disconnecting facility for GIS and power cable testing without any additional dismantling and gas handling) with 100 VA burden class 0.2 / 3P, 1 No. high speed safety ground switch, 1 No. disc connector switch with earthing switch, 2 No. 2500 A

31.5 KA fixed type SF-6 insulated circuit breaker, 2 Nos. of Isolators with earthing switch, 3 Nos. of single phase current transformer (150/1+1+1A) with 5P20 / 0.2 accuracy (this switch will connect to 2 different buses in gas insulated double bus-bar system), local control & monitoring system for complete bay showing density of SF-6 gas, interlocking between components, gas insulated terminal connection for connecting cable line with GIS Panel.

The Transformer Bay Module will consist of 3 Nos. of 66 KV, 2500 A, 31.5 KA for 3 Sec. SF-6 gas insulated each comprising of 3 Nos. of Isolators with earthing switch, 1 No. 2500 A 66 KV GIS, 6 Nos. of single phase CT 120/1+1+1+1 having protection class as PS /5P20/ 0.2/ PS 20VA burden, 6 Nos. of Isolator Switches with earthing along with female terminal connection for connecting cable with GIS through insulated interconnection bus etc. to complete transformer bay module. This will have local control center for showing density of SF-6 gas, interlocking between component, monitoring gas and other parameters.

The Bus Coupler in Double Bus Bar Bay will consist of 1 No. of bus coupler bay module and comprising of 3 Nos. of Isolator switches with earthing, 3 Nos. of single phase CT (150/1+1A) 15 VA burden 5P20/ 5P20 protection class, 1 No. 2500 A SF-6 insulated circuit breaker. This will have local control center for showing density of SF-6 gas, interlocking between component, monitoring gas and other parameters.

a. 66 KV GAS Insulated Switchgear (GIS) :-

a.1 General :-

The specification covers scope of design, engineering, fabrication, manufacturing, shop assembly, inspection and testing before supply, transportation, delivery at destination, unloading & storage at site, site erection, site testing, commissioning and putting in to successful operation complete with all materials, support structures, anchoring bolts, accessories, commissioning spares & maintenance spares, special spanners, tools & tackles, any specific required ancillary services, SF-6 Gas for first filling & spare, etc., for efficient and Trouble free operation for 66kv metal (aluminum alloy) encapsulated SF-6 gas insulated switch- gear suitable for Indoor installation as per GETCO specification.

The scope also covers provision of additional bays (without equipment) over and above bays shown in SLD, with foundations & earthing arrangements so as to install the bay module as and when required without any works pending except the procurement of the required bay module and other related equipment.

a. 2 Design Concept, construction & performance & Safety of SF-6 GIS :-

It is understood that each manufacture has its own particular SF-6 GIS design concept and it is not the purpose of this specification to impose unreasonable restrictions.

However, in the interest of safety, reliability and serviceableness, the switch gear offered shall meet the following minimum requirements.

"The tender stage layout and equipment's minimum required ratings shall be as per the single line diagram and general layout enclosed. However, the ratings of equipment to be supplied shall be as per submitted type test reports.

The supplier has to work out an optimum layout and building size considering the specific features of his product if any, but within overall dimensions of the plot."

All equipment, accessories and wiring shall have tropical protection, involving special treatment

of metal and insulation against fungus, insects and corrosion. Furthermore, no part of the enclosure, or any loose parts may fly off the switchgear in such an event, and no holes may burn through the enclosure until the nearest protective relay has tripped. All grounding connections must remain operational during and after an arc fault. Proper grounding for mitigating over voltages during dis-connector operation shall be included. Each section shall have plug-in modules or easily removable connection pieces to allow for easy replacement of any component with the minimum of disturbance to the remainder of the equipment. The number of transport/shipping splits shall be minimized to keep installation time of GIS to a minimum. The arrangement shall afford maximum flexibility for routine maintenance. Equipment removal and SF6 handling should be accomplished with ease. The ease of operation shall be ensured. In general, the contours of energized metal parts of the GIS and any other accessory shall be such as to eliminate areas or points of high electrostatic flux concentrations. Surfaces shall be smooth with no projection or irregularities, which may cause corona. The equipment offered shall be protected against all types of voltage surges and any equipment necessary to satisfy this requirement shall have deemed to be included.

a.3 Modular Design & Future Extensions :-

The GIS switch gear shall be of modular design offering high degree of flexibility. Each module shall be complete with SF6 gas circuit breaker, Dis-connectors, Maintenance Grounding switches, fast Earthing switches, voltage transformers, Current transformers, bus & elbow sections, cable end enclosures, L.A., local control cubicle and all necessary components required for safe & reliable operation and maintenance. All the three phases of the bus bars and associated equipment like breakers, dis connectors, instrument transformers & earthing switches etc., as detailed in enclosed single line diagram are to be encapsulated in a single gas filled metallic enclosure for 66 kV & 11 kV voltage class and phase wise separate metallic enclosures for 66 kV class. For 66 kV class enclosure it shall be single OR phase wise separate metallic type.

Irrespective of bus bar design, provision is to be made available for isolation of individual bay without disturbing adjacent bay.

- Materials used in the manufacture of the switchgear equipment shall be of the type, composition and physical properties best suited to their particular purposes and in accordance with the latest engineering practices.

- The switchgear shall be of the freestanding, self-supporting dead-front design, with all high voltage

equipment installed inside gas-insulated, metallic grounded enclosures, and suitably subdivided into individual arc and gas-proof compartments, preferably for:

- 1) Bus bars
- 2) Intermediate compartment
- 3) Circuit breakers
- 4) Current transformers
- 5) Line/Bus dis-connectors
- 6) Voltage transformers
- 7) Cable sealing End (CSE)
- 8) Gas Insulated bus duct section between GIS and XLPE cable/Overhead conductor
- 9) Gas insulated bus section between GIS and oil filled transformer or reactor (as applicable) The bus enclosure & GIS shall be sectionalized in a manner that maintenance work on any bus dis- connector can be carried out by isolating and evacuating affected bay & affected Dis connected bus bar only. In this condition, other bus bar & bays must be in energized condition.

-Gas barrier insulators shall be provided so as to divide the GIS & Bus bar into separate compartments. Continuous Bus bar without compartmentalization is not allowed.

These shall be suitably located in order to minimize disturbance in case of leakage or dismantling. They shall be designed to withstand any internal fault thereby keeping an internal arc inside the faulty compartment.

Further, it is prohibited to work adjacent to a gas compartment while it is fully pressurized on the other side. For such cases, the gas pressure in the adjacent compartments needs to be reduced. Accordingly, dummy compartment shall be provided to accomplish above requirement.

-Arc faults caused by external reasons shall be positively confined to the originating compartment and shall not spread to other parts of the switchgear. In case of any internal arc fault in a bus-bar, dis-connector or circuit breaker, of double bus system, repair works must be possible without shutting down complete substation and at least one bus-bar and the undisturbed bays must remain in operation Where bus Coupler sectionaliser is specified and in case of any internal arc fault in a bus-bar, dis- connector or sectionaliser, repair work must be possible without shutting down the complete substation and at least one half of the substation must remain in operation Documents indicating sequence of repair work steps and description of necessary restrictions during work shall be submitted with the technical bid Each bay module should be equipped with suitable arrangement for easy dismantling and refitting during maintenance without disturbing other units

- The maximum temperature in any part of the equipment at specified rating shall not exceed the permissible limits as stipulated in the relevant standards.

- There shall not be any kind of interference to the connected & nearby equipment and system, when the equipment is operated at maximum service voltage.

b. Maintenance and Repair of a Circuit Breaker & other Equipment :-

The arrangement of the equipment offered must provide adequate access for operation, testing, Repair and maintenance. The positioning of the circuit breaker in the GIS shall be such that it shall be possible to access the circuit breaker of any feeder from the front side for routine inspection, maintenance and repair without interfering with the operation of the adjacent feeders. The GIS shall be so designed that during breaker maintenance, only affected feeder can be shut down & both bus bars must be in energized condition. For achieving this requirement, adequate number of intermediate/dummy compartment, if required, shall be provided to ensure equipment & operating personnel's safety. All the elements shall be accessible without removing support structures for routine inspections. The removal of individual enclosure parts or entire breaker bays shall be possible without disturbing the enclosures of neighboring bays and LCC panels.

It should not be possible to unwillingly touch live parts of the switchgear or to perform operations that lead to arcing faults without the use of tools or brute force.

All interlocks that prevent potentially dangerous mal-operations, shall be constructed such that they cannot be operated easily, i.e. the operator must use tools or brute force to override them. In general, the contours of energized metal parts of the GIS and any other accessory shall be such, so as to eliminate areas or points of high electrostatic flux concentrations. The surfaces shall be smooth with no projection or irregularities which may cause visible corona. No corona shall be visible in complete darkness which the equipment is subjected to specified test voltage. There shall be no radio interference from the energized switchgear at rated voltage.

The GIS shall be designed, so as to take care of the VFT over voltages generated as a result of pre-strikes and re-strikes during isolator operation. Maximum VFT over voltages peak shall not be higher than rated lightning impulse withstand voltage (LIWV) of the equipment.

Necessary measures shall be undertaken by GIS manufacture to restrict maximum VFT over voltages lower than the LIWV. Manufacturer shall submit the study report of VFTO generated for GIS installation for all KV classes.

b.1 Interchangeability :-

As much as possible, all the parts shall be of standard manufacturer with similar parts and assemblies being interchangeable. Each section shall have plug-in or easily removable connection pieces to allow for easy replacement of any component with the minimum of disturbance to the remainder of equipment. Inspection windows (View Ports) shall be provided for Disconnect Switch and both type of earth switches i.e. Maintenance and fast operating.

b.2 Future Extension :-

The modular design of GIS switch gear shall be capable of extension in the future on either end (i.e. Both ends) by the addition of extra feeders, bus couplers, bus-bars, circuit breakers, Dis-connectors, and other switch gear components without drilling cutting, welding or dismantling any major part of the equipment even if no future arrangement /space shown in tender layout. The Vendor is required to demonstrate clearly in his submitted documents the suitability of the switchgear design in this respect. The arrangement shall be such that expansion of the original installation can be accomplished with minimum GIS down time. In case of extension, the interface

shall incorporate facilities for installation and testing of extension to limit the part of the existing GIS to be re-tested and to allow for connection to the existing GIS without further dielectric testing. The arrangement of the interface module/End piece shall be such as to facilitate future extension of any make without any modification on the existing equipment and shall not be required to move or dislocate the existing switchgear bays. During detailed engineering stage, the EPC contractor shall make available the complete

Design detail of interface module such as cross section, enclosure material, enclosure dimensions (inner & outer), Flange diameter (inner & outer), conductor cross-section & connection arrangement, bolt spacing & dimension, rated gas pressure, Gasket details etc. The Interface module /End piece shall be designed to provide Isolating link with viewing window. The Isolating link shall be provided in such a way so that, HV test can be performed on either side of the interface module separately, keeping other side of GIS remained isolated. Interface Module drawing with necessary detail shall be submitted for approval. Further the contractor who is extending the existing GIS installation, it shall be his responsibility to provide interface module matching with the existing GIS interface module. The drawing of existing GIS interface/end piece module shall be provided by the employer. However, it shall be the responsibility of the contractor to verify the existing details during site visit.

The EPC contractor shall optimally utilize the space inside the GIS hall (including the extension portion) for accommodating the interface module being supplied under the contract.

The SF-6 GIS shall be of Indoor type. Indoor GIS shall be having degree of protection as IP-42 & IP-55 for Outdoor GIS and suitable for the atmosphere of the location which is heavily polluted, windy, sandy desert & service condition indicated at The required switchgear shall be capable of being supplied in a completely gas- insulated version in which case all switchgear components including the bus-bars shall be of gas insulated type.

b.3 Service Continuity Criteria in case of GIS Equipment Maintenance :-

Type of Equipment Maintenance	Requirement
(1) Bus-bar disconnector (Bus bar)	Only the affected feeder and the bus-bar to which the affected bus-bar disconnected, can be shutdown. The other bays shall still be energized.
(2) Circuit breaker	Only the affected feeder can be shutdown. Both the bus-bars shall still be energized.
(3) Current transformer	Only the affected feeder can be shutdown. Both the bus-bars shall still be energized
(4) Earthing switch next to the bus-bar	Only the affected feeder and one bus-bar (in case of internal fault) can be shutdown.

(5) Extension	<p>The Interface module/End piece (dummy compartment) with isolating link shall be provided at both the ends of each bus in order to maintain the service continuity of the bays adjacent to the extension point during bus-bar connection so that during future extension at least one bus-bar must be in energized condition with all the existing feeders shall still be energized.</p> <p>- The additional bays shall be tested separately before connecting to main GIS set up.</p>
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b.4 Specification requirements :-

The 66 kV GIS switch-gear shall be with Double bus bar or One & half bus bar (as indicated in SLD/BOQ of respective tender) design having phase wise separate enclosure. The 66 kV GIS switch-gear shall be of Double bus bar design having either phase wise separate enclosure or three-phase common (single) enclosure.

The 66 kV GIS switch-gear shall be of a Double bus bar design having three-phase common (single) enclosure concept. It shall consist of Line & transformer bays as indicated in attached Single Line Diagram and General lay out plan. This configuration shall meet within the given area indicated in layout plan attached with respective tender.

b.5 Current Rating :-

The current rating of the switchgear should be assessed on the following requirements Capable of handling power to an extent of as to an ambient day-time mean temperature between – 5°C and + 50°C

The switchgear described in this specification is intended for continuous duty at the specified ratings and under all system operating conditions including sudden change of load and voltage within its ratings and at specified ambient conditions 24 hours a day, 365 days a year unless indicated otherwise.

The rating of the power transformer/s is given in SLD attached in respective tender.

b.6 Electrical, Mechanical and Thermal Capability :-

The assembled equipment shall be capable of withstanding the electrical, mechanical and thermal ratings of the specified system. All joints and connections shall be required to withstand the forces of expansion, vibration, contraction, and specified seismic requirements without deformation or malfunction and leakage. The apparatus shall be capable of withstanding the specified environment.

b.7 Insulation level :-

The switchgear and other equipment shall be designed for a maximum operating voltage and rated impulse withstand voltage as specified in cl. b.3. The switchgear

may require to be installed in an unmanned distribution network with predominantly overhead interconnection or EHV cable as the case may be. Circuit breakers shall be capable of interrupting line, transformer, capacitor bank & cable charging currents of the magnitude indicated in the data schedules

c.8 Physical arrangement :-

The layout shall be properly designed by the bidder to completely accommodate the present & future requirements of the substation as per the furnished single line diagram and the enclosed site plan. They may be adjusted as necessary to suit the manufacturer's standard design and GETCO need.

The arrangement of the switchgear offered must provide adequate access for checking and maintenance.

Optimized arrangements are required so as to reduce installation time, minimize maintenance & repair cost, provide ease of operation and facilitate future expansions.

For 66 kV voltage class GIS, wherever required, stairs, fixed ladder, platforms, and walkways for operation and maintenance access to the operating mechanism and monitoring devices should be provided to permit access. The structures shall be either aluminum or hot-dipped galvanized steel.

All the structure stairs, platforms, and walkways shall conform to the relevant occupational health and safety regulations and designed in accordance with the latest industry standards and guidelines. The platforms and walkways shall have anti-skid surfaces that can be walked on. Handrails shall be provided where necessary.

In addition to above, suitable portable scissor lift shall be provided for access of distant portion of GIS installation for all kV class GIS.

b.9 Gas Sectional Arrangement :-

The switch-gear gas enclosures must be sectioned, with gas tight barriers between sections or compartments.

The sections shall be so designed as to minimize the extent of plant rendered inoperative when gas pressure is reduced, either by excessive leakage or for maintenance purposes, and to minimize the quantity of gas that has to be evacuated and then recharged before and after maintaining any item of equipment.

It shall be ensured that circuit breaker enclosure will not include any other equipment in its gas compartment. However, CT may be placed in circuit breaker enclosure.

b.10 Expansion Joints and Flexible Connections :-

- The layout shall sufficiently take care to the thermal expansion / contraction of the assembly by the provision of expansion joints. Expansion joints shall be placed in between any bay

section of the bus-bar. All joint surfaces shall be machined, and all castings shall be spotfaced for all bolt heads or nuts and washers.

- If necessary, the number and position of expansion joints or flexible connections are to be determined by the manufacturer to ensure that the complete installation will not be subject to any expansion stresses which could lead to distortion or premature failure of any piece of the SF-6 equipment, support structures or foundations.
- Bracing shall be provided for all mechanical components against the effects of short circuit currents specified under system parameter. The design of the equipment shall be such that the agreed permitted movement of foundations or thermal effects does not impair the assigned performance of the equipment.
- The design calculations for all the supports shall be submitted to ensure care taken.
- The continuity of service during thermal expansion / contraction and vibrations shall be ensured. Expansion joints, flexible connections and adjustable mountings shall be provided to compensate for reasonable manufacturing and construction tolerances in the associated equipment to which the GIS may be connected. Required sliding plug-in contacts for conductors shall be provided. This is to ensure that unreasonably excessive accuracy is not required when installing such equipment and constructing the associated foundations or support structures, e.g. transformers or the interconnection of isolated sections of switch-gear by means of long GIS bus-bar or duct installations. Flexible joints may also be provided to allow more efficient maintenance and future extensions of the GIS.

c. Barrier and Non-Barrier Insulators :-

c.1 Support insulators shall be used to maintain the conductors and enclosure in proper Relation. These support insulators may be of two types. Barrier insulators which are employed to isolate gas compartments and non-barrier insulators which allow the gas pressure to equalize.

c.2 The gas barrier insulators sealing to the conductors and the enclosure wall shall be designed to withstand the maximum pressure difference that could occur across the barrier, i.e. maximum operating pressure at one side while a vacuum is drawn at the other side & in case of internal arc fault with a safety factor

c.3 The support insulators and section barriers / insulators shall be manufactured from the highest quality material. They shall be free from all voids and the design shall be such as to reduce the electrical stresses in the insulators to a minimum. They shall also be of sufficient strength to ensure that the conductor spacing and clearances are maintained when short circuit faults occurs

c.4 Tests shall be carried out during the manufacture of the Switchgear to ensure that all parts of the equipment are free of partial discharge with a partial discharge extinction voltage which is at least 10% higher than the rated voltage.

c.5 Arrangement of section barriers/insulator with bus conductor shall be such that there shall not

Be any requirement for removal of adjacent bay while replacing of gas barriers.

d. Gas seals, Gas Density & Pressure and other requirements :-

d.1 Single sealing of O-ring type shall be used for sealing the connections between the switchgear

modules. The leakage rates shall be kept to an absolute minimum under all normal pressure, temperature, electrical load and fault conditions. The guaranteed leakage rate of each individual gas compartment and between compartments must be less than 0.5%

p.a. for the service life of equipment.

d.2 Piping and fittings for gas monitoring and gas supply shall be made of copper or brass. The gas monitor device should be installed at each individual compartment of the module. Each gas compartment must be independent, external gas pipe connections should be avoided to minimize leakage.

d.3 All gas compartments shall be fitted with filter material which absorbs the residual moisture and moisture entering inside the High-voltage enclosure. Filters in gas compartments with switching devices must also be capable to absorb the gas decomposition products resulting from the switching arc.

d.4 The rated pressure of the SF-6 insulating gas in the metal-clad equipment shall be as low as is compatible with the requirements for electrical insulation and space limitations to reduce the effects of leaks.

d.5 The SF6 switch-gear shall be designed for use with SF-6 gas complying with the Recommendations of IEC : 60376 at the time of the first charging with gas.

d.6 Connections including bolts and nuts shall be adequately protected from corrosion and easily accessible with the proper tools.

d.7 All components shall be fire retardant and shall be tested in accordance with relevant standards. Gas emissivity when the Material is heated shall be minimal.

e. Gas Treatment Requirements :-

Under normal operating conditions it shall not be necessary to treat the insulating SF-6 gas between major overhauls. In all gas compartments permanent efficient filters and desiccants shall be effective for the duration of time between major overhauls. Notwithstanding this, the insulators in the circuit breaker shall be made of epoxy resin composition that will resist decomposition products in contact with moisture.

f. Gas Monitoring Devices :-

Gas density or pressure monitoring devices shall be provided for each gas compartment. The devices shall provide continuous and automatic monitoring of the state of the gas. The SF-6 gas monitoring device shall have two supervision and alarm settings. These shall be set so that, an advanced warning can be given that the gas density/pressure is reducing to an unacceptable level. After an urgent alarm, operative measures can be taken to immediately isolate the particular compartment electrically by tripping circuit breakers and opening disconnectors. It shall be ensured that there is no chance of the gas liquefying at The lowest ambient temperature.

The gas monitoring device shall monitor at least the following, locally and on remote.

i) "Gas Refill" Level- This will be used to annunciate the need for gas refilling.

ii) "Breaker Block" Level- This is the minimum gas density at which the manufacturer will guarantee the rated fault interrupting capability of the breaker. At this level the device contact shall trip the breaker and block the closing circuits.

iii) Over pressure alarm level- This alarm level shall be provided to indicate abnormal pressure rise in the gas compartment

g. Conductors :-

The conductors shall be made of aluminum alloy suitable for specified voltage and current ratings. The electrical connections between the various gas sections shall be

made by means of multiple contact connectors (plug-in type) so that electrical connection is automatically achieved when bolting one section to another. Field welding of conductor and continuous bus conductor is not acceptable. The surface of the connector fingers and conductor on such connections shall be silver plated. Both, the conductors as well as the contacts for the conductor connections must be designed for the continuous rated current of the switch gear under the ambient conditions furnished, and shall not exceed the permissible temperature rise."

Design of bus conductor shall be such that during removal of any bay, only affected portion of conductor shall be disconnected from plug-in type connectors keeping adjacent bays and remaining portion of bus shall be in intact position.

h. Enclosures :-

The enclosure shall be of continuous design and shall meet the requirement as specified IEEE : 80 2013 (special considerations for GIS).

The enclosure shall be sized for carrying induced current equal to the rated current of the Bus. The conductor and the enclosure shall form the concentric pair with effective shielding of the field internal to the enclosure.

- The metal enclosures for the SF-6 gas insulated equipment modules shall be made from Aluminum alloy. Suitable anti corrosive paints shade 631 of IS : 5 or equivalent must be applied on the exterior of the enclosures. The enclosure shall be separate phase wise in case of 400 kV class GIS and shall be with Single Enclosure for three phases in case of 132 KV & 66 KV class GIS, while for 220 KV class enclosure shall be either single OR phase wise separate metallic type. The external fixtures should be made of corrosion-resistant material and should be capped wherever required.

- Bidder shall provide adequate number of internal UHF sensors in the all offered 66 KV class GIS for PD measurement even if on line PD system is not in scope of supply and the number and location of these sensors shall be subject to approval of the purchaser. (External UHF sensors are not allowed)"

- The number & location of these sensors shall be based on laboratory test on typical design of GIS as per recommendations of CIGRE Document No. 654 (application guide for sensitivity verification for uhf partial discharge detection system for GIS). Offered numbers and location of UHF sensors shall be submitted based on above said criteria along with attenuation calculation for approval of the employer. Further UHF sensors shall necessarily be provided in close proximity to VT compartments.

- However, adequacy of number of sensors and their location shall be verified at site as per recommendations of above CIGRE Document No. 654. In case during site testing, additional UHF sensors are required, the same shall be supplied & installed to complete the technical requirement.

- The calibration and frequency response of PD couplers shall be as per relevant standard/Technical guideline. Data sheet shall be submitted for the UHF couplers meeting this requirement.

Bellow compensators shall be made of Stainless steel to preserve the mechanical strength of the equipment at the connection portions to deal with the following problems:

- a) Expansion and Contraction of outer enclosure and conductor due to temperature variations.

- b) Mismatch in various components of GIS.
- c) Vibration of the transformer and switching equipment.
- d) Dimensional variations due to uneven settling of foundation.
- e) Seismic forces as mentioned in climatic condition.

i. SF-6 Gas Processing Unit :-

a) An SF-6 gas-processing unit suitable for evacuating, liquefying, evaporating, filling, drying and purifying SF-6 gas during the initial installation, subsequent maintenance and future extension of GIS shall be provided. The cart shall be equipped with rubber wheels and shall be easily maneuverable within the GIS building.

b) A wheeled maintenance unit shall be supplied which shall be self-contained (except for Additional gas storage bottles and external power supply at 415 V AC, 3-phase, 50 Hz.) and fully equipped with an electric vacuum pump, gas compressor, gas drier, gas filter, refrigeration unit, evaporator, gas storage tank, full instrumentation for measuring vacuum, Compressor inlet temperature, tank pressure and temperature, valving and piping to perform the following operations as a minimum requirement :

- i) Evacuation from a gas filled compartment using the vacuum pump,
- ii) Transfer of SF-6 gas from a system at some positive or negative pressure to the Storage tank via the gas drier and filter;
- iii) Recirculation of SF-6 gas in the storage tank through the drier,
- iv) Re circulation of SF-6 gas in any switchgear or bus duct compartment through the drier and filter;
- v) Evaporating and filling SF-6 Gas,
- vi) Drawing off and liquefying SF-6 Gas,
- vii) A combination operation of filling SF-6 gas into a gas system and evacuating a second gas system using the vacuum pump.

c) Adequate length of hoses with necessary adaptors shall be provided for filling of SF-6 gas in any of the gas compartment with the help of gas cart.

d) GA drawing and Schematic drawing for gas processing unit shall be submitted for approval

j. Auxiliary Equipment :-

The following items shall be included for a complete installation:

- a) Control system including local control cubicles.
- b) Cable and wiring between individual items of supplier supplied equipment.
- c) Name plates.
- d) All ladders, platforms, stairs, walkways, and supports necessary to operate and maintain all equipment safely and efficiently.
- e) Special tools and tackles for installation.
- f) Special tools and tackles for maintenance

k. Safety Precautions :-

k.1 The switch-gear must provide a maximum degree of safety for the operators and others in the vicinity of the switch gear under all normal and fault conditions. The safety clearances of all live parts of the equipment shall be as per relevant standards.

k.2 It must be made impossible to touch any live part of the switch-gear unwillingly, i.e. without use of tools or brute force.

k.3 An operator standing in the normal operating position should not be endangered by any moving external part of the switch-gear.

k.4 Interlocks: Mechanical & electrical interlocks must be provided to ensure absolute and reliable protection against potentially harmful Mal-operation of the switchgear. All interlocks that prevent potentially dangerous mal-operations shall be so constructed such that they cannot be defeated easily, i.e. the operator must use tools and/or technique to over-ride them only in case of emergency.

The following functions shall be provided :

1) The operator must be forced in to the only safe and logical sequence to actuate the circuit breakers, dis-connectors & earthing switches.

2) The actual, completely closed or completely opened position of all switching devices must be checked before and after each move.

3) Implementation of logic checks and issuing the resultant signals Enabled or Blocked for the switching device.

Each gas compartment must have its own *automated external* pressure relief device to provide instant and safe discharge of accidental overpressure during internal arc. Rupture diaphragms shall be preferably used as pressure relief mechanisms. The bursting pressure of relief device should be effectively coordinated with the rated gas pressure and the pressure rise due to arcing. PRD shall have

- All earthing connections must remain operational.

- The enclosure of the switch gear must withstand the thermal effects of an arc at the full rated short circuit current until the nearest protective relay has acted and tripped the breaker.

To limit the effects of an internal arc the switch gear shall be suitably subdivided into individual arc and gas-proof compartments, preferably for

- Bus-bar together with bus-bar isolator and earthing switch
- Circuit breaker
- Line isolators and earthing switch, (Line, transformer)
- Instrument transformers.
- Intermediate compartment

I. Special Tools, Tackles and Equipment :-

Special tools, tackles and equipment that are required to perform installation, commissioning, Operation & maintenance of the gas insulated switch gear.

1. Dew point measurement meter
2. SF-6 gas leakage detector
3. Precision pressure gauge
4. Gas recovery unit with required accessories
5. On line PD monitoring system for 66 KV GIS modules.

6. SF-6 gas purity detector / analyzer for SO₂, H₂O, CF₄, AIR etc.
7. Portable hand held PD measurement kit suitable for GIS along with required accessories
8. Air / gas humidity tester,
9. Breaker timing measurement kit

m. Grounding of GIS :-

m.1 GIS will be housed on GIS floor. The bidder will provide under-ground mat below the substation. The bidder shall also provide adequate number of Galvanized steel risers to be connected to grounding mat, as per relevant standards and in consultation with GETCO during detailed engineering

m.2 The bidder shall supply entire material for ground bus of GIS such as conductor, clamps, joints, operating and safety platforms etc. to be laid / embedded in GIS floors. The bidder is also required to supply all grounding connectors and associated hardware material for :

- i) Connecting all GIS equipment, Bus duct, enclosures, control cubicles, supporting structures etc. to the ground bus of GIS
- ii) Connecting ground bus of GIS to the ground mat risers

m.3 The grounding arrangement of GIS shall ensure that touch and step voltages are limited to safe values as per IEEE std. 80-2000. The enclosures of the GIS shall be grounded at several points such that there shall be a grounded cage around all live parts. The ground continuity between each enclosure shall be affected over flanges, with or without links or straps to bridge the flanges. Copper/Aluminum straps shall however bridge the metallic expansion bellows. The grounding switches shall be connected to ground through the enclosure.

Individual ground leads for the ground switches are not allowed. The inductive voltage against ground in each part of the enclosure shall not be more than 65 Volts

m.4 Where operating mechanism cubicles are mounted on the switchgear, the grounding shall be made by separate conductor. Bay control cubicles shall be grounded through a separate conductor.

m.5 All conduits and control cable sheaths shall be connected to the control cubicle grounding bus. All steel structures shall be grounded

m.6 Each removable section of catwalk shall be bolted to the support structure for ground Continuity

m.7 The enclosure grounding system shall be designed to minimize circulating currents and to ensure that the potential rise during an external or internal fault is kept to an acceptable level. The guidelines of IEEE Std. 80-2000 on GIS grounding, especially the transient ground potential rise caused by high frequency phenomena, shall be taken into consideration while designing the grounding system for GIS

m.8 The manufacturer shall furnish readily accessible connectors of sufficient mechanical strength to withstand electromagnetic forces as well as capable of carrying the anticipated maximum fault current without overheating by at least from two paths to ground from the main ground bus

m.9 Provisions of IEC : 517 & 694 regarding safeguards in grounding of connected cables, testing during maintenance and other safety measures shall be ensured.

n. Gas Insulated Bus :-

GIB shall be designed based on the following criteria.

- (1) Maximum weight of gas in a gas tight section of GIB shall not exceed 250 Kg.
- (2) GIB shall be generally in horizontal layer. However, in exceptional circumstance GIB in vertical layers can be provided with the approval of employer.
- (3) The minimum vertical ground clearance of GIB at road crossing shall be 8 meters.
- (4) The horizontal clearance between GIB and GIS building /any other building Wall shall be minimum 3 meters.
- (5) The GIB route inside the GIS Hall shall not obstruct easy access to GIS and control room buildings and shall not obstruct movement of crane, equipment including HV test equipment for maintenance works.
- (6) The GIB clear height outside the GIS hall in switchyard area shall be minimum 4 meter, so as not to obstruct easy access to GIB, movement of crane for maintenance work.
- (7) For the maintenance of GIB of one circuit, only that circuit shall be isolated.

o. Service Conditions :-

Climatic Conditions:

The equipment and the accessories to be supplied against this technical specification shall be suitable for satisfactory continuous operation under the following tropical conditions.

Max ambient temperature	:	50°C
Min. ambient temperature	:	-5°C
Max daily average ambient temperature	:	38°C
Max relative Humidity (%)	:	As per IEC
Max altitude above M.S.L. (meters)	:	<1000
Average Annual Rainfall (mm.)	:	1000
Max wind pressure (Kg./Sq. mtr.)	:	130
level(days/yr.)	:	50
Average no. of rainy days/annum	:	120
Condensation	:	Occasional
Induced electromagnetic disturbance	:	1.6 KV
Cree page distance	:	31 mm./kV
Seismic Zone	:	Zone-V

Acceleration due to gravity, g	:	0.5
Max ambient temperature	:	50°C
Min. ambient temperature	:	-5°C
Max daily average ambient temperature	:	38°C
Max relative Humidity (%)	:	As per IEC
Max altitude above M.S.L. (meters)	:	<1000
Average Annual Rainfall(mm.)	:	1000
Max wind pressure (Kg./Sq. mtr.)	:	130

p. Standards :-

p.1 Reference Standards :-

The GIS offered shall confirm to IEC : 62271-203 and other relevant IEC standard except to the extent explicitly modified in the specification and shall be in accordance with requirement specified in GTP.

The metal-enclosed gas-insulated switchgear, including the operating devices, accessories and auxiliary equipment forming integral part thereof, shall be designed, manufactured, assembled and tested in accordance with the following International Electro-Technical Commission (IEC) Publications including their parts and supplements as amended or revised as on date of bid

High voltage switchgear& Control gear	:	IEC 60694
High voltage metal enclosed switch gearfor 72.5KV &above	:	IEC 62271-203
Specification for acceptance of new Sulphur Hexafluoride	:	IEC 60376
Guide to checking of Sulphur Hexafluoride Taken from Electrical equipment	:	IEC 60480
Surge Arresters	:	IEC 60099
Overhead line, Cable and Transformer Terminals	:	IEC 60137
Bushings for alternating voltages above1000V	:	
Cable connections for gas insulated metal enclosed Switchgear for rated voltages of 72.5KV and above	:	IEC 60859
High voltage test techniques	:	IEC 60060
Insulation coordination	:	IEC 60071
Electrical Relays	:	IEC 60255
High voltage switches	:	IEC 60265
Partial discharge measurement	:	IEC 60270
Degree of protection	:	IEC 60529
Pollution levels	:	IEC 60815
EMC	:	IEC 61000
Use and handling of SF-6 gas	:	IEC 61634

p.2 Instrument Transformers :

: IEC 61869

(a) Circuit BreakerHigh voltage Alternating current circuit
Breakers

: IEC 62271-100

Report on Synthetic testing of high voltage
alternating Current Circuit breakers

: IEC 60427

(b) Dis-connectors and earthing Switch

Alternating current Dis-connectors

: IEC 60129

Alternating current earthing switches,
Induced current Switching

: IEC 60129

Artificial pollution test on HV
insulators to be used on ac system

: IEC 60507

Gas insulated metal enclosed switchgear
for rated voltages of 72.5 kV and above

: IEC 60517

Classification of degree of protection
provided by enclosures

: IEC 60529

q. Electrical Data :-

Rated System Voltage/ Highest System/Equipment Voltage	kV	33/36	66/72.5	132/145	220/245	400/420
One min. Power frequency withstand voltage	Kvrms	70	140	275	460	610
Across open isolator	kVrms	80	160	315	530	610
Across the open gaps of CB	kVrms	70	140	275	460	520
Phase to phase	kVp	170	350	650	1050	1425
Phase to earth	kVp	170	350	650	1050	1425
Across open isolator	kVp	195	375	750	1200	1425 kVp+ 240kVpoopp polarity
Across the open gaps of CB	kVp	170	350	650	1050	1425

Rated Frequency	Hz	50	50	50	50	50
Rated Continuous current at 50°C ambient temperature Bus-bar	Amps	3150	2000	2000	3150/2500	4000
Feeder and Transformer Bay	Amps	2500	1600	1600	3150/2000	3150
Rated Short circuit With stand current for 3 seconds	kA	40	40	40	50	63
Rated dynamic with stand current	kAp	100	100	100	125	157
Maximum Partial Discharge (at 1.1 Un)	pico-coulombs	5	5	5	5	5
System Neutral earthing		Solidly earth	Solidly earth	Solidly earth	Solidly earth	Solidly earth
Maximum SF-6 Gas leakage rate peryear	per year					

r. Detailed technical requirements for GIS Components :-

r.1 Circuit Breaker:

- 1) The GIS Circuit breaker shall be **C2 – M2** class and comply with the following general Requirements for circuit breakers and the latest revisions of the relevant IEC-62271-100 specifications
- 2) Circuit – breakers shall be of single pressure, single break, self-compression self-blast /Auto puffer type with SF6 as arc quenching & insulation medium and with a minimum maintenance Contact system
- 3) 66 kV breakers shall be of separate phase wise enclosure whereas 66/11 kV breakers shall be of three phase encapsulated type. For 66 kV Circuit breakers are to be supplied with Controlled Switching Device (CSD) compatible to SCADA remote operation with IEC 61850 protocols OR with PIR OR as indicated in BOQ of respective tender.
- 4) 66 kV Circuit breakers shall be Gas insulated type only, Vacuum type Interrupter shall not be allowed.
- 5) Ratings of the circuit breaker shall be as per enclosed technical parameters.
- 6) They should be shipped as a completed three-phase unit within a complete bay module.
- 7) Each circuit-breaker shall have spring/Hydraulic/ combined drive mechanism ensuring proper closing and opening, and shall permit checking of adjustments and opening/closing

characteristic. The ON/OFF latches shall be mechanically interlocked with each other. The circuit breaker shall be completely factory assembled, adjusted and tested.

8) The total break time from energizing the trip coil at rated control voltage to final arc extinction shall be as short as possible, but in any event not greater than 3 cycles i.e. 60 ms.

9) The circuit breaker shall be capable of breaking all currents from zero up to the specified maximum fault current in accordance with the relevant IEC recommendations.

10. The circuit breaker shall be capable of interrupting the steady and transient magnetizing current as per follows:

Voltage level	Transformer rating	Rating in MVA
66KV	220kV/66kV	50to160
	132kV/66KV	150to100
	66kV/11KV	5to20

r.2 Contacts

All making and breaking contacts shall be sealed and free from atmospheric effects. Contacts shall be designed to have adequate thermal and current carrying capacity for the duty specified and to have a life expectancy so that frequent replacement due to excessive burning will not be necessary. Provision shall be made for rapid dissipation of heat generated by the arc on opening. Breakers shall be so designed that when operated within their specified rating, temperature of each part will be limited to values consistent with a long life for the material used. The temperature rise shall not exceed that indicated in IEC-62271- 100 underspecified ambient conditions. Provisions shall be made for attaching an operational analyzer to record travel, speed and making measurement of operating timings etc. after installation at site. The contractor shall supply three set of transducers.

r.3 Closing Devices

a) The closing coils shall be suitable for operation at any voltage between 110% and 85% of the nominal control voltage measured at the device terminals

b) The breaker shall close correctly when an electrical closing pulse of 50 msec. Duration is applied to the closing coil.

r.4 Tripping Devices

a) All electrical tripping coils shall be suitable for operation at any voltage between 110% and **70%** of the nominal control voltage measured at the device terminals.

b) Each circuit-breaker shall be equipped with two shunt trip system. The one shunt trip system shall be electrically separated from the other system.

c) An emergency hand tripping (mechanical) device shall be provided in the operating mechanism

r.5 Operating Mechanism

The breaker shall include suitable spring/Hydraulic/combined operating mechanism to assure proper opening & closing operations. The provision shall be made for checking adjustments

and opening characteristics. The mechanism shall be capable of re-closing within the range specified in the applicable standards. The mechanism shall include dual trip coils. Charging of opening mechanism shall be possible in the event of failure of the motor drive

Spring Operated Mechanism:

- a) Spring operated mechanism shall be complete with motor, opening spring, closing spring with limit switch for automatic charging and all necessary accessories to make the mechanism a complete operating unit.
- b) As long as power is available to the motor, a continuous sequence of closing and opening operations shall be possible.
- c) After failure of power supply to the motor, at least O-C-O operations of the circuit breaker shall be possible.
- d) Breaker operation shall be independent of the motor which shall be used solely for compressing the closing spring.
- e) Motor rating shall be such that it requires only about 30 seconds for fully charging the closing spring.
- f) Closing action of the circuit breaker shall compress the opening spring ready for tripping.
- g) When closing springs are discharged after closing a breaker, closing springs shall automatically be charged for the next operation. And an indication of this shall be provided in the local control cabinet & SAS

r.6 Auxiliary Switches

Each breaker shall have auxiliary switches with adequate number of NO and NC contacts all wired to terminals located in the local control cubicle of the circuit breaker bay. Additional 10 NO (Normally open) & 10 (Normally Close) auxiliary contacts for future use should be provided & wired up to terminal block of LCC.

r.7 Indication Devise

- a) Position indicators shall be provided to clearly indicate whether a circuit-breaker is open or closed.

	Status	Colour
Open position	Open	Green
Closed position	Closed	Red

- b) Each circuit-breaker shall be provided with an operation counter to record the number of tripping operations performed. The counter may be located at the local control cubicle.
- c) All position indicators and counters shall be readable at a convenient elevation i.e. from the place of operation.

s. Principal Parameters :-

The Circuit Breakers of GIS equipment shall confirm to the specific technical requirements given as under.

Sr. No.	Particulars	33KV/66KV/132KV/(220KV)/400KV
1)	Enclosure	Single/Single/Single/(Single or separate phase wise)/separate
2)	Enclosure material	Aluminum Alloy
3)	Rated voltage	36KV/72.5KV/145KV/245KV/420KV
4)a	Rated current(Line, Trans & Reactor)	2500A/1600A/1600A/3150or2000A /3150A
b	Rated current (Bus-bar & Bus coupler)	3150A/ 2000A/ 2000A/ 3150A or 2500A/4000A
5)	Rated frequency	50 Hz.
6)	Rated short-circuit breaking current/ Duration	40/40/40/50/ 63 KArms 3 sec
7)	Rated break-time	3cycle
8)	Rated short-circuit making current	100/100/100/125/157 KAp
9)	Rated operating sequence	O-0.3s-CO-3min-CO
10)	Type of operating mechanism for circuit Breaker	Spring–Spring/hydraulic/combined
11)	Rated control voltage - Closing coil - Tripping coil	110/220 VDC 110/220 VDC
12)	Mechanical Endurance class	M2
13)	Electrical Endurance class	E1
14)	Characteristic for short line Fault related to rated short circuit breaking current	As per IEC : 62271-100
15)	TRV characteristics	As per IEC : 62271-100
16)	Inductive current breaking capability	Switching No Load current of transformer
17)	First pole to clear factor	As per IEC : 62271-100
18)	Opening time in ms	Notmorethan40
19)	Closing time in ms	Notmorethan100
20)	Noise level base of CB	As per NEMA standard
21)	No of tripping coils per breaker	2
22)	No of closing coils per breaker	1
23)	Restricting probability class	C2

24)	Rated line charging breaking Current	10/10/50/125/400A (Max. over breaking capacity voltage factor 1.5PU)
25)	Rated cable charging breaking current	50/125/160/250/400A
26)	Rated capacitor bank Switching current	400/400/400/400/400A
27)	Rated out of phase making And breaking current in %of rated short circuit breaking current	As per applicable IEC

Controlled switching shall be provided for GIS as per indicated in BOQ of respective tender.
The circuit breaker shall be suitable for the application

- a. Switching Off & On of the Line
- b. Switching Off & On of the Transformer
- c. Switching Off & On of the Shunt Reactor

The controlling relay shall also record and monitor switching operations and make adjustments to the switching instant to optimize switching behavior as necessary. It shall provide self- diagnostic facilities, signaling of alarms and enable downloading of data captured from switching events.

Calculations and related test reports of scheme proving rating for duties specified above shall be furnished in the bid. The calculations shall take care of requirements of programming etc. for setting switching for various duties like long line, Shunt reactor, power transformer and time setting.

The proposed scheme should be designed keeping in view all the system parameters of GETCO and applicability with various operations. Circuit Breaker on which CSD is to be provided along with all the other connected equipment's, Transformer, reactor, CT-PT, LA Dis-conenctor CVT, wave trap etc. is not supposed to be Mal functioned or failed due to this scheme. The CSD supplier shall be responsible for any such unwanted event. The very advantage of provision of controlled switching should not be spoiled due to any design defect. All the preliminary literatures on this scheme should be provided with the bid. Bidder shall provide all the detailed documents, function diagrams, calculations and design criteria etc.

t. Technical Requirement for controlled switching device :-

- a) CSD shall be designed to operate correctly and satisfactorily with the excursion of auxiliary A/C & DC voltages and frequency as specified.
- b) The CSD shall have functions for switching ON & OFF the circuit breakers.
- c) The CSD shall get command to operate the breakers manually. The controller shall be able to analyze the current and voltage waves available through the signals from secondary's of CTs & CVTs for the purpose of calculation of optimum moment of the switching the circuit breaker and issue command to circuit breaker to operate.
- d) The CSD shall also have an adaptive control feature to consider the next operating time of the breaker in calculation of optimum time of issuing the switching command. In calculation of next operating time of the breaker, the CSD must consider all factors that may affect the operating time of the breaker such as, but not limited to, ambient temperature, control voltage

variation, SF6 gas density variations etc. Schematic drawing for this purpose shall be provided by the contractor. The accuracy of the operating time estimation by the controller shall be better than ± 0.5 ms.

- e) The CSD should have display facility at the front for the display of settings and measured values.
- f) The CSD shall be PC compatible for the setting of various parameters and down loading of the settings and measured values, date, time of switching etc. Window based software for this purpose shall be supplied by the contractor to be used on the owner's PC.
- g) The controller shall be suitable for current input of 1 ampere from the secondary of the CTs and 110 V or 220V (Ph to Ph) from the PTs or CVTs. The CSD shall withstand transient and dynamic state values of the current from the secondary of the CTs and CVTs.
- h) The CSD shall have time setting resolution of 0.1 ms or better.
- i) The CSD shall have sufficient number of output/input potential free contacts for connecting the monitoring equipment and annunciation system available in the control room. Necessary details shall be worked out during engineering of the scheme.
- j) The CSD shall also record and monitor the switching operations and make adjustments to the switching instants to optimize the switching behavior as necessary. It shall provide self-diagnostic facilities, signaling of alarms and enable downloading of data captured from the switching events.
- k) The provision for bypassing the Controlled switching device shall be provided through BCU and SCADA both so that whenever, the CSD is not healthy due to any reason (including auxiliary supply failure), uncontrolled trip/close command can be extended to the circuit Breaker. Alternatively, in case of any non-operation of the CSD after receiving a close/trip command after a pre-determined time delay, the CSD should automatically be bypassed so as to ensure that the trip and close commands are extended to the Trip/Close coils through subsequent command.

u. Tests :-

Type Tests

All the CSDs offered shall be fully type tested for following, as per relevant standard latest Editions at the NABL accredited or Government approved laboratory of the eligible country.

A. Dielectric withstand test (IEC-60255-5)

1. Power frequency voltage withstand
2. Impulse voltage withstands

B. Electromagnetic immunity tests

1. 1 MHz burst (IEC- 60255-22-1)
2. Electrostatic discharge (IEC- 60255-22-2)
3. Radiated electromagnetic field (IEC- 60255-22-3)
4. Fast transient / burst immunity test (IEC- 60255-22-4) / IEC61000-4-4)
5. Surge immunity test (IEC- 61000-4-5)
6. Conducted disturbances induced by radio frequency fields (IEC- 61000 6)
7. magnetic field test (IEC- 61000-4-8,9 & 10)
8. Ripple on Dc power supply (IEC 61000-4-17)

C. Electromagnetic interference tests (IEC 60255-25)

1. Conducted emission test
2. Radiated emission test

D. Mechanical test

1. Vibration test (IEC- 60255-21-1)
2. shock test (IEC- 60255-22-2)
3. bump test (IEC- 60255-22-2)
4. Seismic test (IEC- 60255-22-3)

E. Environment test

1. Cold test (IEC-60068-2-1)
2. dry heat test (IEC-60068-2-2)
3. Damp heat test steady state (IEC-60068-2-3)
4. Damp heat cyclic(IEC-60068-2-30)

The Bidder shall furnish ONE set of all above type test reports for the offered CSD along with the offer. The type test reports shall not be older than 15 (Fifteen) years and shall be valid as on the last date of submission of bid.

v. Dis-connector Switches and Maintenance Grounding Switches: -

v.1 The GIS dis-connector switches and grounding switches shall comply with the following general requirements of disconnect switches and the latest version of the relevant specifications IEC 60129, 61128, 61129, 61259.

v.2 Disconnect switches shall be gang operated and separate phase wise for 66 kV, Single or separate phase wise for 66 kV and three phase encapsulated for 66 kV/11 kV, group operated, no break, with one common motor operated mechanism for all the three poles. They shall also have facilities for emergency manual operation and necessary handles shall be provided.

v.3 Maintenance earthing switches shall be gang operated and separate phase wise for 66 kV, Single or separate phase wise for 220 kV and three phase encapsulated for 66 kV/11 kV, group operated, no break, with one common motor operated mechanism for all the three poles. They shall also have facilities for emergency manual operation and necessary handles shall be provided.

v.4 Disconnect switches and grounding switches shall have electrical and Mechanical interlocks to prevent grounding switch from closing on an energized section. OR Disconnect switches and grounding switches shall have electrical interlocks to prevent grounding switch from closing on an energized section. However, pad locking arrangement shall be provided to have mechanical interlock manually.

w. Interlocks :-

Interlocking devices must provide absolute and positive protection against potentially harmful mal-operations of the switchgear. The following functions shall be assured:

- a) Forcing the operator into the only safe and logic sequence to actuate breakers, switches, isolators and grounding switches.
- b) Checking the actual fully closed or fully open position of all switching elements before and after each move.

- c) Providing the logical checks and issuing the resulting PERMISSIVE or BLOCKED signals for the switchgear.
- d) Indicating positively the absolute condition/position of the supervised equipment.
- e) Local manual and remote electrical operation of all essential functions.
- f) Local emergency unlocking facilities via safety-key switches under the full responsibility of the operator.

Intraday and interlay interlocking shall be provided. Electrical interlocking arrangement shall be fail-safe type. Mechanical interlocks for isolator & Earthing Switch shall be fail-safe type.

w.1 All main contacts, male and female, shall be silver plated.

w.2 Each disconnect switch and grounding switch shall open or close only due to motor driven or manual operation independently. The switch contact shall not move due to gravity or other means, even if a part fails. Once initiated, the motor mechanism shall complete an open or close operation without requiring the initiating contact be held closed. Operation of respective end position limit switches shall only disconnect the motor mechanism. There should also be a pre-set timer in motor circuit for protection against time over-run in case of inadvertent failure of drive mechanism in any intermediate position of the dis-connector travel path.

w.3 The disconnect switches and grounding switches shall be located as shown in the Single Line Diagram.

w.4 The disconnect switches shall be capable of interrupting the charging current of the connected GIS bus & associated components.

w.5 Duty requirements: The disconnecting switches shall have breaking capabilities as per IEC requirements. Contact shielding shall be designed to prevent restrikes and high local stresses caused by the transient recovery voltages when currents are interrupted. The bus disconnecting switches shall reliably handle capacitive currents due to the making and breaking of switchgear components as well as commutation currents due to bus bar reconfiguration. The fast acting ground switches, used for overhead double circuit lines and underground cable feeders shall be capable of switching induced current as per IEC requirement.

x. Short Circuit Requirements :-

The rated peak short-circuit current or the rated short time current carried by an isolator or earthing switch for the rated maximum duration of short circuit shall not cause:

- a) Mechanical damage to any part of the isolator or earthing switch.
- b) Separation of the contacts or contact welding.
- c) A temperature rise likely to damage insulation.

y. Operating Mechanism :

y.1 Mechanism shall be arranged mechanically, electrically, so that all three phases of any particular disconnect switch or grounding switch operate simultaneously.

y.2 All mechanisms shall be suitable for electrical motor operation to achieve a fully automatic operation. For emergency situations manual operation shall be possible. Handles or hand cranks

shall be provided, together with all necessary operation rods and rod guides. Manual operation shall be prevented if the interlocking system does not allow the operation of the switch.

y.3 The auxiliary supply shall be electrically decoupled from the motor when the switch is operated manually.

y.4 The mechanisms shall be arranged for locking in the open and in the closed position. Facility shall be available to allow the switch to be padlocked in any position.

y.5 Disconnecting operating mechanism of all disconnectors/ isolator & earth switches shall be at a easy operable height.

y.6 The isolator shall be provided with positive continuous control throughout the entire cycle of operation.

y.7 The operating pipes and rods shall be sufficiently rigid to maintain positive control under most adverse conditions and when operated in tension or compression for isolator closing. They shall also be capable of withstanding all torsional and bending stresses due to operation of the isolator.

z. Auxiliary Switches :-

All disconnecting switches shall be provided with electrically independent auxiliary switch, directly driven by the common operating shaft. Each disconnect switch and grounding switch shall furnish with sufficient Nos. of NO – NC as per entire scheme requirement. Additional 6 NO (Normally open) & 6 (Normally Close) auxiliary contacts for future use should be provided & wired up to terminal block of LCC. The auxiliary switches shall indicate the position of the switch contacts, and shall be independent of the motor operation.

aa. Position Indicators :-

Mechanically connected position indicators shall be provided externally to permit observation of close/open position of the disconnect switch and grounding switch. The place of Position Indicators should be easily visible from the place of operation of respective equipment.

Position Indicator	Status	Color
Open position	Open	Green
Closed position	Closed	Red

ab. Technical Data Requirements for Disconnector :-

Sr. No.	Particulars	Parameter
1	Enclosure	Single/Single/Single/(Single or separate Phase wise) /separate phase wise
2	Enclosure material	Aluminum Alloy
3	Rated voltage	36/72.5/132/245/420kV

4	Rated current (A)(Feeder)	2500/1600/1600/ 3150or2000A /3150A
5	Rated current(Bus bar &Bus coupler)	3150A/2000A/2000A/3150Aor2500/4000A
6	Rated short-time current Duration	40/40/40/50/ 63kArms 3sec
7	Rated control and operating voltage	Asperclause2.3.1
8	Type of operating mechanism	Motor operated
9	Type	Mechanically & electrically ganged operated
10	Rated insulation level	
a)	Power frequency with stand voltage	
	-phase to phase, between phases	70/140/275/460/520kVrms
	-Across the isolating distance	80/160/315/510/610 kVrms
b)	Lightning impulse withstand	
	-phase to phase, between phases	170/350/650/1050/1425kVpeak
	-Across the isolating distance	195/375/750/1200/1665kVpeak
11	Mechanical Endurance Class	M2
12	Bus transfer switching capability	80%(max.2500A)
13	Rated bus charging current	0.1A/0.2A/0.25A/0.3A

ac. Low-voltage test provision :-

A low-voltage test provision may be supplied with a grounding switch to permit test voltages of up to 10kV (optional 2.5kV) and up to 200 A to be applied to the conductor without removing SF6 gas or other components, except for ground shunt leads.

ad.1 Fast Acting Grounding Switches :-

ad.1 Fast acting grounding switches can be located at the terminal of HV/EHV overhead line/cable. They shall be able to switch safely load currents of overhead lines. They must have fault making capability and be able to switch on a live line. Applicable standards are IEC 60129, 60517, 61129. The fast acting grounding switches shall comply with the following general requirements of fast acting grounding switches and the latest revision of the relevant IEC specifications.

ad.2 Fast acting grounding switches shall be of three phase, encapsulated, three phase linkage group operated by a maintenance-free self contained electrical motor. They shall also have facilities for emergency manual operation and the necessary operating handles or hand cranks shall be supplied.

ad.3 Fast acting grounding switches shall be electrically or mechanically interlocked with related disconnectors, to prevent the fast acting grounding switch from closing on an energized bus section.

ad.4 All main contacts, male and female, shall either be silver plated or shall have silver inserts.

ad.5 Each fast acting grounding switch shall open or close only due to motor-drive or manual operation but shall be operable from local only. The switch contact shall not move due to

gravity or other means, even if a part fails. Once initiated, the motor mechanism shall complete an open or close operation without requiring the initiating contact to be held closed.

ad.6 Each fast acting grounding switch shall be fully insulated and connected to ground by a removable bolted link in order that the grounding switch may be used for various test purposes. The insulation shall be capable of withstanding an applied power frequency voltage of 5 KV

ad.(a) Operating Mechanism :-

- Mechanisms shall be coupled either mechanically or electrically or by both, so that all three phases of any particular fast acting grounding switch operate simultaneously without any discrimination.
- All mechanisms shall be equipped with a motor suitable for operation from the auxiliary supply, and a set of springs so arranged that energizing of the motor will cause the springs to be charged and then released. The springs in turn shall close the fast acting grounding switch.
- Motors shall be suitable for operation at any voltage between 85% and 110% of the rated auxiliary voltage, measure at the motor terminals.
- For emergency situations manual operation shall be possible. Handles or hand cranks shall be provided, together with all necessary operation rods and rod guides.
- The auxiliary energy shall be electrically uncoupled from the motor when the switch is operated manually.
- The mechanisms shall be arranged for locking in the open and in the closed position.

ad.(b) Auxiliary Switches :-

Each of the fast acting grounding switch shall be furnished with sufficient Nos. of NO – NC as per entire scheme requirement. Additional 6 NO (Normally open) & 6 (Normally Close) auxiliary contacts for future use should be provided & wired up to terminal block of LCC. The auxiliary switches shall indicate the position of the switch contacts, and shall be independent of the motor operation.

ad.(c) Position Indicators :-

Mechanically connected position indicators shall be provided externally to ascertain the open/close position of the grounding switch. It should be easily visible from the place of operation of equipment.

Position Indicator	Stat	Color
Open position	Open	Green
Closed position	Close	Red

ae. Technical Data Requirement :-

High Speed Earthing Switch

Sr. No.	Particulars	33kV/66kV/132kV/(220kV)/400kV
1)	Enclosure	Single/Single/ (Single or separate phase wise)/separate phase wise
2)	Enclosure material	Aluminum Alloy
3)	Rated voltage	36/72.5/145/245/420kV
4)	Rated short-time current	40/40/40/50/ 63kArms3sec
5)	Rated peak with stand current	100/100/100/125/157kAp
6)	Type of operating mechanism	Motor operated
7)	Rated control and operating voltage	Asperclause2.3.1
8)	Power frequency with stand voltage across the open gap	70/140/275/460/520kVrms 80/160/315/510/610 kVrms
9)	Lightning impulse with stand voltage across the open gap	170/350/650/1050/1425kVpeak 195/375/750/1200/1665kVpeak
10)	Electrical Endurance class	E1
11)	Rated induced current switching capability	AsperIEC62271–102classB

ae.1 Current Transformers:

ae.1.1 The current transformers provided for each phase shall be supplied in accordance with the following general requirements and the latest revisions of the relevant IEC- 61869 specifications.

ae.1.2 The current transformers must be suitable for continuous operation when installed on the conditions.

ae.1.3 The current transformer shall be ring / toroid type, multi ratio with fully distributed secondary windings with relay accuracy as per IEC : 60185, incl. IEC : 61869, multi core as per requirement and shall be mounted inside the high voltage enclosure. The secondary terminals of current transformers shall be placed outside the high voltage enclosures, mounted in suitable, accessible terminal boxes and the secondary leads of all the current transformers shall be wired to shorting type terminals.

ae.1.4 It shall be possible to test each current transformer without the removal of gas through the insulated grounding switches.

ae.1.5 The number and position of the current transformers shall be relative to the circuit breakers, disconnecting switches and ground switches as detailed in the attached single line diagram.

ae.2 Rating and Diagram Plates

Rating and diagram plates shall be provided. The information to be supplied on each plate shall be as specified in the relevant IEC specification, which shall be given for the tap for which the rated performance is specified and for each transformer core.

66 KV class CT-Bay wise core requirement considering 12.5 MVA 66/11 KV Transformer								
Core No.	Purpose	Ratio	Out putbur den	Accu racy class	Instrumen t security factor	Min. Knee point voltage at highest rated current	Max. excita ti on current at KPV	Max. CTR ct Sec. at highest ratio
	Feeder-bay							
1	Metering	600 - 300/1	15 VA	0.5	≤5	--	--	--
2	Dir. O/C-E/F Protection	600 - 300/1	10 VA	5P	10	--	--	--
3	Spare	600 - 300/1	10 VA	5P	10	--	--	--
	12.5 MVA, 66/11 KV Transformer Bay (HV)							
1	Metering	200 - 100/1	15 VA**	0.5	≤5	--	--	--
2	Non-Dir. O/C-E/F Protection	200- 100/1	10 VA**	5P	10	--	--	--
3	Differential Protection	200 - 100/1	--	PS	--	100 to 400 V	100 mA (at 100 V) to 200 mA (at 400 V)	<5Ω
4	Spare	200 - 100/1	--	PS	--	100 to 400 V		<5Ω
	Bus Coupler Bay							
1	Metering	600 - 300/1	15 VA	0.5	≤5	--	--	--

2	Non-Dir. O/C- E/F Protection	600 300/1	-	10 VA	5P	10	--	--	--
3	Spare	600 300/1	-	10 VA	5P	10	--	--	--

ae.3 Voltage Transformer:

SF-6 insulated: Each voltage transformer shall be metal enclosed, SF6 insulated inductive type in accordance with relevant IEC 61869 The location, polarity, ratios, and accuracy shall be as specified.

ae.3.1. Construction:

VTs should be in segregated compartment and not forming a part of bus bar. Transformers should be of either plug-in construction or the disconnect-link type, and be attached to the gas-insulated system in such a manner that they can be easily disconnected while the system is being dielectrically tested Alternately, a voltage transformer designed so that it does not have to be disconnected during dielectric testing may be specified. The metal housing of the transformer should be connected to the metal enclosure of the GIS with a flanged, bolted, and gasket joint so that the transformer housing is grounded to the GIS enclosure. Adequate measures shall be provided to prevent any unacceptable impact on the secondary control and protection circuits, which might result from fast transients (VFT) or Ferro-resonance.

ae.3.2. Covers and shields :

Special covers and any necessary corona shields should be supplied so that the system can be pressurized and dielectrically tested after removal of the transformer. Primary and secondary terminals: Primary and secondary terminals should have permanent markings for identification of polarity, in accordance with IEC. The secondary terminals of voltage transformers shall be placed outside the high voltage enclosures, and the secondary leads of all the voltage transformers shall be wired up to terminals mounted in suitable & accessible terminal boxes. Test condition for tests at site: Power frequency tests for the completed GIS at site shall be possible without removing the VT. The primary and secondary neutral terminal points, intended to be earthed, should be insulated and shall withstand power frequency voltage of 3 KV rms for 1 minute. The VT shall be capable to withstand discharge current arising from capacitance of underground cable circuits.

Technical Data Requirement :-

SN	Particulars	Parameters
1	Rated voltage	33/66kV/132/220kV/400 KV
2	Highest system voltage	36/72.5/145/245/420 KV
3	Rated frequency	50 Hz.
4	PF(dry)with stand voltages	70/140/275/460/610 KV
5	Voltage factor	1.2 continuous
6	1.2/50microsec.lightningimpulswithstandvoltage	170/350/650/1050/1450/KV

7	Earthing	Effective
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66 KV class Bus PT Core Details				
Core	Purpose	<u>Ratio</u>	Burden	Class of accuracy
1	Metering	$6KV/\sqrt{3}/110V/\sqrt{3}$	50VA	0.5
2	Protection	$6KV/\sqrt{3}/110V/\sqrt{3}$	50VA	3P
3	Spare	$6KV/\sqrt{3}/110V/\sqrt{3}$	50 VA	3P

af. Bushings :-

- Outdoor bushings shall be provided for connection of conventional external conductors to SF-6 GIS if asked in general layout plan. Bushing shall be polymer type only. Necessary valid type test reports as per relevant applicable standards shall be submitted. Suitable clamp & connectors shall be supplied with bushing. The dimensional and clearance requirements for the metal clad enclosure shall be maintained as per requirement of relevant standards.

- All the bushings shall have an impulse & power frequency withstand level that is higher or equal to the level specified in cl. 2.3. Only SF-6 insulated composite silicon bushings will be accepted. The terminals on the outdoor bushings shall be a solid stem with dimensions specified.

ag. Metal-Enclosed Surge Arresters :-

- 66 KV, 20 KA, CI-4 / 198 KV, 10 kA, CI-3 / 120 KV, 10 kA, CI-3 / 60 KV, 10 kA, CI-3 / 30 KV, 10 KA, CL-2 hermetically sealed, Gapless, ZnO, Surge arrestor, suitable for use with GIS, for each phase, at the 66kV line underground cable entry terminals of GIS shall be provided, if indicated in SLD/BOQ of respective tender. Each Surge Arrester shall be provided with self- leakage current monitoring device at convenient elevation. Location of SF-6 Surge Arrester shall be as per tender drawings.

- They shall have adequate thermal discharge capacity for severe switching surges, long duration surges and multiple strokes. The surge arresters when provided with pressure relief devices shall be capable of withstanding the internal pressures developed during the above discharges without operation of the pressure relief devices. Surge Arresters, if any provided, shall be of either the "plug-in" construction or the disconnect link type and be attached to the gas-insulated system in such a manner that they can be readily disconnected from the system while the system is being dielectrically tested. The metal housing of the arrester shall be connected to the metal enclosure of the GIS with a flanged, bolted joint.

-The ground connection shall be sized for the fault level of the GIS. It shall be insulated from the GIS-enclosure and grounded externally to permit periodic maintenance and monitoring of the leakage current.

-If the arresters are not equipped with removable links, special covers and any necessary corona shields should be supplied so that the system can be pressurized and dielectrically tested after removal of the arrester.

ah. Insulating Gas and Gas Leakage Rate :-

The GIS shall be furnished with sufficient sulfur hexa-fluoride (SF-6) gas to pressurize the complete system in a sequential approach, one zone or compartment at a time to the rated nominal density. The guaranteed leakage rate of each individual gas compartment and between compartments must be less than 0.5% p.a. for the service life of equipment.

The quality of new filled-in SF-6 gas shall meet the following requirements in line with IEC :60376.

Content	Specification	Analytical methods (for indication only, not exhaustive)	Precision
Air	2 g/kg. [note1]	Infrared absorption method	35 mg./kg.
		Gas-chromatographic method	3–10 mg./kg.
		Density method	10 mg./kg.
CF ₄	2400 mg./kg. [note2]	Gas-chromatographic method	9 mg./kg.
H ₂ O	25 mg./kg. [note3]	Gravimetric method	0.5 mg./kg. [note3]
		Electrolytic method	2–15 mg./kg.
		Dew point method	1°C
Mineral oil	10 mg./kg.	Photometric method	<2 mg./kg.
		Gravimetric method	0.5 mg./kg. [note5]
Total acidity expressed in HF	1 mg./kg. [note4]	Titration	0.2 mg./kg.
SO ₂	<1 ppmv		

The supplier should provide guidelines or recommended practices for the reuse or recycling of SF6 gas removed from the equipment. These guidelines should be consistent with current industry practices, as they pertain to the effect of SF6 on global warming; i.e. SF6 gas should be reused and recycled whenever possible and never be unnecessarily released into the atmosphere. Clear instructions shall be provided by bidder about handling, recycling & treatment of new and used SF6 gas.

SF6 gas shall be tested for purity, dew point, air, hydrolysable fluorides, and water contents as per IEC:60376, 60376A & 60376B and test certificates shall be furnished to the Employer indicating all test results as per IEC standards for each lot of SF6 gas.

ah.1 Gas sections :-

- The GIS enclosures shall be divided into several gas sections separated by gas-tight barriers. Each section shall be provided with necessary valves to allow evacuation and refill of gas without evacuation of any other section. Location of gas barrier insulators is to be clearly discriminated outside the enclosure by a band of distinct colour normally used for safety purposes.

- The gas system proposed shall be shown on a "gas single line diagram" and submitted with the technical bid and in the event of an order for approval. It should include the necessary valves, connections, density monitors, gas monitor system and controls, indication, orifices, and isolation to prevent current circulation. Means of calibrating density monitors without de-energizing the equipment should be specified by the supplier.

- For the purpose of gas monitoring and maintenance, the GIS shall be divided into various individual zones in each bay. The CB gas zone shall be independent from all other gas compartments and shall meet the requirement of relevant IEC. Each gas zone shall be furnished with a gas monitoring system consisting of a gas density continuous monitoring device provided with two electrically independent contacts which operate in two stages as follows :

- a) First alarm : At a gas density normally 5 to 10% below the nominal fill density.
- b) Second alarm : Minimum gas density to achieve equipment ratings.

ai. GIS Connection :-

ai.1 GIS to Transformer/Reactor :-

1) For 66/11 kV Transformers (As specified in SLD / SECT DRG / BOQ):

66 KV side : by GIS SF-6 to air bushing to OIP condensers bushing of transformer by conductor. GIS SF-6 to air bushing shall be polymer type only.

ai.2 GIS to Line:

66 KV class: by GIS SF-6 to air bushing to line termination gantry by conductor. GIS SF-6 to air bushing shall be polymer type only. (As specified in SLD / SECT DRG / BOQ.) or 66 KV class: by GIS to XLPE cable (66 KV – single or twin, 1C, 630 mm.², 66 KV - single or twin, 1C, 630 mm.², 66 KV - single or twin, 1C, 630 mm²) as per BOQ and SLD)

ai.3 SF6 GIS to XLPE Cable Termination:

Cable termination kit (CSE) shall be supplied by GIS OEM/EPC contractor. This interface section shall be designed in a manner which will allow ease of operation and maintenance. The SF-6 GIS to XLPE cable termination shall conform to IEC : 859 (latest edition). The provision shall be made for a removable link. The gap created when the link is removed & should have sufficient electric strength to withstand the switchgear high voltage site tests. The bidder may suggest alternative arrangements to meet these requirements. The corona rings/stress shields for the control of electrical field in the vicinity of the isolation gap shall be

provided by the GIS manufacturer. All supporting structures for the SF-6 bus-duct Connections between the XLPE cable sealing ends and the GIS shall be supplied by the supplier.

The supplier may specify alternative connecting & supporting arrangements for approval of the purchaser. The opening for access shall be provided in each phase terminal enclosures as necessary to permit removal of connectors to isolate the XLPE cables to allow carrying out the insulation tests. The typical arrangement drawing of interconnecting bus-duct from GIS bay module to XLPE cable termination end shall be submitted along with offer. A separate cable basement is provided for cable entry, its distribution and installation.

The design of the cable end box shall fully comply with the IEC standard. The type and size of cable is specified. All end cable modules shall be suitable for connecting single core, XLPE specified cable. Necessary provision for termination of specified nos. of such power cables shall be made in GIS.

GIS supplier shall either carry out the work of termination or coordinate with cable terminator for such connection as specified in schedule of requirement. Provision shall be suitable for terminating GETCO Approved cable.

aj. GIS SF-6 SCADA :-

For Total control, monitoring, supervision and operation from SCADA system potential free contacts shall be provided for each and every interface of Switchgear status, Control, Monitoring, Interlocking, Alarms, Troubles etc. and all other interfaces considered in LCC which are mandatory.

66 KV, 11 KV Circuit Breaker :

1) Pressure switch shall be provided with following minimum numbers of potential free contacts for breaker gas monitoring in SCADA / Control Panel status; over and above provided for Scheme.

- (a) SF-6 gas pressure normal – minimum 1 NO or 1 NC plus one spare
- (b) SF-6 gas pressure low – minimum 2 NO or 2 NC plus one spare
- (c) SF-6 gas pressure lockout - minimum 2 NO or 2 NC plus one spare

2) Following minimum numbers of potential free contacts are required to be provided for breaker Monitoring in SCADA / control panel; over and above provided for breaker scheme:

- (a) Breaker spring charge – minimum 2 NO or 2 NC plus one spare
- (b) Control supply DC-1 & DC-2 fail, Motor MCB Trip, CB AC supply fail indication contacts Plus one spare.
- (c) Local remote switch – minimum 1 NO or 1 NC plus one spare for each position i.e. Local & Remote
- (d) CB ready status for Auto reclose for 145 KV - minimum 1 NO or 1 NC plus one spare
- (e) Other interfaces if any SCADA

3) Similarly, potential free contacts for SF-6 Gas monitoring of other switchgears and compartments as per requirement. i.e. Local & Remote

4) Other interfaces if any

Similarly, potential free contacts for SF-6 Gas monitoring of other switchgears and compartments as per requirement in future scope.

ak. Wiring Requirements :-

Each circuit breaker shall have control suitable for operation on 110 V/220 V DC with two electrically independent trip circuits. The miniature circuit-breakers (MCB) shall be provided for the closing circuit and an independent separate switch fuse unit of suitable rating shall be provided for the primary and back up trip circuits.

1. Wiring shall be complete in all respects to ensure proper functioning of the control, Protection and monitoring and interlocking schemes.
2. DC circuit for trip coil 1 & 2 shall be wired separately.
3. Wiring shall be done with flexible 1100V grade, FRLS, PVC insulated, switchboard wires with minimum 1.5 mm² stranded copper conductor however, based on functional requirement higher size shall be provided. The control wire in a grouped environment shall not convey flame, continue to burn. Wiring between equipment and control cubicle shall be routed through energized parts.
4. Each wire shall identify at both ends with permanent markers bearing wire numbers as per Contractor's wiring diagram.
5. Minimum 1 set of spare contacts as utilized contacts shall be provided for each and every component of LCC whose contacts are utilized in schematics.
6. All spare contacts of relays, push buttons, auxiliary switches etc. shall be wired up to terminal blocks in the control cubicle.
7. Terminal blocks shall be 1100V grade, stud type with engraved numbers suitable for termination of at least two numbers of 2.5 mm² stranded copper conductor. Terminal blocks for CT, PT, and auxiliary AC & DC supply shall be disconnecting link type.
8. Not more than two wires shall be connected to any terminal. Spare terminals equal in number to 20% active terminals shall be furnished.
9. Terminal blocks shall be located to allow easy access. Wiring shall be so arranged that individual wires of an external cable can be connected to consecutive terminals.
10. Terminal connectors that carry power supply should be shrouded from adjoining connectors.
11. Manufacturer shall provide all control wiring and terminations internal to the switchgear, and connecting the switchgear to the bay control cubicles.
12. All control cables shall be shielded. Cable shields shall be grounded. Grounding connections shall be as short and direct as possible and shall terminate at the point of entry to cubicles or terminal boxes.
13. Co-axial type cable glands suitable for use with shielded cables shall be used at each termination.
14. All control cables shall be installed and terminated in such a manner as to limit the effects of transient electromagnetic voltages on the control conductors to an acceptable level.
15. Any cabling within GIS shall be supported on cable tray. No cable shall be in hanging position.
16. Insulator cones shall be embedded in full return current carrying metal fixing rings in order to avoid mechanical stresses to the cast resin part and to impart full conductivity across

the flange connection. Earthing of different gas compartments/enclosures is not allowed with cross bonding with any metal strips.

al. Connections within the GIS and their LCCs :-

All cable connections between the various GIS modules and the LCC's shall be made by prefabricated multi-core cables with multipoint plug in connections on both the ends. PTs & CTs circuit shall be wired with crimped type copper lugs. All cables shall be shielded and adequate for their application (indoor / outdoor). The cables shall be fire retardant low smoke. The length and the number of terminal points of control wiring & SF6 gas connections shall be minimized.

The electrical connections between the various gas sections shall preferably be made by means of multiple contact connectors so that electrical connection is automatically achieved when bolting on section to another. The surface of the connector fingers and conductor tubes on such connections shall be silver plated.

am. Name plates :-

Name plates of the following types shall be furnished in a convenient central location to provide information for operation and maintenance.

a) Gas Single Line Diagram showing all HV devices in a single line diagram with the gas sectionalizing of the GIS indicated. Also shown shall be the GIS nomenclature, a legend, Manufacturer's type and serial number and year of manufacture.

b) GIS Rating / Name plate:

Manufacturer's name & address, type & designation, Sr. No, Maximum ambient temperature, System frequency, Maximum continuous voltage, Maximum continuous current at 40°C ambient temperature, Basic Impulse Level, Power Frequency one- minute voltage, Short circuit current, rms., symmetrical Short time (rms.) current & duration, symmetrical Momentary current, peak, Total weight of gas at rated density, Rated gas pressure at 20°C. Opening pressure of the bursting disc, recommended moisture limits of insulation gas (PPMV),

Auxiliary voltages, Contract/Purchase Order numbers, Total weight of the equipment

c) Equipment nameplate containing nameplate rating information for all HV modules (like circuit breaker, disconnect switches, current transformer, voltage transformer, surge arrester, etc.) as required in relevant IEC.

d) Nameplates showing serial numbers and similar data specific to individual components shall be mounted on the components. Each instrument transformer must have its own rating plate mounted adjacent to each terminal box cover, will all terminal

an. Type Tests :-

Following type test reports from NABL laboratory, as specified in IEC standard 62271 – 203 & 62271-100 (amended up to date) shall be submitted for the offered type, rating of GIS invariably with the technical bid. Bid without type test reports will not be considered for evaluation. The type test reports shall not be older than 15 (Fifteen) years and shall be valid as on the last date of submission of bid.

1. Tests to verify the insulation level (Lightning impulse, switching impulse and power frequency withstand test with PD) test On Each device of GIS (CB, DS, CT, Bus etc...) in line with IEC : 62271-203.
2. Dielectric tests on auxiliary circuits.
3. Tests to prove the radio interference voltage (RIV) level (66 KV to 11 KV class)
4. Tests to prove the temperature rise of any part of the equipment and measurement of the resistance of the main circuit.
5. Tests to prove the ability of the main and earthing circuits to carry the rated peak and the rated short time withstand current.
6. Tests to verify the making and breaking capacity of the included switching devices.

A. Circuit breakers

- i. Basic Short circuit duty tests (T10, T30, T60, T100a, T 100 s)
- ii. Short line fault test (L60, L75, L90)
- iii. Single phase test
- iv. Out of phase making & breaking test
- v. Capacitive current switching test
- vi. Shunt reactor current switching test (For 66 KV Class)

B. Dis- connectors

- i. Bus Transfer Current Switching Test

C. Fast acting earth switch

1. Short circuit making test
2. induced current switching test
3. Tests to prove the satisfactory operation of the included switching devices.
4. Tests to prove the strength of enclosures.
5. Verification of the degree of protection of the enclosure.
6. Gas tightness tests
7. Electromagnetic compatibility tests (EMC).
8. Additional tests on auxiliary and control circuits.
9. Tests on partitions.
10. Tests to prove the satisfactory operation at limit temperatures.
11. Tests to prove performance under thermal cycling and gas tightness tests on insulators.
12. Corrosion test on earthing connections (if applicable).
13. Tests to assess the effects of arcing due to an internal fault.
14. Tests on solid dielectric components (operating rods, spacers, etc.)
15. Seismic test / Calculation
16. Test on Auxiliary switches (Electrical & Mechanical Endurance, Heat run, IR & HV test)
17. Tests on CTs and PTs (On Primary & secondary) as per IEC : 61869
18. Test on surge arresters
19. Test on control switching devices/PIR

an.1 Test Certificates:

- a. Certified reports of all the tests carried out at the works shall be furnished in required number copies for approval of the Owner.

- b. The equipment shall be dispatched from works only after receipt of Owner/Purchaser's written dispatch clearance & approval of the test reports.
- c. Routine test certificates of bought out components shall be furnished.
- d. Type test certificate on any equipment or component if so desired by the Owner shall be furnished. Otherwise the equipment shall have to be type tested, free of charge, to prove the design.

an.2 Tests after installation of complete GIS at Site:

After installation and before being put into service, the GIS shall be tested in order to check the correct operation and dielectric integrity of the equipment as laid down in IEC : 62271-

203. The successful bidder shall furnish a commissioning test plan and a statement method for the tests on site.

Tests shall include the following :

1. Dielectric tests on the main circuits.
2. Dielectric tests on auxiliary circuits.
3. Measurement of the resistance of the main circuit.
4. Gas tightness tests.
5. Checks and verifications.
6. Gas quality verifications.
7. On site power frequency voltage withstand test with PD test.
8. Tests as per IEEE C37.122.1 clause 4.10.5.
9. Functional & interlock tests for all items.
10. Demonstration of operational compatibility with SCADA
11. Visual inspection, checks & verifications.
12. Mechanical operation tests of circuit breakers, Dis-connectors and earthing switches and high-speed earthing switches
13. Insulation resistance measurement
14. Tests on CTs and PTs
15. Test on control switching devices/PIR
16. DCRM test (as per Clause 3.15.3 A & B)
17. PD sensor sensitivity check for each PD sensor during commissioning before HV & PD test.

an.3 Drawings, Data, Manuals & calculations:

Drawings, Data, calculations and Manuals shall be submitted in triplicate with the bid and in quantities and procedures as specified in General Conditions on Contract and/or elsewhere in this specification for approval and subsequent distribution after the issue of Letter of Intent. To be submitted with the Bid :

1. Schedule of Guaranteed Technical Particulars
2. All the type test reports as per specification.
3. Typical general arrangement drawings of the equipments indicating space requirement, room dimensions, crane capacity etc.
4. Technical Specifications of equipment and special tools explaining construction features, principle of operation, special features etc.
5. Comprehensive QAP, FQP, SLD, Gas Schematic diagram, Technical brochures, building requirements, Earth mat design, List of recommended spares, special tools or fixtures, O&M manuals, environmental guide for handling SF6 gas & decommissioning, estimated time

schedule for installation & commissioning, bill of materials, and any other documents required for successful commissioning & operation of complete GIS.

6. Control and protection: Block & principle diagram showing proposed scheme, layout & equipment arrangement drawings, catalogues & brochures of offered devices. In absence of above technical documents, bid shall be evaluated accordingly. Successful bidder shall submit 3 sets of spiral bound volume of following drawings & data for approval/ information before commencement of supply:

1. A comprehensive Manufacturing Quality assurance plan with effective quality assurance system. (MQP)
2. Field Quality plan indicating instruction & procedures sequenced for storage, assemble, maintenance and disassembly. (FQP)
3. Gas Schematic diagram (GAS SLD)
4. GIS general arrangement drawings (Plan & section view) including 3D drawing
5. GIS component drawing
6. Interface modules drawing for GIS extension
7. Rating and name plate drawing
8. SF-6 to air bushing /Cable termination drawing
9. Bay wise Bus duct drawings including 3D drawing (Plan & Section views for all offsets/bends)
10. LCC GA & Schematic drawings
11. GIS support structure drawing
12. GIS platforms & walkway drawings
13. GIS key diagram enlisting and marking each and every GIS module clearly & separately identifiable (Indoor & Outdoor)
14. Method Statement along with sequential instruction for dismantling and assembling of all major components of GIS exhibiting service continuity requirement
15. Conductor detachment procedure for GIS and Bus-bar.
16. Capacity calculation of EOT crane for GIS hall
17. Method statement/ procedure of ON SITE high voltage testing with PD measurement and Switching Impulse test
18. Seismic Analysis Report

an.4 Maintenance :-

The operational integrity of the GIS switchgear shall not subject to external influences, such as pollution, moisture, dust etc. As a consequence of this GIS switchgear should be practically maintenance free; however, the details of inspection required at regular interval shall be indicated in the offer. Visual inspection shall be required not below 2 (two) years interval. Inspection shall not be required often than every 10 years. During inspection it must not be necessary to open the switchgear enclosures for interrupt operation of substation. Provision of functional testing of the close and trip coils, auxiliary switches, pressure and control switches etc. shall be provided. Following minimum Maintenance period shall be accepted.

(a) Circuit breaker : 5000 closing and opening or 20 interruptions at max rated current

(b) Dis connector : 5000 closing and opening operations.

(c) Fast acting earth switch: 2000 closing and opening operations or 2 making operations onto max rated fault current. The bidder shall provide the services of experienced persons, supervisors, engineers, experts, etc., for complete specified work for satisfactory operation. Successful bidder shall depute his expert to site annually for the period of Five years from the

date of commissioning, to inspect GIS for carrying out status evaluation of GIS performance. This is intended to share the operational challenges and confirm the maintenances followed by GETCO. The bidder shall have dedicated localized after sales & service team which should be capable of any activity to operate complete GIS satisfactorily.

ao. GIS Building :-

The GIS building, if it is a part of schedule of requirements, shall comply with the requirements of Civil specifications.

For 66/11 KV sub-station, One GIS buildings are required. For 66/11 KV sub-station, only one GIS room is required.

The proposed arrangement of building and positions in which the switchgears shall be installed relative to lines, transformers, cable circuit and any other switchgear of any other voltages will be indicated in general arrangement layout. The overall height of building shall allow for overhead traveling crane.

ao.1 Training :-

Training to Ten (10) persons of DPA on construction, installation, commissioning and O&M shall be imparted by bidder free of cost. Duration of the complete training shall be 7 working days, covering minimum below specified curriculum. Any other specific area may be brought to notice and included.

1. General Explanation for GIS
2. Layout and Architecture of GIS
3. Gas Sectionalisation of GIS
4. Construction of CB
5. Operating Mechanism of CB
6. Maintenance of CB
7. Overhaul of CB (Interrupting chamber)
8. Overhaul of CB (Operating Unit)
9. Construction of DS/ES
10. Maintenance of DS/ES
11. Overhaul of DS/ ES
12. Construction of Bus/ Cable head/ SF-6 – air bushing
13. Maintenance of Bus/ Cable head/ SF-6 – air bushing
14. Overhaul of Bus/ Cable head
15. Overhaul of various transformer connections
16. Operation of GIS with SCADA
17. Construction & Maintenance of Lightning Arrester
18. Construction & Maintenance of VT/CT
19. Construction & Maintenance of Local control panel
20. Erection of GIS at site.
21. Installation & Testing of GIS at site
22. Type tests of GIS
23. Routine tests of GIS
24. Faults simulation of GIS
25. Localization of GIS fault.

Bidder shall at his cost arrange for the above training facilities and in addition shall bear all living expenses plus inland travel expenses of all the trainees. The Purchaser shall only pay to and from passage of the trainees.

ap. Shipment storage and installation :-

The contractor shall be responsible for the loading, transport, handling and offloading of all equipment and materials from the place of manufacture or supply to site. The contractor shall be responsible to select and verify the route, mode of transportation and make all necessary arrangement with the appropriate authorities as well as determining any transport restrictions and regulations imposed by the government and other local authorities. All equipment shall be suitably packed in wooden box with proper marking on each item (Bay & phase wise) and protected during shipment/transportation. Each shipping unit shall be sealed in a clean dry condition with leak-tight shipping covers securely mounted for shipment. All covers to be removed during installation shall be clearly marked. Each shipping section shall be carefully sealed and filled with dry gas to a slightly positive pressure to prevent the entrance of moisture and contamination.

The packing method for the GIS equipment shall be standard and it shall be guaranteed that each component of the equipment will not be damaged, deformed or lost. The storage instructions shall be submitted by bidder for long term storage. Component requiring indoor storage shall be so identified. Gas insulated switchgear (GIS) shall be properly packed to protect during ocean shipment, inland transport, carriage at site and outdoor storage during transit and at the site. Completely assembled bays (subject to transport limitations) of the GIS shall be transported as one shipment unit. Packing materials shall be dust and waterproof. All packages shall be clearly, legibly and durably marked with uniform block letters on at least three sides. Fragile items like bushings, CTs, VTs, Las and fully assembled bays shall be securely packaged and shipped in containers. Silica gel or approved equivalent moisture absorbing material in small cotton bags shall be placed and tied at various points on the equipment wherever necessary. As far as possible, transshipment should be avoided.

Impact recorders (Accelerometers) shall be provided on the packages to confirm that GIS has not suffered any shocks during shipment, transport, handling, etc. The impact recorder readings are to be noted on receipt of equipment at site and reported to user & manufacturer, in case the readings are exceeding the permissible values. It shall be at discretion of user to accept or reject the same. Special precautions shall be taken to protect any parts containing electrical insulation against the ingress of moisture. This applies particularly to the metal clad equipment of which each gas section shall be sealed and pressurized prior to shipping. Either dry nitrogen/air or dry SF-6 gas shall be used and the pressure shall be such as to ensure that, allowing for reasonable leakage, it will always be greater than the atmospheric pressure for all variations in ambient temperature and the atmospheric pressure encountered during shipment to site and calculating the pressure to which the sections shall be filled to ensure positive pressure at all times during shipment. Blanking plates, caps, seals, etc., necessary for sealing the gas sections during shipment to site which may on later stage necessarily be used during repair and maintenance shall remain the property of GETCO. Balance blanking plates, caps, seals, etc. shall be returnable to the contractor.

If considered necessary, blanking plates or other sealing devices shall be provided with facilities for measuring the gas pressure and recharging at any time during the transport period. Any seals, gaskets, 'O' rings, etc. that may be used as part of the arrangement for sealing off gas sections for shipment of site, shall not be used in the final installation of the equipment at site.

Identification numbers shall be stamped into the blanking plates, etc., and on the switchgear equipment to which they are fitted so that they can easily be identified and refitted should it ever be necessary to ship sections of the switchgear back to the manufacturer's works for repair.

The contractor shall ensure that during the period between arrival at site and erection, all materials and parts of the contract works are suitably stored in such approved manner as to prevent damage by weather, corrosion, insects, vermin or fungal growth. The scope of providing the necessary protection, storing on raised platform, as required etc. is included in the works to be performed by the contractor. Cost of the raised platform for temporary storage is deemed to be included in overall cost. The raised platform needs to be made ready before arrival of GIS equipment at site. The contractor may use the available storage areas at site with permission of site in charge. The equipment shall be unpacked immediately before installation. They shall not be left lying unnecessarily in open crates or containers. Special precautions shall be taken when gas sections which have been sealed and pressurized for shipping are opened up to reduce the ingress of dirt and atmospheric moisture to a minimum. Whenever possible this shall only be done immediately prior to installation and if any section is to be left outside for any length of time after being opened, it shall be resealed and pressurized with either dry nitrogen or SF₆ gas until required.

For the purpose of release of payment linked to receipt and physical verification; in case of GIS equipment it shall mean random opening and physical verification of one number of packing unit of each type of main equipment (i.e. GIS CB/ISO/ES/PT/LA etc.) for each voltage level. Thereafter proper re-packing of the GIS unit shall be ensured as per manufacturer recommendation.

ap.1 Installation

During Civil works of GIS Hall including internal cable trench shall be completed along with GIS hall sealing in all respects before taking up the installation and it shall be ensured that Ventilation System is operational and all dust and dirt in the hall are removed. The GIS hall needs to be in positive pressure before starting installation.

The installation area shall be secured against entry of unauthorized personnel. Only certified manufacturer's engineer and supervisor shall undertake the erection works. Engineers and supervisors of the manufacturer shall submit authorization and competency certificate to GETCO. Un-packaging of GIS modules shall be done outside the GIS hall and in no case module to be taken inside GIS hall with packing.

All assembly work shall be done by qualified personnel only who are to be identified and list submitted to GETCO site before starting of erection work. Assembly drawing for GIS erection for the section under progress shall be available and displayed in GIS hall at the time of erection work.

GIS hall door shall have automatic close facility after entry of personnel to avoid dust and moisture entry. Walls and ceiling shall be in a condition so that neither dirt nor plaster might fall or rub off and formation of condensation water in ceiling shall be prevented under any circumstances.

Installation of flanges shall be done immediately after removal of transport covers and O Rings shall be properly stored and taken out only before installation. O Rings are also to be cleaned before use with manufacturer authorized cleaning agent. Bus duct exits in the GIS hall's wall shall be kept covered by suitable means until permanent cover is provided after installation of bus ducts. Approved Field Quality Plan shall be followed during site work

ap.2 Quality Assurance:

i) Superior quality control system shall be adopted to assure high product quality. Raw materials of the best commercial grade quality and high reliability shall be used in the manufacture of GIS. High reliability of materials shall be ensured so as to keep maintenancework to a minimum.

A quality assurance plan for major components such as breakers, disconnecting switches, lightning arrestors, earth switches, etc. with in-process inspection methods, tests, records, etc. shall be submitted with the technical bid. Customer hold points will also be included in the plan, which shall be mutually agreed by the purchaser and manufacturer, and approved.

aq. Technical Particulars of 66 KV GIS Switchgear :-

Sl. No.	Particulars	66 KV GIS (Cubicle type)
1.a	Type (Model No.)	To be specified by the bidder.
1.b	Standard Applicable	IEC : 62271-100/ IEC : 62271-200
2.	Service	Indoor
3.a	Enclosure-Tank	Stainless steel
3.b	Enclosure- Panel	CRCA
4.	Nominal System Voltage	66 KV
5.	Highest System Voltage	75 KV
6.	No. of phases and frequency	3 ph.50 Hz.
7.	Bus-bar material	Copper
8.	Bus Color code	RYB
9.	System Earthing	Impedance earthed
10.	Circuit Breaker Rating	2500 A (IC,OG & BC)
10.1	Continuous Current Rating at 50°C	2500 A for BusBar
10.2	Short Circuit Rating	31.5 KA
10.3	Short Circuit duration	3 sec
10.4	Internal Arc Rating	31.5 KA
10.5	Internal Arc Duration	1 sec.
11.	Rated making Current	As per IEC : 62271
12	Operating duty	O-0.3sec-CO-3minutes-CO
13	Leakage rate per year in gas	Less than0.2%
14.	Bus bar rating	2500 A
15.	Outgoing feeder rating	2500 A
16.	Power Frequency Withstand voltage	66 kV for 1 minute
17.	Impulse withstand voltage (1.2/50 microsec)	75 KV
18.	Control Voltage	110/220 V DC
19	Spring charge motor voltage	110/220 V DC
20.	CT Ratio	300 -150/1-1 (during detail engineering)
21.	PT ratio-STAR/ STAR	(11/√3)/ (.11/√3)/ (.11/√3)
22.	Aux. Contacts	6 NO + 6 NC
23.	Termination	
23.1	Incomers	XLPE Cables as specified
23.2	Outgoings	XLPE Cables as specified
24.	Degree of protection (HV equipment)	IP-65 for Gas Compartment
25.	Dimensions in mm.	1785 (D) X 800 (W) X 2600 (H)

2. Technical Specification of Item No. 2

This includes Supply, Installation, Testing and Commissioning of 25 Way 11 KV indoor type GIS Panel Board of approved make as per following details.

Incomer : 06 (Six) Nos. of 2500 A, i.e. 03 (Three) from Transformer, 02 (Two) for Bus-coupler and 01 (One) from HT DG Set.

Outgoing : 19 (Nineteen) Nos. of 1250 A, i.e. 03 (Three) Nos. for Old 66 KV Substation; 03 (Three) Nos. for Capacitor Bank; 01 (One) No. for Station Transformer; 02 (Two) Nos. for DC-1 & DC-2; 04 (Four) Nos. for 13TH, 14th, 15th & 16th Berths and 06 (Six) Nos. as Spare. The GIS outgoing feeder shall be of 1250 A, 26.1 KA GIS 11 KV Board Panel circuit breaker horizontally insulated horizontal draw out type, electrical motor Operated, spring charged with facility of manual closing. Incomer feeder shall be suitable to terminate 3R X 3C X 300 Sq. mm. cable per phase

3 Nos. of CT 300/1+1+1+1+1 A (PS class/PS class/5P20/0.2/PS class) 20 VA burden CT with 0.2 accuracy, PS class for differential, PS class for REF, 5P20 for over current and earth fault, 5P20 protection class for metering, one no PS class as spare.

Bus Coupler : 02 (Two) Nos. of 2500 A, 26.1 KA VCB circuit breaker horizontally insulated horizontal draw out type, electrical motor operated, spring charged with facility of manual closing as bus coupler with protections of over current and earth fault.

1 No. 3 phase 11 KV/ $\sqrt{3}$ /110 V/ $\sqrt{3}$ /110 V/ $\sqrt{3}$ draw out PT with burden and class 0.2/3P accuracy. This shall be suitable for resistively earthed system & PT shall with duty cycle of 1.9 times for 30 Sec.

This shall consist of the followings.

- 01 (One) No. Digital MFM.
- 01 (One) No. Local / Remote switch for operation
- 01 (One) No. emergency OFF push button outside
- Spring charge status with Indication
- Annunciator window with minimum 8 windows (or as per requirement as directed) with hooter.
- Auto / Manual switch. In Manual mode, it shall have local TNC switch for operation.
- Separate indication for each electrical fault.
- Minimum 8 windows (or as per requirement as directed) Annunciator for all electrical faults.
- Buzzer

General :-

This specification covers the design, manufacture, assembly, testing at manufacture's works before dispatch and delivery of metal clad partitioned, SF6 gas insulated, switchboard panel conforming to IEC-62271-200.

The switchboard panels for incoming bays, outgoing bays, bus coupler/Bus-section bays, etc. shall be fitted with Vacuum circuit breakers, three position disconnecting and earthing switches, voltage transformers, current transformer, metering instruments, protection relays, cable terminal ends for incoming & outgoing cable feeders etc. as per foregoing specification.

Reference Standards :-

The metal-enclosed gas-insulated switchgear, including the operating devices, accessories and auxiliary equipment forming integral part thereof, shall be designed, manufactured, assembled and tested in accordance with the relevant standards, specification and codes of practices, referred to herein and shall be the latest editions including all applicable official amendments and revisions as on the date of opening of bid. In case of conflict between this specification and those (IS Codes, Standards etc.), the former shall prevail. In addition to relevant standards specified in Section-GTR, following standards shall also be applicable :

IEC : 62271-200	Gas insulated metal-enclosed switchgear for rated voltage above 1 KV and up to and including 52 KV
IEC : 62271-1	High-voltage switchgear and control gear – Part 1: Common specifications
IEC : 62271-100	High-voltage alternating-current circuit-breakers
IEC : 62271-102	A.C. dis-connectors (isolators) and Earthing switches for voltages above 1000 V
IEC : 62271-207	Seismic qualification for gas-insulated switchgear assemblies for rated voltages above 52 kV
IEC : 62271-1	High-voltage switchgear and control gear – Part-1: Common specifications
IEC : 62271-100	High-voltage alternating-current circuit-breakers
IEC : 60376	New Sulphur hexafluoride
IEC : 62271-4	Use and handling of sulphur hexafluoride (SF-6)
IEC : 61243- 5	Voltage Detecting Systems
IEC : 60376	New Sulphur hexafluoride
IEC : 62271-4	Use and handling of sulphur hexafluoride (SF-6)
IEC : 61243- 5	Voltage Detecting Systems
IEC : 60262, IEC : 60529	Degree of Protection
IEC : 60071	Insulation coordination
IEC : 61936-1	Power Installations exceeding 1 KV
IEC : 60721-3-3	Classification of environmental conditions
IEC : 60044-1	Current Transformers
IEC : 60044-2	Voltage Transformers
IEC : 60262, IEC : 60529	Degree of Protection
IEC : 60071	Insulation coordination
IEC : 62271-209	Cable connections for gas-insulated switchgear
IEC : 61 936-1	Power installations exceeding 1 kV
IEC : 60 721-3-3	Classification of environmental conditions
EN : 50110	Operation of electrical installations

Equipment Specifications :-

Switchgear Panel :-

Gas insulated Metal clad switchgear shall be complete with all the accessories for efficient operation. The equipment offered shall be safe, reliable and compact to install. 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 GIS shall be designed, manufactured and tested in accordance with the best international engineering practices under strict quality control to meet the requirement stipulated in the technical specification. Adequate safety margin with respect to thermal, mechanical, dielectric stress and insulation coordination etc. shall be maintained during design, selection of raw material, manufacturing process etc. so that the GIS provides long life with least maintenance.

The workmanship shall be of the highest quality and shall conform to the latest modern practices for the manufacture of high technology machinery and electrical switchgear. The switchgear panel shall be free standing, floor mounted, fully compartmentalized, metal enclosed, of uniform width not exceeding 500 mm irrespective of feeder rating to ensure neat aesthetic uniform foundation civil layout construction and complying good engineering practices.

The adjacent panels shall preferably be completely separated by steel sheets as per manufacturer's standard switchgear design, however bus-bar compartment housing silicone insulated touch proof bus-bars shall be common which may run along the entire length of board.

The SF-6 gas insulated metal enclosed switchgear shall be totally safe against inadvertent touch of any of its constituent live parts.

The Service Class Continuity of Switchgears shall be LSC - 2 (as per IEC : 62271-200, latest standard).

Bus-bar compartment to have suitable baffle arrangement with very fine GI mesh screen. Relays shall be fully flush mounted on the switchgear panels at a suitable height from operator point of view.

Switchgear shall have an Internal Arc Classification of IAC-A-FLR 26.3 KA, 1 Sec. The rated short – time withstand current is 26.3 KA. The short-circuit duration is 3 sec. The test report must be shown with the offer. The internal arc classified switchgear enclosure consists of the following assemblies :

- Three-part panel front
- Floor cover in cable compartment
- Rear wall with gas flow path and top explosion provision
- Bus-bar cover with integrated expanded metal to reduce the pressure and cool down the hot gases.

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. All operations of circuit breaker, Dis- connector, earthing, switches, spring charging etc. and viewing of all status, shall be done from front of GIS without opening any additional front panel door to ensure complete safety of operator, including internal arc compliance.

Gas Pressure relief device/Explosion Vent shall be provided for each compartment, so that in case of a fault in any of the compartment, the gases produced are safely vented

out from top of the panel. During Internal arc, the hot gases from circuit breaker or cable compartment should not affect or travel through the bus-bar compartment in any manner. The pressure relief device/Explosion Vent shall not however reduce the degree of protection of panels under normal working conditions.

The switchgear shall be cooled by natural air flow.

A standard user interface ergonomically Positioned at a convenient height shall be provided. It must be visible directly without opening of doors etc. The user interface comprises all the mechanical, panel- related interfaces and continuous interrogating interlocks.

All the basic mechanical ON/OFF of CB, Isolator & earth switch operation, manual spring charge of CB must be possible without opening the door to ensure the operatorsafety.

Mechanical mimic directly linked to mechanism shall be provided at the panel front door. The basic switchgear unit is to be designed for suitable freestanding installation within a switch room.

The Interlocking shall be provided, so that under no condition an earthed cable is charged.

Suitable interlock & Indications shall be provided to prevent access to cable compartment doors, in case the incoming supply is ON.

The switch board shall have the facility for extension on both sides and no gas work should be required for extensions or panel replacement.

SF-6 gas leakage rate should not exceed 0.1% per annum. The gas enclosures should therefore be manufactured according to the latest state of the art technology. The GIS should be tested for its basic insulation level (28kV Power Frequency and 75 KVP Lightning impulse) voltage at 1 Bar gas pressure.

Thermostatically controlled space heater with common MCB shall be provided in required compartments.

Special Switchgear Features :-

Operational Reliability :-

Consistent hermetically welded enclosure excludes any external influence on the primary part. Due to the welded stainless-steel enclosures, loss of SF-6 gas is impossible.

Long-time proven components like welded-in bushings, welded-in bellows and the Siemens vacuum switching technology are integrated in this innovative global concept.

Personal Safety :-

Internal enclosure of components, internal arc resistant design and a complete interlocking concept - all this guarantees a maximum degree of personnel safety.

Climatic and Environmental Independence :-

Hermetically welded stainless-steel enclosure make the switchgear insensitive to any environmental influences. The primary part is therefore consistently protected against external influences such as humidity, pollution, dust, aggressive gas, small animals, etc.

These reasons make the offered switchgear also suitable for application in extreme climates or under aggressive environmental conditions.

Compactness :-

SF-6 insulation enables very compact dimensions, offering at the same time a high switchgear performance. This provides an economical utilization of surface and space, especially in cities and conurbation, both for existing set up and for new buildings.

Maintenance-Free Design :-

The offered switchgear is maintenance-free for life due to the following features:

- No repair and maintenance cycles required.
- Hermetically welded stainless-steel enclosure, with maintenance-free vacuum switching technology and maintenance-free three-positions switches,
- Maintenance-free operating mechanisms for circuit-breakers and three- position switches,
- No need to check the gas quantity and quality due to the welded stainless-steel enclosures.

Ergonomic Design :-

The switchgear stands out for a user-friendly and functional industrial design. All switching devices are operated from the switchgear front. Control elements and indicators are located at an ergonomic height and are optimally integrated in the overall design.

Installation Friendliness :-

Switchgear installation and extension as well as panel replacement is done without SF6 gas work. The switchgear can be installed without special tools and instruments. Busbar interconnection from panel to panel is made through bolted busbar units.

For more information regarding installation and operation, please refer to our operating and installation instructions.

Circuit Breakers :-

- a) The circuit breakers shall be of Vacuum type with vertically mounted interrupters. They shall comprise of three pole interrupting units, operated through a common shaft by a sturdy operating mechanism.
- b) Circuit breaker shall be re-strike free, stored energy operated and trip free type. Motor wound closing spring charging shall only be acceptable. Anti-pumping features shall be provided for each breaker.
- c) Circuit breaker shall be provided with two trip coils
- d) Painted Mimic 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. All the positions via mimic shall indicate true positions of the switching devices linked mechanically with the device operation. Mimic should not be dependent on any auxiliary supply voltage.
- e) The rated control supply voltage shall be 110 or 220 V DC or as mentioned elsewhere under Technical parameters. The closing coil and spring charging motor shall operate satisfactorily at all values of control supply voltage between 85 – 110 % of the rated voltage. The trip coil shall operate satisfactorily under all operating conditions of the circuit breaker upto its rated short circuit breaking current at all values of control supply voltage between 70 – 110 % of the rated voltage. The trip coil shall be so designed that it does not get energized when its healthiness is monitored by indicating lamps and trip coil supervision relay

f) The time taken for charging of closing spring shall be within 15 Seconds. The spring charging shall take place automatically preferably after a closing operation. Breaker operation shall be independent of the spring charging motor which shall only charge the closing spring. Opening spring shall get charged automatically during closing operation. As long as power supply is available to the charging motor, a continuous sequence of closing and opening operations shall be possible. One open-close-open operation of the circuit breaker shall be possible after failure of power supply to the motor. Spring charging motors shall be capable of starting and charging the closing spring twice in quick succession without exceeding acceptable winding temperature when the control supply voltage is anywhere between 85-110% of rated voltage. Spring charging motor shall be of universal type.

g) Motor windings insulation shall be given tropical and fungicidal treatment for successful operation of the motor in a hot, humid and tropical climate

h) Circuit breaker operating mechanism will be outside the SF-6 tank, manually and electrically operated. The operating mechanism should consist in the following items:

- Spring system that stores the necessary energy for opening and closing operation.
- Spring charging system (motor operated) that automatically recharges the springs after the main contacts of the CB have closed.
- Mechanical "charged-discharged" position indicator for CB opening and closing springs.
- Manually operated spring charging system (in case of lack of auxiliary power supply).
- Electrical system including:
 - Tripping coil
 - Anti-pumping relay
 - Mechanical emergency trip pushbutton.
 - Operation counter
 - Spring charging indication contact.
 - Mechanical indicator for Open / Closed position
 - Minimum CB position auxiliary contacts

The operating system shall be with Motor operating stored-energy spring mechanism. The maintenance-free operating mechanism shall have the following features :

- "Trip-free" according to IEC : 62271-100
- Auxiliary switch contacts for control and signalling
- Operations counter
- Circuit-breaker tripping signal through Relay
- Closing solenoid
- Releases equipped according to typical
- 'Spring charged' indication
- Mechanical position indicator
- Mechanical OFF pushbutton
- Mechanical ON pushbutton

In all circuit-breaker panels, the feeder is make-proof earthed by closing the circuit- breaker additionally.

Endurance class of circuit-breaker :

Function	Class	Standard	Property of Switchgear	
BREAKER	M2	IEC : 62271-100	10,000 X	mechanically without maintenance
	E2	IEC : 62271-100	10,000 X	rated normal current without maintenance
	C2	IEC : 62271-100	Very low probability of restrikes	

Three Position Switch (ON-OFF-EARTH)

Each bay shall have three position switch (ON-OFF-EARTH) mounted inside the same SF-6 compartment which is also housing circuit breaker.

- Each Switchgear Panel shall be provided with three position switch (ON-OFF-EARTH) of required rating.
- It shall be possible to control these switches from front of the panel, both manually and should also be completely motorized operation for all three ON-OFF-EARTH positions.
- Padlocking facility shall be provided for all three switch position (ON- OFF-EARTH).

The dis-connector shall be placed between the CB and the bus-bar system in order to isolate the bus-bar system from the circuit side and earth the CB side terminals. The Earthing Dis-connector shall operate always de-energized and the design for making capacity is to be provided in the circuit-breaker.

The indication of the position of the Dis-connector shall preferably be mechanical. The Operating mechanism shall be outside the SF-6 atmosphere and preferably accessible from the front. The Dis-connector shall preferably have single common rotation-driving axis for both the Dis-connector and the Earthing switch. It is mandatory that the operation from "closed to open (ready to earth)" and "open (ready to earth) to earthed" is made in two separate operations. These are two completely independent operations, with two separated operating access.

Endurance class of three-position dis-connector :-

Function	Class	Standard	Property of Switchgear
Disconnecting	M1	IEC : 62271-102	2,000 X mechanically without maintenance
Ready-to-Earth			2,000 X mechanically without maintenance
Earthing	E2	IEC : 62271-102 & IEC : 62271-200	5 X rated short-circuit making current I _{max} . through CB without maintenance

Control and Interlocks :-

The mechanical operating lever actuation type interlocking system must be designed according to the interrogation interlock principle. This means that an operating lever can only be inserted or that actuating forces may only act on the components if this is permitted by the appropriate operating condition of the functional unit in question. Digital switchgear interlock units are not accepted due to their high costs and as these systems depend on the switchgear's auxiliary voltage.

- a) The circuit breaker shall normally be controlled through closing and trip coils. However, it shall also be designed to control locally from front of the panel.
- b) Facilities shall be provided for mechanical tripping of the breaker in an emergency. Facility shall also be provided for manual charging of the stored energy mechanism for a complete duty cycle.
- c) Necessary logical mechanical interlocks shall be provided between CB and three switch position (ON-OFF-EARTH) and cable compartment for failsafe operation.
- d) Each CB and three switch position (ON-OFF-EARTH) shall have 2 NO + 2 NC Auxiliary spare contacts for future use by owner.

Functional compartments :-

Each GIS panel shall be having following functional compartments:

- Bus-bar compartment (accessible tool based) containing:
 - Silicone-insulated, screened, touch proof type bus-bars (outside SF-6 Gas)
- SF-6 filled switching compartment (fixed type, non-accessible) containing:
 - Three position dis-connector (On-Off- earth)
 - Vacuum Circuit Breaker
- Cable connection compartment (Air insulated and interlocked based) containing:
 - Cable Terminations
 - Line CT's (as applicable)
 - Line VT's (as applicable)
- Low-voltage compartment (Air insulated) containing:
 - Numerical Protection Relays, LED indications, TNC switches (as applicable)
 - Multi-Function Meter (as applicable)

Bus-bars and Insulators :-

Bus-bar shall be of Electrolytic Copper with 99.9 % purity of adequate size for specified current ratings. The bus-bar itself is made of round-bar copper, the length of which depends on the panel width. They shall be adequately supported on insulators to withstand electrical and mechanical stresses due to specified short circuit currents.

Bus-bar is plugged onto the switchgear vessels from above and screwed tight. The bus-bars are flat at ends, making it easy for extension in future for any switchgears. Bus bar cross-section shall be uniform throughout the length of switchgear board. The bus-bar shall be touch proof screened silicone insulated placed outside the gas compartment of switchboard in-order to :

- Reduce amount of SF-6 gas for better sustainable design.
- Maintenance free life cycle.

- Perform under harsh environmental conditions.

Bus-bar insulators shall be of arc and track resistant, high strength, non-hygroscopic, non-combustible type and shall be suitable to withstand stresses due to over-voltages, and short circuit current.

All bus-bars shall have suitable phase identification. Bus switching scheme shall be as per Single Line diagram attached with bidding documents.

The temperature of the bus-bars and all other equipment, when carrying the rated current continuously shall be limited as per the stipulations of relevant Standards, duly considering the specified design ambient temperature.

Earthing and Earthing Devices :-

a) The grounding system for GIS shall be designed and provided as per IEEE : 80- 2000 and CIGRE-44 to protect operating staff against any hazardous touch voltages and electro-magnetic interferences.

b) A copper earthing bus shall be provided at the bottom and shall extend throughout the length of each switch board. It shall be bolted/ welded to the framework of each panel and each breaker earthing contact bar. The earth bus shall have sufficient cross-section to carry the momentary short-circuit and short time fault currents to earth without exceeding the allowable temperature rise.

c) Suitable arrangement shall be provided at each end of the earth bus for bolting to station earthing grid. All joint splices to the earth bus shall be made through at least two bolts and taps by proper lug and bolt connection.

d) All non-current carrying metal work of the switchboard shall be effectively bonded to the earth bus. Electrical continuity of the whole switchgear enclosure frame work shall be maintained even after painting.

e) All metallic cases of relays, instruments and other panel mounted equipment shall be connected to earth by independent stranded copper wires of size not less than 2.5 Sq. mm. Insulation color code of earthing wires shall be green. Earthing wires shall be connected to terminals with suitable clamp connectors and soldering shall not be acceptable. Looping of earth connections which would result in loss of earth connection to other devices, when a device is removed is not acceptable. However, looping of earth connections between equipment to provide alternative paths of earth bus is acceptable.

f) VT and CT secondary neutral point earthing shall be at one place only on the terminal block. Such earthing shall be made through links so that earthing of one secondary circuit may be removed without disturbing the earthing of other circuits.

g) The Panel shall have Voltage Presence Indicator (VPI) to warn the operator against earthing of live connections.

h) All hinged doors shall be earthed through flexible earthing braid.

Capacitive Voltage Presence Indicator :-

Capacitive layers are integrated in the bushings.

Capacitive voltage detection is performed with an LRM socket module (LRM = low resistance modified). In this LRM socket module, fixed voltage indicators are mounted to verify safe isolation from supply phase by phase.

Surface Treatment :-

The material used for sheet metal shall be CRCA Grade-D as per IS-513 (From reputed manufacturers like Tata Steel, JSW, Essar Steel etc.) with robust surface

finish, having lower strain hardening coefficient and improved planar anisotropy (improved drawability). The switchgear structure having CRCA sheets shall be powder coated (both inside and outside) providing optimal surface protection with long life properties enabling easy maintenance and cleaning. The sheet metal shall be pre-treated using 7-Tank process and then epoxy powder coated with paint shade of RAL-7035. Thickness of paint shall be 100 (+/-20) micron average.

Instrument Transformers :-

All current transformers shall be low voltage cast resin ring core type whereas voltage transformers shall be cast resin insulated type. Tape wound CT's are not acceptable. Current/voltage sensors, Rogowski coil and or other non-standard arrangement are not acceptable

Instrument transformers shall be suitable for continuous operation at the ambient temperature prevailing inside the switchgear enclosure, when the switchboard is operating at its rated load and the outside ambient temperature is 45°C.

Voltage transformers shall withstand the power frequency and impulse test voltage specified for the switchgear assembly. The current transformer shall further have the dynamic and short time ratings at least equal to those specified for the associated switchgear and shall safely withstand the thermal and mechanical stress produced by maximum fault currents specified when mounted inside the switchgear for circuit breaker modules. Access to Line VT shall be possible only after it is earthed thus providing operator's safety.

The parameters of instrument transformers specified in this specification are indicative and shall be finalized during detailed engineering, considering the actual burden of various relays and other devices finally selected.

All instrument transformers shall have clear indelible polarity markings. All secondary terminals shall be wired to separate terminals on an accessible terminal block.

Current & Voltage Transformers shall be located in metal enclosed cable compartment and mounted outside SF-6 gas tank. All CT/VT shall be single phase type.

All voltage transformers shall have suitable HRC current limiting fuses (if applicable) on primary side and MCB on secondary sides. Line Voltage transformers shall be removable for maintenance without removal of power cables.

Bus voltage transformer shall be provided in a separate Bus PT panel with a SF-6 insulated disconnecting switch (ON-EARTH) for ease of maintenance at site. Bus PT shall be outside SF-6 compartment.

Low-voltage compartment :-

The low-voltage (IP4X) compartment must be at top and operated from the front. The control and signaling circuit wiring must be flexible and of cross-section 1.0mm.²; for transformer circuits the figure is 2.5 mm.². The signaling and control leads must be led to a terminal block via plug connectors in which they are grouped together according to function. There shall be numerical protection relay(s) (50, 50 N, 51, 51 N, 95, 86) in each incomer and outgoing feeder conforming to communication protocol IEC : 61850 There shall be Auxiliary relays for transformer faults (OTI, WTI, Bucholz) in each transformer feeder Metering equipment's to be considered as per SLD

Other standard accessories like TNC switches, TTB, illumination lamp, thermostat with heater, aux contactors, indication lamps, L/R switch, MCB, control switch etc. shall be integral part of LV chamber as per SLD requirement.

Numerical Protection Relays :-

Indoor switchgear panels shall have communicable numerical protection relays (IEDs) complying with IEC-61850 edition 2 on all feeders which shall be networked on Ethernet to communicate with substation SAS/SCADA system on 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) equipment alarms and use defined alarms from GIS shall also be made available to SAS/SCADA station from protection IEDs. Further, multifunction meters with Modbus protocol are also envisaged, which will be connected in daisy-chain-link to communicate to station SAS. Modbus to IEC

: 61850 converter OR Serial Server shall be provided for integration with SAS, 3rd Party converter / serial server may need to be considered.

The Bidder's scope shall include the followings :

- a) Communicable Numerical Protection Relays (with Redundant site selectable PRP & HSR feature) shall be provided in each of the feeders & Bus-section/Bus coupler.
- b) IED's/Numerical Relays shall have large SLD based display to facilitate settings, relay operations and to view measurement, fault event and alarm etc.
- c) Relays shall be SCADA compatible & shall have built in Local/Remote Selector Switch OR function keys which can be set as Local/Remote or shall have option to select local remote from relay HMI display.

All Numerical relays shall be latest & shall be of proven design for the application satisfying requirements specified elsewhere and shall be subject to Employer's approval. Numerical Relays shall have very high setting ranges, accuracy, resetting ratio, transient overreach and other characteristics to provide required sensitivity for the intended application.

All numerical relays shall be rated for control supply voltage 24 V to 250 V 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 in the closing and tripping circuits of breaker without the need of any interposing / master trip Relays.

Threshold voltage for binary inputs shall be site selectable to ensure avoidance of mal-operation due to stray voltages.

The device shall be equipped with graphical multi page LCD display so that operator can access all the necessary information without using any complex sequence of buttons in the relay HMI. Relay shall have minimum 18 tricolored LEDs. Parameters shall be set via an integrated keypad and an USB front interface using a user-friendly parameterization tool.

Failure of a control supply and de-energization of a relay shall not initiate any circuit breaker operation.

Relays shall have event recording feature with time stamping. Minimum 3000 Nos. of event records shall be stored in Non-volatile memory and failure of control supply shall not result in deletion of any of these data. Relay shall also store 20 Nos. of

disturbance records. Minimum total storage time for 20 Nos. of disturbance records shall be 200 Seconds.

All Numerical relays shall have features for electrical measurements including Voltage, Current, Power (active & reactive), Frequency, Power Factor etc. Incomer and Bus-coupler Relays shall have Voltage related measurements, whereas outgoing Transformer feeders shall have Current measurements.

All Numerical Relays shall have built-in key pad / keys to allow relay setting from relay front. Resetting of relay shall be possible from remote SCADA.

Relays shall have suitable output contact for circuit breaker failure protection (LBB) logic.

Relays shall have self-diagnostic feature with continuous self-check for power failure, program routines, memory and main CPU failures and a separate output contact for indication of any failure.

Contractor shall submit applicable Type Test reports for Numerical relays as per IEC : 255 from accredited lab and KEMA Level A certification for IEC : 61850 edition 2.

All PCB used in relays shall be assembled in the Indian facility of OEM's. The PCB should have harsh environmental/conformal coating as per standard IEC : 60068 to increase the particle repellency and thereby increasing the life of relay under harsh environmental/moisture conditions.

Necessary user-friendly configuration tool shall be provided to configure the relays. It should be compatible with SCL/SCD files generated by a third-party system.

The IEDs temperature dissipation should be such that no intrusion of insects or any tiny living things is possible by any means. If the construction design is such, then OEM has to provide additional arrangement to prevent the intrusion of any tiny living organism and its excretion. This arrangement is necessary to prevent relay failures.

Control & Protection System :-

All numerical relays shall communicate to station SCADA / SAS on IEC : 61850 communication protocol. It is envisaged that these protection IEDs shall be used for CB control & monitoring of bay equipment.

Numerical Outgoing feeder Protection Relay :-

Numerical relays for Outgoing feeders shall have provision current (4 CT) inputs for protection & measurement purposes using protection cores.

The relay shall have instantaneous as well as time delayed three over current (50) and one earth fault (50 N) protection elements.

The over current element should have the minimum setting adjustable between 20 – 200 % of CT secondary rated current and high set setting 500 - 2000 %.

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 %.

They relay shall also have following protection & supervision features :

- Negative phase sequence over current protection (46)
- Broken conductor (I2/I1)
- CB Trip counter
- CB monitoring

Trip circuit supervision shall be provided to monitor the circuit breaker trip circuit both in pre-trip and post-trip conditions.

Relay shall have Minimum 22 Binary inputs to take care of status of all devices, trip circuit supervision inputs and Auxiliary fault alarms. Relay shall have minimum 10 Binary outputs.

Numerical Incomer and Bus coupler Protection Relay :-

Numerical Relays for Incomer and Bus sectionaliser shall have provision of both current(4 CT) & Voltage (4 VT) inputs for Protection & Measurement purposes.

The Relay shall have instantaneous as well as time delayed directional over current (67) and earth fault (67 N) Protection elements.

The over current element should have the minimum setting adjustable between 20 -200 % of CT secondary rated current.

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.

They relay shall also have following protection & supervision features :

- Over & Under voltage protection 27/59
- Over & under frequency protection 81 U/81 O
- Negative phase sequence over current protection (46)
- Broken conductor (I2/I1)
- Voltage vector Shift (78 VS)
- Low impedance REF protection (87 NL)
- Check synch (25)
- VT fuse fail detection
- CB Trip counter
- CB monitoring

Trip circuit supervision shall be provided to monitor the circuit breaker trip circuit both in pre-trip and post-trip conditions.

The relay shall have selectable directional and Non directional feature for overcurrent function.

Relay shall have Minimum 24 Binary inputs to take care of status of all devices, trip circuit supervision inputs and fault alarms. Relay shall have minimum 12 Binary outputs.

Power Cable Termination :-

Cable termination compartment shall receive the Al / Cu conductor, XLPE insulated, shielded, armored, PVC jacketed, single core/three core, unearthed/earthed grade HT power cable(s).

Adequate clearance shall be kept between the cable lug bottom ends and gland plates for stress cone formation for XLPE cables. Inter-phase clearance in the cable termination compartment shall be adequate to meet electrical and mechanical requirement besides facilitating easy connections and disconnection of cables.

Cable termination compartment shall have provision for termination of power cables of sizes indicated in the bidding documents with removable undrilled gland plates as applicable for standard design of GIS manufacturer. Cable entry shall generally be from the bottom.

Cable termination compartment shall be accessible from front end. Cable termination required will be conventional heat shrinkable type. Access to cable termination compartment shall be possible only in case of feeder is earthed.

Type Tests :-

The switchgear should have been subjected to all type tests at an internationally recognized testing lab, like PEHLA, KEMA, ERDA or equivalent. The vendor shall also submit type test certificates covering the proposed switchgear components.

The GIS offered should be fully type tested, in the type test reports the GIS manufacturing location should be same as the location from where complete GIS is offered and shall be supplied by the manufacturer for this project. Any local manufacturing or assembling of the SF-6 vessel or complete GIS panel in India and same not type tested from recognized labs shall not be acceptable.

Manufacturer shall offer the circuit breaker along with their own make vacuum interrupter manufactured in India and which was originally type tested in panel.

Type tests certificates/reports shall be considered acceptable if they are in compliance with the latest applicable relevant Standards and the following:

If the presented type test reports are not in accordance with the above requirements, Owner reserves the right to ask for the type tests to be repeated in the international lab/independent test lab subject to the approval of Company/Purchaser and at no additional cost. The recognized laboratory shall issue the relevant type test certificates upon successful test.

The manufacturer shall submit the reports for the following type tests on Switchgear Panel with Circuit Breaker installed (as applicable) :

- a. Short circuit duty test
- b. Short time and peak withstand current test
- c. Power frequency withstand test
- d. Lightning impulse withstand test
- e. Temperature rise test
- f. Internal Arc Test AFLR 26.3 KA, for 1 second
 - a. Cable compartment
 - b. Gas vessel
 - c. Bus Bar Compartment
- g. Measurement of resistance of main circuit
- h. Short circuit withstand test of earthing device
- i. Verification of protection (IP coding) :
 - a. IP : 67 Test for SF-6 compartment
 - b. IP : 4X Test for enclosure
- j. Seismic Test
- k. Pressure withstand test for gas filled compartment.
- l. Out of phase breaking capacity test

Routine Tests :-

All acceptance and routine tests as per the specification and relevant standards IEC :62271-200 & IEC : 62271-100 shall be carried out. Charges for these shall be deemed to be included in the equipment price.

The manufacturer shall furnish a detailed Quality Plan indicating the practice and procedure along with relevant supporting documents.

Routine test certificates shall be submitted for Company/Purchaser's review and approval before shipment of the switchgear components.

The routine tests for the switchgear shall also include the functional tests for the associated protection panels.

The following tests shall be performed as routine tests in addition to the standard tests:
 Partial discharge measurements (during manufacturing stage and report shall be submitted)
 Functional Tests for all components and for all panels, including Protection and interlocking functionality, inter-tripping, mechanical and electrical operations, etc.

- Dielectric Test on the Main Circuit
- Tests on Auxiliary and Control Circuits
- Measurement of the Resistance of the Main Circuit

Switchgear Ratings :-

Sl. No.	Description	Units	Technical Data
A	System Parameters		
1	Nominal System voltage	KV	11
2	Highest System voltage	KV	12
3	Phases		3
4	Frequency	Hz.	50
5	System Neutral Earthing		As per vector group of Transformer
6	Short time withstand current rating for 3 Sec.	KA	26.3
7	Rated peak withstand current	KA Peak	65.75
8	Rated Short Circuit PF withstand Voltage	kV RMS	28
9	Rated Lightning impulse withstand Voltage	kV peak	75
10	IAC AFLR Rating (CB compartment, Bus Bar compartment & Cable Compartment) for 1 Sec	kA	26.3
11	Design Ambient Temperature	°C	40°C
12	Maximum Relative Humidity	%	0.95
B	General DATA for 12 KV Switchgear		
1	Type of Breaker		Vacuum Circuit Breaker
2	Type of Insulation		
a)	For Vacuum Circuit Breaker cum dis-connector compartment		SF-6
b)	For Bus-bar		Touch proof screened silicone insulated
3	Degree of Protection:		
a)	Gas encapsulated chamber		IP-67
b)	Low voltage compartments		IP-4X
4	Gas Leakage rate per annum	%	0.10%

5	Type of Pressure Relief		Rupture disc
6	Gas filling Arrangement via NRV		Yes
7	Gas Monitoring Arrangement for Circuit Breaker cum dis-connector Compartment		via Manometer
8	Mechanical indication for CB, Dis-connector and Earthing Switch position		Yes
9	Cable entry		Bottom with front access
10	No gas handling at site during installation/ extension of GIS panel		Yes
C	Panel Enclosure		
1	Type of Arrangement		Free Standing
2	Powder Coating thickness		100 microns (+/-25 micron)
3	Indoor/Outdoor		Indoor
4	Material of Gas enclosure		Stainless Steel SS-304 grade
5	Enclosure Ingress Protection Class		IP-4X
D	Bus Bar Information		
1	Material		Copper
2	Material Purity		0.999
3	Bus-bar Insulation		Touch proof screened silicone insulated
4	Main Bus Bar Rating	A	1250
5	Rated Continuous Current @ Design Ambient temp. 40°C	A	1250
E	Power Cable Compartment		
1	Power Cable entry		Bottom with front access
2	Cable bushings		Outer cone type
F	Circuit Breaker		
1	Type of Breaker		Vacuum Circuit Breaker
2	Rated Nominal Voltage	KV	11
3	Maximum Voltage	KV	12
4	Rated Short-Circuit withstand current	KA	26.3
5	Short circuit-Current Withstand Time	Sec.	3 Sec.
6	CB rated Current		
a)	Incomer	A	1250
b)	Outgoing feeder Breaker	A	1250
c)	Bus Sectionaliser & Bus-coupler Breaker	A	1250

7	Power Frequency Withstand Voltage	KV rms	28
8	Lightning Impulse Withstand Voltage	KV peak	75
9	First pole to clear factor		1.5
10	Closing Time	ms	<60 ms
11	Opening Time	ms	<60 ms
12	Arcing Time	ms	<15 ms
13	Spring Charged after CO		Yes
14	Rated Operating duty cycle		O – 0.3 Sec. – CO – 3 min – CO
15	Trip Coil Operating Voltage	V DC	110
16	Trip Coil Operating Voltage Range	%	70 % - 110 %
17	Closing Coil Operating Voltage	V DC	110
18	Closing Coil Operating Voltage Range	%	85% - 110%
19	Spring Charging Motor Voltage	V AC	230 V
20	Spring Charging Motor Voltage range	%	85% - 110%
21	Rated filling pressure of insulating gas	bar	1.5
22	Minimum functional pressure of insulating gas	bar	1.3
23	Endurance Class Classification		M2/E2/C2
24	Auxiliary contacts		4 NO + 4 NC for Employers future use besides scheme requirement
25	Operating Mechanism		Motor wound spring charged stored energy type
G	Three Position Disconnecter		
1	Type of Dis-connector		3 Position Switch
2	Manual/Motor Operation		Manual + Motor
3	Dis-connector position indication		Mechanical
4	No. of mechanical operation without any maintenance	Nos.	2000
5	Type of Interlocking		Electrical and Mechanical
6	Auxiliary Contacts		5 NO + 5 NC
7	Dis-connector motor Voltage	V AC	230V AC
H	CONTROL WIRING		
1	Type:		PVC
2	Insulation Grade	V	1100
3	Auxiliary Bus wire Size (minimum)	mm.	Min 2.5 Sq. mm.

4	Control circuit (Ac/DC) wire size (minimum)	mm.	Min 1.5 Sq. mm.
5	CT Circuit wire size (minimum)	mm.	Min 2.5 Sq. mm.
6	PT Circuit wire size (minimum)	mm.	Min 2.5 Sq. mm.
I	Panel Dimensions		
1	Incomer (Width x Depth)	mm.	500 X 1100
2	Outgoing (Width x Depth)	mm.	500 X 1100
3	Bus coupler (Width x Depth)	mm.	1000 X 1100
4	Bus PT (Width x Depth)	mm.	500 X 1100
J	Painting / Finishing		
1	Color		RAL : 7032
2	Paint thickness		100 microns (+/-25 micron)
K	Current Transformers		
1	Rated primary voltage		0.72 kV
2	Type of CT		1 - Phase
3	Max temp rise		As per IEC : 61869-2
4	Class of Insulation		Class - B
5	One minute power frequency withstand voltage between secondary terminal & earth		2kV
6	Accuracy class		Metering : 0.5 Protection : 5P10
L	Voltage Transformer		
1	Rated primary Voltage		11kV
2	IEC Standard		IEC : 61869-3
3	Type		1-phase
4	Voltage ratio (KV)		$(11/\sqrt{3})/(0.11/\sqrt{3})$
5	Rated Voltage Factor		1.2 continuous and 1.5 for 30 seconds
6	Nos. of Secondary cores		2
7	Accuracy of Secondary core		Metering Protection 0.5 3P
8	Class of insulation		Class - B
9	Rated output burden (Minimum)		50 VA

Metering Devices :-

Incomer and Outgoing feeder must have Multifunction meter. The Multifunction meter shall have feature to measure KV, I, MW, MVAR, PF, MW hr, MVAR hr with accuracy class of 0.5. Further, multifunction meter shall have bi-directional feature to register/record MW hr values. Bus coupler must have digital volt meter.

Site Tests :-

On-site primary and secondary injection tests shall be carried out on all protection relays and metering, together with their associated current transformers, to prove correct phasing, polarity and operating values. On-site functional testing shall be

carried out on the complete set of new panels, including circuit breakers, auxiliary equipment and circuits.

Also following tests shall be carried out after installation at site: The site tests shall include the following:

- Power frequency withstand test (at 80% of the rated power frequency withstand voltage)
- Insulation resistance
- Functional test of the fully installed and wired equipment delivered. Gas

leakage test on each bay with hand held gas leakage detector on all seals.

Documentation :-

Bidder to submit detailed General Arrangement drawings of GIS switchboards along with the tender documents. The GIS dimensions shall be in line with layout drawings for respective substations attached with the tender. No deviation shall be entertained. On award of contract the General Arrangement & schematic drawings shall be approved by consultant, thereafter, the bidder can go ahead with procurement of GIS Panel. Bidder shall also submit Installation Manuals for GIS Panels, relays or any other equipment installed in panel along with the supply of material at site.

Configuration of 11 KV GIS Typical :-

Sl. No	Equipment	Incomer Feeder	Outgoing Feeder	Bus Sectionalizer	Bus PT Panel
1	CB, Three position Switch (ON-OFF-EARTH)	1	1	1	-
2	Two position Switch (ON-Earth)	-	-	-	1
3	CB Spring charge mimic indicator	1	1	1	-
4	ON/OFF mimic indicator for CB	1	1	1	-
5	ON/OFF/EARTH mimic indicator for Three position Switch	1	1	2	-
6	CT (1-Phase)	3	3	3	-
7	BUS PT (1-Phase)	-	-	-	3
8	Multi-Function Meter	1	1	-	-
9	Digital Voltmeter	-	-	-	1
10	Control switch for breaker (T-N-C)	1	1	1	-
11	Control Switches for Disconnecter	1	1	2	-
12	LED lamps (lot)	1	1	1	-
13	SF6 Gas Manometer	1	1	1	1
14	LRM Capacitive Voltage Detection system (CVD)	1	1	-	-
15	Mechanical Mimic to represent SLD	1	1	1	1
16	Numerical protection relay (IED)	1	1	1	-
17	Cable Termination (as per BOQ)	1	1	-	-

Technical Particulars for 11 KV GIS Numerical Relays

01.	Manufacturer's Name and country of origin	SIEMENS/ABB/GE
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02.	Manufacturer's design Ref/Type	--
03.	Applicable Standards	GIS 11 KV Panel Board
04.	Current setting range for	
	(a)Over current relay	IDMTL Instantaneous
	(b)Earth-fault relay	IDMTL Instantaneous
		0.05,0.06.....50 X In (Derived) 0.005....25 X In (Measured)
	(c)Contact Rating	4 A
05.	Indication of Nos. in Master Trip Relay	16 LEDs
06.	Whether High Set is Transient free	----
07.	Whether separate Time setting for IDMTL/ Instantaneous Elements available	----
08.	DC Auxiliary voltage 3 O/C + 1 E/F Relay	110 V DC
09..	Make of high speed Master Trip relay	Function is part of 7SR220 Relay
10.	Whether settings site selectable and HMI provided	YES
11.	Whether Alpha Numeric LED display	YES
12..	Whether Compatible for 110 VDC	YES
13.	Whether Compatible for 1A CT Secondary	5A
14.	Whether Self diagnostic features available	
15.	Whether Communication Port RS485 Compatible for IEC61850	YES
16.	Non-direction 3 O/C +1 E/F Relay	K55
17.	Number of N/O And N/C contacts provided for High speed Master Trip Relay	Above 22 BI & 12 BO
18.	Time Setting of High Speed Master Trip Relay	<20ms
19.	Frequency of High speed Master Relay	50 HZ
20.	Reset time	0.02 sec.
21.	DC Auxiliary Voltage of high Speed Master Trip Relay	110/220 V DC

11KV GIS TECHNICAL SPECIFICATION

01.	Manufacturer's Name and Country of origin	SIEMENS/ABB/GE
02.	Manufacturing Facilities for GIS in INDIA	YES
03.	Manufacturing Location	---
04.	Manufacturer's Design/type Ref	11 KV GIS / 8DJH ST E

05.	Frequency	50 HZ.
06.	Rated Voltage	11 KV
07.	Highest system voltage	12 KV
08.	Rated current	1250 A
09.	Short Circuit current rating with duration	26.1 KA/ 3 Sec
10	Certificate or report of short circuit type test	YES
11.	Rated operating duty cycle	0-0.3 sec-CO-3 min-CO
12.	Short Circuit Breaking Current: (a)Symmetrical (b)Symmetrical at rated voltage (c) Asymmetrical at rated voltage (1)Per Phase (2)Frequency d) D.C. Component	a) 65.7 KA b) 75 KV 1) 11-12.5 KV 2) 50 Hz. 3) 110/220 V DC, 140W
13.	Arcing time (at rated breaking current) in ms.	0-0.3 Sec.
14.	Current density	1.6
15.	Circuit Breaker	
	Power Frequency withstand voltage for 1 min of circuit breaker	28 KV
16.	Current transformer ratio	400-200/5 A
17.	Potential transformer ratio	11KV / $\sqrt{3}$ /110V/ $\sqrt{3}$
18.	Bus Conductor rating	800 – 1250 A
19.	Control Circuit Voltage DC	110/220 V
20.	Power required for Closing Coil at 110 V	YES
21.	Power required for Tripping Coil at 110 V	YES
22.	Whether Trip free or not	YES
23.	Whether all the interlocks provided	YES
24.	Voltmeter/Energy meter/TNC/Relay	YES (As Per Specification)
25.	Total weight of one complete Breaker	150 Kg.
26.	Space between bus-bar in mm.	Phase to phase -78 mm.

03. Technical Specification of Item No. 3

This includes Supply, Installation, Testing and Commissioning of a Newly Manufactured Outdoor type 12.5 MVA Power Transformer, 66 KV/11.55 KV, 50 Cycle 3 Phase Delta/Star, KNAN, Double Copper wound Power Transformer conforming to IS : 2026 and IEC : 62770 standard with Natural Ester Oil filled and shall have followingspecifications : This specification covers design, engineering, manufacture; shop testing, inspection, painting, packing, and supply of Power Transformers complete with all accessories for efficient and trouble-free operation.

The design, manufacture and performance of equipment shall comply with all currently applicable statues, regulations and safety codes to suit with the local situation where the equipment will be installed. Nothing in this specification shall be construed to relieve the Bidder of this responsibility. The Quality of Raw material, manufacturing process & design parameters should meet the requirement to ensure quality of transformers. The transformer shall be with Heavy Duty Automatic and Manual On Load Tap Changer with RTCC and AVR, Heavy Duty NGR with SS-304 Box, NIPS, including all standard fittings, accessories and instruments along with providing of suitable Sump complete as per specifications and as required with latest technology as per approved make. Transformer shall be provided with Open Air Bushing with Arching Horn on 66 KV suitable for Panther conductor and 11 KV side cable box with aluminum gland plate for 2 X 1C X 300 Sq. mm. aluminum armoured XLPE (UE) cable. The transformer shall have 20% voltage variation 16 steps with 4 taps. The Transformer shall be provided with all types of latest numeric protection Relays.

The transformer shall have magnetic oil level gauge with trip & alarm contacts, air cell conservator, surge relay with trip & alarm contacts, buchholz double float relay, winding temp. Meter with trip & alarm contacts, oil temp. Meter with trip & alarm contacts for 12.5 MVA rating during ONAF condition. This shall have neutral CT on LVstar side with 2 neutral CT's ratio 300/1 PS class /5P20. The transformer will have Al.gland plate on 11 KV side for terminating single core 11 KV (UE) Cables. This installation shall include all supply, installation and termination of control cables between transformer OLTC & RTCC along with Installation of 11 KV NGR for 12.5 MVA Transformer suitable for Outdoor installation as directed.

The equipment shall conform to the latest applicable standards. In case of conflict between applicable standards and this specification, this specification shall govern.

- IS : 2026, for Tests & tolerance on Guaranteed Particulars
- IS : 3639 for Fittings and Accessories
- IS : 2099 for Bushings > 1000 V
- IS : 7421 for Bushings < 1000 V
- IS : 1271 for Electrical Insulation classified by Thermal stability

General Construction : -

All material used shall be of best quality and of the class most suitable for working under the conditions specified and shall withstand the variations of temperature and atmospheric conditions, overloads, over excitation, short-circuits as per specified standards, without distortion or deterioration or the setting up of undue stresses in any part, and also without affecting the

strength and suitability of the various parts for the work which they have to perform.

Tank :-

The exterior of tank and other steel surfaces exposed to the weather shall be thoroughly cleaned and have a priming coat of zinc chromate applied. The second coat shall be of an oil and weather-resistant nature, preferably of distinct color from the prime and finish coats. The final coat shall be of aflossy, oil and weather resisting non-fading paint of specified shade. The interior of the tank shall be cleaned by shot blasting and painting with two coats of heat resistant and oil insoluble paint.

- a) Steel bolts and nuts exposed to the atmosphere shall be galvanized.
- b) Unless otherwise stated, the tank together with radiators, conservator, bushings and other fittings shall be designed to withstand without permanent distortion the following conditions:
- c) Full vacuum of 760 mm. of Hg., for filling with oil by vacuum.
- d) Internal gas pressure of 0.35 Kg./Cm.² (5 lbs./Sq. inches) with oil at operating level.
- e) The tank cover shall be suitably sloped so that it does not retain rain water.
- f) The material used for gaskets shall be cork neoprene or approved equivalent.

Core : -

Transformer shall be double wound, core type with low loss, non-ageing, high permeability PRIMEGRADE, CRGO with M4 Grade or Better, perfectly insulated and clamped to minimize noise and vibrations. Followings should be Mandatory for any Manufacturer: -

- a) Transformer shall be of Boltless core design
- b) Core shall be purchased Directly from Manufacturer or from their accredited Marketing organization of Repute & not through any agent. Bidder must submit manufacturer's name during bidding having sufficient credential & Core must be purchased from the approved manufacturer.
- c) Stage inspection of the core shall be done at manufacturer's premises & inspection call shall be given with following Documents
 - i) Invoice of the supplier
 - ii) Mill's test certificate
 - iii) Packing list
 - iv) Bill of landing & Bill of Entry certificate by customs
- d) Transformer manufacturer should have in-house core cutting facilities for proper control & monitoring of quality & to avoid mixing of Prime core with Second grade /defective core materials. Transformer Manufacturer should have in-house slitting Machine so that the core is cut to width & stacked with minimum air gap thus ensuring Burr level less than 10Microns.
- e) Core shall be procured from one of these reputed Manufacturers –
Posco/Nippon/ Novex/Ak Steels.
- f) The insulation structure for the core to bolts and core to clamp plates shall be such as to withstand a voltage of 2000 V for one minute.

Windings : -

- a) Winding shall be made with 99.9% pure electrolytic grade copper, insulated with thermally upgraded paper (Insulation Class-A/Conductor Turn Insulation Class-E). The HV & LV winding should be able to withstand thermal and mechanical stress in the event of short circuit.
- b) Winding shall be carried in dust free area
- c) The completed core and coil assembly shall be dried in vacuum and shall be immediately impregnated with oil after the drying process to ensure elimination of air and moisture within the insulation.

Temperature Rise

With the given climatic conditions, the transformer shall be capable of operating continuously on any tap at their normal rating without exceeding following temperature rises:

- a) 45° C above ambient temperature for oil.
- b) 55° C above ambient temperature for winding.

The temperature of a hot spot in winding shall not exceed 110°C when calculated over max. Annual weighted average temperature of 50°C.

Oil :-

Transformer oil shall be as per IEC : 62770 - Natural Ester vegetable oil. Oil should be Environment friendly, Green & Biodegradable. It should also exhibit safety against fire hazards.

Conservator Tank :-

Oil preservation shall be done by means of conservator tank arranged above at the highest point of the oil circulating system. Connections into the main tank shall be at the highest point to prevent trapping of air or gas under the main tank cover.

Temperature Indicator :

One set of winding temperature indicators with necessary current transformer, heating coil and a detector element and one set of oil temperature indicator with maximum reading pointer shall be mounted locally to be readable at a standing height from ground level. Each of the above indicators shall be provided with necessary contacts for alarm and trip.

Buchholz Relay :-

The Buchholz relay shall be provided with two floats and two pairs of electrically separate contacts for alarm and trip. The relay shall have facility for testing by injection of air by hand pump and with cock for draining and venting of air. The location of the relay shall be such that all rising gas will readily reach it.

Bushings :-

- i. All bushings shall be homogenous, solid porcelain oil commissioning type, uniformly glazed and free from blisters, burns and other defects and shall be furnished complete with suitable terminal connectors of adequate

capacity. The bushings shall be located so as to provide necessary electrical clearances between phases and also between phase and ground as specified in relevant standards.

- ii. Bushings rated for 400 A and above shall have non-ferrous flanges and hardware.
- iii. All bushings shall have puncture strength greater than the dry flashover value.
- iv. Neutral CTs shall be furnished with its secondary leads wired upto the terminal blocks. The terminals for CT secondary leads shall have provision for shorting. The arrangement shall be such that the CT can be removed from the transformer without removing the tank cover.

Terminal Arrangement :-

- i Low voltage terminals of Power transformer shall be brought out to bushing inside Cable Box
- ii. High voltage terminals of Power transformer shall be bare busing.
- iii. The cable box shall be suitable for cable termination kits and shall be self-supporting, weather proof, air filled type, complete with all hardware such as gland plate, brass glands, tinned copper lugs, armour clamps etc.

Marshalling Box :-

- i. A sheet steel weather proof marshaling box of IP-55 construction, shall be mounted on the tank of transformer and shall accommodate all auxiliary devices except those which must be located directly on the transformer. All terminal blocks for external cable connections shall be located in this box.
The terminal block shall be Elmex or Phoenix 10 mm².
- ii. The marshalling box shall have the following as a minimum
 - a. Load disconnect switch for incoming power supply for auxiliaries.
 - b. All outgoing connections from transformer viz. buchholz relay, temperature indicators, fault contacts for annunciation system etc.
 - c. Wiring and termination points individually of the following trip contacts for remote alarm and trip.
 - Winding temperature high / very high
 - Oil temperature high / very high
 - Buchholz relay Alarm / Trip
 - Oil level low
- iii. Cubicle illumination lamp with door switch and space heater with thermostat and ON/OFF switch shall be provided.
- iv. Marshalling box shall be designed to facilitate external cable entry from bottom. Removable gland plates shall be furnished with double compression type brass cable glands.
- v. Sufficient space shall be provided to avoid sharp bending and for easy connection of cables. A minimum space of 200 mm from the gland plate to the nearest terminal block shall be provided.

- vi. Wiring shall be done with HR PVC 650 V grade wires. The wire size for CT circuits shall be 4 mm.² copper and for other circuits shall be a minimum of 2.5 mm.² copper. Not more than two (2) wires shall be connected to a terminal. 10% spare terminals shall be provided.
- vii. All devices and terminal blocks within the marshalling box shall be identified by symbols corresponding to those used in applicable schematic or wiring diagrams.

Grounding :-

- i. Two Grounding Pads, located on the opposite sides of the tank, shall be provided for connection of Switchyard Ground Mat for each Transformer. Grounding Pads shall have clean buffed surface with tapped holes. M-10 G.I. bolts, nuts and spring washer shall be provided.
- ii. 2 Nos. of Ground Terminals each shall also be provided on Marshalling Box, Cable Box & OLTC Panel to ensure effective earthing.
- iii. The Neutrals of the windings shall be brought out through neutral bushings at suitable location. The neutrals shall be suitable for connecting 75 X 10 mm. Copper flat.
- iv. For conductivity of earth connection, all gasket joints shall be provided with minimum 02 Nos. of copper strips of adequate size.

ON Load Tap Changing Mechanism :-

- a) OLTC In Tank Type, with heavy duty Easun MR India make, Range: +5% to - 15% @ 1.25%, No. of Steps: 16, with On HV for HV variation (CFVV)
- b) RTCC & AVR to be supplied along with the OLTC.
- c) The RTCC panel shall be supplied with master follower logic control system and an out of state relay for synchronization of tapping position.
- d) Master/Follower/Independent/Off mode Master/Follower/Independent/Off mode is required in Digital RTCC relay for parallel/group operation of transformers. Master-follower scheme implies that controlled decision shall be taken by the Master and control actions (Raise/Lower tap position) shall be executed simultaneously by Master & Follower units. Same logic needs to be implemented in digital RTCC relays.

Master Position: If the digital RTCC relay is in master position, it shall be possible to control the OLTC units of other parallel operating transformers in the follower mode by operation from the master unit. Follower Position: If the digital RTCC relay is in Follower position, control of OLTC shall be possible only from panel where master mode is selected. Independent Position: In independent position of selector switch, control of OLTC shall be possible only from the panel where independent mode is selected. Suitable interlock arrangement shall be provided to avoid unwanted/inconsistent operation of OLTC of the transformer.

- a) Valves :-

- i. Valves shall be of forged carbon steel above 50 mm and of gun metal for sizes upto 50mm. They shall be of full way type with screwed ends. They shall be opened by turning counter clock-wise when facing the hand wheel. There shall be no oil leakage when the valves are in closed position.
- ii. Every valve shall be provided with open/close position indicators. The valves shall be suitable for pad locking in open/close positions. All screwed valves shall be furnished with pipe plugs for protection.
- iii. All valves shall be provided with flanges having machined faces drilled to suit the applicable requirements.
- iv. Oil tight blank flanges shall be provided for the following.

- Valves opening to atmosphere.

- For each connection for use when any radiator is detached.

- v. Any special radiator valves tools required shall be supplied by the bidder.

The Transformer shall provide with Nitrogen Fire Protection system to envisage complete safety from Fire Hazards.

Transformer Losses :-

The transformers are to be designed with maximum permissible losses as indicated below:

No Load Losses : 8.5 KW at rated voltage & frequency. Load

Losses : 60 KW at rated current & 75°C

Impedance: 9% at 75°C, rated current & Freq. ($\pm 10\%$ tol.)

However, for all the above losses, permissible tolerances will be accepted as per relevant IS Standards.

Tests :

- i) Routine Tests – As derived in Special Condition of Contract.
- ii) Type Tests – The following type tests shall be performed at manufacturer's work shop.
 - a) Full wave Lightning Impulse withstand test on one limb of HV & LV.
 - b) Temperature rise test.
 - c) Zero phase sequence impedance measurement.
 - d) Measurement of acoustic noise level
 - e) Measurement of harmonics in no load current
 - f) Tank Pressure & Vacuum test.
 - g) Capacitance & Tan Delta Measurement.
 - h) Dissolve Gas Analysis test before & after HRT

Note :- Dynamic/Thermal Short Circuit Test : Type Test report of nearest ratings shall be submitted.

a) All the measurement of losses shall be carried out by digital meters of class 0.5 or better accuracy and should be certified by the manufacturer. If the losses measured are found to be out of tolerance band as stated in Standard and guaranteed losses declared by manufacturer, the same shall be attributed to the manufacturer as per capitalization formula till the end of warranty period.

- b). Oil Leakage test for acceptance shall be conducted at pressure of 0.35 Kg./Sq.Cm. for one hour.
- c). Checking of weights, Dimensions, fitting and accessories, tank sheet thickness, oil quantity, material, finish and workmanship, Physical verification of core coil assembly and measurement of flux density on one unit of each rating of the offered lot regarding the GTP and contract drawings.
- d). Temperature rise test on transformer shall carried out at manufacturer's workshop.

Rejection :-

DPA may reject the Transformer, if during tests or service, any of the following conditions arises :

No load loss exceeds the guaranteed value, greater than the tolerance limit mentioned in IS : 2026

- i) Load loss exceeds the guaranteed value greater than tolerance limit mentioned in IS : 2026
- ii) Impedance value differs the guaranteed value by + 10% or more
- iii) Winding Temperature rise exceeds the specified value by 5°C
- iv) Transformer fails on Impulse Test
- v) Transformer fails on power frequency voltage withstand test
- vi) Transformer is proved to have been manufactured not in accordance with the agreed specification.
- vii) The DPA reserves the right to retain the rejected transformer and take it into service until the Bidder replaces, at no extra cost to DPA, the defective transformer by a new acceptable transformer.

The GTP to be filled by the bidder :

1	Name of Manufacturer	
2	MVA Rating	12.5
3	No. of Phase & Rated Frequency	
4	Rated Voltage	
	HV	
	LV	
5	Connection	
	HV	
	LV	
6	Winding	
	HV	
	LV	
7	Insulation Level (Impulse Withstand) KV Peak	
	HV	

	LV	
8	Insulation Level (Power Frequency Withstand) (KV rms)	
	HV	
	LV	
9	Tapping	
a	Range	
b	No. of Steps	
c	On HV	
d	Tap Changer Type	
10	Temperature rise of winding over design ambient temperature of 50°C	
11	Hot spot temperature rise over maximum yearly weighted temperature of 32°C	
12	Short Circuit Thermal withstand time Seconds	
13	% Impedance at 75°C, rated current & Frequency (subject to IS Tolerance.)	
14	No load losses at rated voltage & frequency KW	
15	Load loss at rated current & 75°C	
16	Efficiency%	
a	100 %	
b	75 %	
c	50 %	
17	% efficiency at which maximum load occurs %	
18	Maximum Efficiency %	
19	Regulation at Full Load 0.8 p.f. %	
20	Regulation at Full Load Unity p.f. %	
21	Bushings	
a	Reference standard	
b	Type of Bushing	
c	Voltage Rating KV	
d	Current rating Amps	
22	Weight in Kgs. (Approximate)	
a	Core & Windings	
b	Tank & Fitting	
c	Oil	
d	Total Weight	
23	Approximate overall dimension in mm	
a	Overall length	
b	Overall breadth	
c	Overall height	
24	Approximate weight of Heaviest package (Kg.)	
25	Approximate Transport Dimension L X B X H (mm.)	
26	Fitting & Accessories as per specification	
27	Reference Standard	
28	Termination	

	HV	
	LV	

Installation of RTCC Panel 12.5 MVA Transformer according to rating with auto/ manual Switch Operation with Panel with Meter, alarm with Indicator in Latest Standard.

The Transformer shall be installed at least 1.5 Meters above the Ground Level with proper Foundation and securing the it properly considering the place is under high Seismic Zone (Zone - 5) and Cyclone Prone Area.

3.1. Performance

- i) Transformer shall be capable of withstanding for two seconds without damage to any external short circuit, with the short circuit MVA available at the terminals.
- ii) The maximum flux density in any part of the core and yoke at rated Voltage and frequency shall be such that the flux density with +12.5% combined voltage and frequency variation from rated voltage and frequency shall not exceed 1.9Tesla.
- iii) Transformer shall under exceptional circumstances due to sudden disconnection of the load, be capable of operating at the voltage approximately 25% above normal rated voltage for a period of not exceeding one minute and 40% above normal for a period of 5 seconds.
- iv) The transformer may be operated continuously without danger on any particular tapping at the rated MVA $\pm 1.25\%$ of the voltage corresponding to the tapping.
- v) The thermal ability to withstand short circuit shall be demonstrated by calculation.

Transformer shall be capable of withstanding thermal and mechanical stress caused by any symmetrical and asymmetrical faults on any winding.

3.2. Drawings/Documents Incorporating the following particulars shall Be submitted with the Bid

- a) General outline drawing showing shipping dimensions and overall dimensions, net weights and shipping weights, quality of insulating oil, spacing of wheels in either direction of motion, location of coolers, marshalling box and tap changers etc.
- b) Assembly drawings of core, windings etc. and weights of main components / parts.
- c) Height of center line on HV and LV connectors of transformers from the railtop level.
- d) Dimensions of the largest part to be transported.
- e) GA drawings / details of various types of bushing
- f) Tap changing and Name Plate diagram
- g) Illustrative & descriptive literature of the Transformer.

- i) Maintenance and Operating Instructions.

3.3. Miscellaneous

- i) Padlocks along with duplicate keys as asked for various valves, marshalling box etc. shall be supplied by the contractor, wherever locking arrangement is provided.
- ii) Foundation bolts for wheel locking devices of Transformer shall be supplied by the Contractor.

3.4. Name Plate

Transformer rating plate shall contain the information as given in clause 15 of IS- 2026(Part-I). The details on rating plate shall be finalized during the detailed engineering. Further, each transformer shall have inscription of Employer's name. The name plate shall also include (i) The short circuit rating, (ii) Measured no load current and no load losses at rated voltage and rated frequency, (iii) measured load losses at 75°C (normal tap only), (iv) DC resistance of each winding at 75°C.

The bidder shall offer the core, windings and tank of each transformer for inspection by the Employer's representative(s). During stage Inspection, all the measurements like diameter, window height, leg Centre, stack width, stack thickness, thickness of laminations etc. for core assembly, conductor size, Insulation thickness, I.D., O.D, winding height, major and minor insulations for both H.V and L.V windings, length, breadth, height and thickness of plates of Transformer tank, the quality of fittings and accessories will be taken / determined. The supplier can offer for final inspection of the transformers subject to clearance of the stage Inspection report by the Employer.

3.5. Transformer Condition :-

- In case of any defect/ defective workmanship observed at any stage by the purchaser's Inspecting officer, the same shall be pointed out to the Bidder in writing for taking remedial measures. Further processing shall only be done after clearance from the inspecting officer / purchaser.
- All tests and inspection shall be carried out at the place of manufacture unless otherwise specifically agreed upon by the manufacturer and bidder at the time of purchase/tender.
- The manufacturer shall offer the inspector representing the Purchaser all reasonable facilities, without charges, to satisfy him that the material is being supplied in accordance with this specification. This will include Stage Inspection during manufacturing stage as well as during Acceptance Tests.
- The bidder shall provide all services to establish and maintain quality of workmanship in his works and to ensure the mechanical/electrical performance of components, compliance with drawings, identification and

acceptability of all materials, parts and equipment as per latest quality standards of ISO - 9000

-Fire protection scheme to the power transformer should have authentic certification regarding performance similar to one issued by LAPEM (MEXICO)/TAC/RDSO /any other approved standard laboratory.

-The power transformer shall be of following make.

SIEMENS, SCHNEIDER, GE.

4. Technical Specification of Item No. 3.2

This includes Disconnection, Removal, Shifting from existing position to new Substation, Installation, Testing and Commissioning of 02 Nos. (1 No. 10 MVA & 01 No. 12.5 MVA) of 66/11 KV Power Transformers with NGR, NIPS, RTCC and other accessories including Oil Sump, Oil Filtration, Refilling including tope up complete in all respect earthing, protection etc. as per requirement & as directed.

The Transformer shall be installed at least 1.5 Meters above the Ground Level with proper Foundation for securing the Transformer considering the place is under highly Seismic Zone (Zone-5) and Cyclone Prone Area.

5. Technical Specification of Item No. 3.3

This includes Supply, Installation, Testing and Commissioning of a Newly Manufactured Outdoor cubicle type neutral isolator cum NGR as per IEEE norms and shall be of $11/\sqrt{3}$ KV, 656 A & rated for 9.68 Ohms, 1656 A for 30 Sec. with suitable space for 110 KV (UE) cable terminations. The NGR panel shall be made of SS-304.

Supply, Installation, Testing and Commissioning of NGR of $11/\sqrt{3}$ kV, 656A, 9.68 ohm Suitable for Outdoor installation as per the specifications.

Technical Specification of Neutral Ground Resistor (NGR) suitable for supplied 12.5 MVA Power Transformer as per following technical specifications as per GETCO norms.

Perforated bottom sheet with wire mesh shall be made from S. S. Neutral Grounding Resistor shall be formed of non-aging (grade ASTM A240/AISI-304 or better) corrosion resistant punched stainless steel elements. Resistance material shall have high electrical resistivity and low temperature co-efficient of resistance.

The resistor unit shall consist of suitable no. of elements. All the elements shall be mounted inside the cubicle so as to ensure ease of inspection and replacement of individual element. All the resistor elements consisting the NGR shall be assembled and supported inside the cubicle in such a way that no distortion or breakage will occur during the passage of specified fault current to earth.

Wet process type brown glass porcelain insulators shall be used for supporting resistor elements and used to insulate the resistor element from enclosure. Porcelain insulators shall have high creep age value suitable for heavily polluted atmosphere charged with dust particles.

Enclosure:

Each neutral grounding resistor shall be housed in weather-proof enclosure having Degree of Protection IP - 55.

Enclosure shall be Stainless Steel having a minimum thickness of 2 mm. Suitable ventilating louvers shall be provided on sides to ensure proper ventilation. The louvers shall be provided with fine wire mesh to make over min proof.

The terminals for neutral and earthing connections shall be housed in separate vermin-proof, weather-proof terminal box with min. IP-55 degree of ingress protection.

A separate canopy shall be provided above enclosure roof with a suitable air gap between them. It shall also cover the terminal compartment. Suitable lifting arrangement shall be provided to lift the canopy.

The bottom of the enclosure shall be provided with a drain plug to remove water that may get collected in the enclosure.

The enclosure shall be supported on insulators placed on mounting structure in such a fashion that it is not easily accessible for man standing on ground level. Any part of insulator shall be at a height 2500 mm. above ground/plinth.

Each cubicle shall be complete with front access door with handles, lock and also a removable bolted cover. All doors and removable covers shall be properly gasketed with good quality neoprene/synthetic rubber gaskets.

All the external hardware shall be S.S.

All cubicle door hinges shall be concealed type. Each cubicle shall be complete with suitably mounted cable box fitted with removable gland plate of Aluminium of suitable thickness for fixing cable gland.

6. Technical Specification of Item No. 3.4

This includes Supply, Installation, Testing and Commissioning of a Newly Manufactured Nitrogen Injection Fire Protection System suitable for 12.5 MVA Power Transformer as per latest standards as directed.

7. Technical Specification of Item No. 5

Design, Manufacture/Assemble, Supply, Installation, Testing and Commissioning of Control Relay Panel with associated equipment/accessories and shall comply with the latest editions (including amendments thereto) of all currently applicable statutes, regulations and safety codes in the locality where the equipment will be installed. The equipment shall also conform to the latest applicable standards. Nothing in this specification shall be construed to relieve the Contractor from his responsibility.

The contractor shall also note that the list of standards presented in this specification is not complete. Whenever necessary the list of standards shall be considered in conjunction with specific IS/IEC.

IS - 3231 : Electrical Relays for Power System Protection. IS -

3842 : Application of Relays for Protective Relays.

IEC - 60255 : Electrical Relays.

IEC - 61850 : Automation Design & Communication Protocol. IEC

60529: Degree of protection provided by enclosures.

IS 11353: Guide for uniform system of marking and identification of conductors and apparatus terminals.

The Control & Relay Panel (CRP) shall be considered as a Protection and Back up control panel to SCADA system. In case of SCADA system fails or is not available, then these panels shall be used for all the required functionalities. The various

functionalities such as control etc. shall be achieved by using Numerical Relays in addition to interlocking scheme, annunciation, indications, Mimics, Local / Remote selection for protection and data communication functions. Separate auxiliary relays, Annunciator, hardwired control and interlocking scheme, mimics, indicating meters, Control / Selector switches, Push buttons, indicating lamps etc. are not envisaged. Minimum hardware shall be used to achieve the required functionalities. Only separate electronic Load Manager as indicating meter, is envisaged. The panel shall mainly comprise of Load Manager and advance version of Numerical Relays for protection and control of bay equipment's. Communication protocol for Numerical Relays shall be IEC : 61850 and all inter bay interlocks shall be through GOOSE signals. All C & R, IEC : 61850 IED's should Time Synchronise through TPL GPS over WAN Network, via SNTP Protocol. All the Numerical Relays shall be designed for open architecture philosophy. The Relay protocol shall be IEC : 61850 only. Relays with proprietary or other protocol shall not be considered. Use of protocol converter is not acceptable. Numerical Relays shall be suitable for flush mounting. The relay enclosure shall be of transparent and dust proof having minimum degree of protection of IP :

54. Numerical relays shall have front keypad/keys to allow Relay settings from Relay. All the Relays shall also have the hand-reset button on Relay front. Relay to be self-reset or hand reset shall be software selectable. Relays shall also have facility to reset from remote command from SCADA IEC : 61850 protocols. Numerical relays shall have self-diagnostic feature with indication of Relay failure on Relay front. Relay failure signal shall be communicated through communication link to SCADA system. Numerical relay shall have minimum four sets of setting group (banks) for multipurpose usage. All the setting groups shall be independently programmable. Switching over from one group to another/other shall be by 1) the Relay keypad & 2) the SCADA system. Numerical relays shall have other functions like metering and control apart from the protection functions. Control function shall be through 1) the Relay keypad, 2) the SCADA system on IEC protocol as well as through 3) the Relay setting tool. Numerical Relays shall preferably have inbuilt LCD type Mimic and user define Mimic generation facility. Numerical Relays shall have an interlocking and control function for circuit breaker, isolator, earth switch etc. according to the requirement. The Relays shall have the interlock override features as well as the force/bypass facility for user-selected signals. The same shall be possible through 1) the Relay keypad 2) the SCADA system on IEC protocol 3) the Relay setting tool. The Relays shall have settable, self-powered internal clock with HH:MM:SS facility and provision for time synchronization. The Setting of Relay Clock Time shall be possible with the GPS, the Laptop and the SCADA System. All display values shall be actual primary values for the parameters displayed and not in the percentage values. The Relays shall be provided with suitable security like password protection against unauthorized access for change in Relay settings. However, it shall be possible to view metering, protection setting, status and event data as 'Read Only' without password protection. All Relays shall have LCD display for display of settings, status, faults, and events. The Relays shall have LED-indicating lamps for Fault trip, Relay healthy, Relay failure, Aux. Supply ON. Each Relay shall have status; data and events shall be stored in non-volatile memory or battery backup memory. Unless otherwise specified, it should be possible to save minimum 50 Disturbance records and 2000 Sequence of Events in a First-in-First-out - FIFO configuration. All disturbances

records and events shall be stored & displayed with time resolution & accuracy of 1 ms. The Trip circuit supervision relay shall be part of Numerical Relay.

Protection Requirement :-

66 KV Power Transformer Numerical Differential Protection :

Numerical Differential Relay :-

It shall consist of fully numerical/digital type, variable percentage, biased type differential relay. It shall be triple pole type, with faulty phase identification/indication. The Relay shall have 8 number of site selectable 1A/5A current inputs. The Relay shall remain stable under initial magnetizing inrush current, sympathetic inrush when adjacent transformers are charged, through fault stability and over fluxing conditions. The relay shall have second harmonic restraint feature. The Relay shall be very fast in operation with an operating time not greater than 30 milli-seconds at 5 times setting. The Relays shall have 9 programmable function keys. The bias setting of the Relay shall be adjustable with range of 5 – 100 %. The relay shall offer a USB serial port as standard on the front of all units. All of the Relay's functions can be set on a PC using suitable software via the USB port. The connection is made with a USB cable and operates with a 'plug and play' connection; so, no pre-setting of the Relay is required. The Relay shall support user selectable communications protocols DNP-3.0, MODBUS-RTU, IEC : 60870-5-103 with RS-485 connection possibility or shall support IEC : 61850 edition 2 protocol with either electrical or optical redundant ports. Relay with IEC : 61850 ports shall support site selectable Parallel redundancy protocol (PRP)/ High-availability Seamless Redundancy (HSR) shall be provided for rear communication. The Relay shall have a disturbance feature to record graphic form of instantaneous values of current in all two/three winding transformer analog channels, during faults and disturbances for pre-fault and post -fault period.

Fault records & Disturbance analysis :

Event Logs > 1000

Trip Logs / Fault records > 100

Oscillograph Fault recordings > 50.

The maximum fault recording with total capacity minimum 100 sec. Site selectable sampling rate up to 1/2 Kilo Hz. The disturbance recorder shall have the facility to record the following external digital channel signals apart from the digital signals pertaining to differential relay.

1) REF Protection operated. 2) HV & LV breaker status. 3) Buchholz /OLTC surge relay alarm / trip. 4) WTI/OTI/PRD alarm/trip of transformer necessary hardware and software for downloading the data captured by disturbance recorder to personal computer available in the Sub-station automation system is in the scope of the contractor. 5) The Relays should be modular in construction with possibility of future addition of BI, BO's , protection functions by using additional sub modules / cards without complete replacement of the main relay / base module of the relay. 6) All protection Relays shall have graphical Large Screen display with dedicated open & close control keys. 7) The Relay shall be Cyber Secured according to IEC : 62443 and BDEW Whitepaper. 8) The Relay shall be suitable for simulated testing of various protection functions via Relay configuration software without actual secondary injection kit. 9) Easy access to process and device information via a standard WEB-Browser for displaying operational measuring values, operational and fault logs, setting values and device

information. 10) Upgradable to process bus in future as per IEC : 61850-9-2 standard.

11) Relay shall be conformal coated as per ISA : 71.04, IEC : 60068-2-42, IEC60068-2-43 and IEC : 60068-2-60 suitable for G3 environment.

Restricted Earth fault Protection:

The restricted earth fault protection shall be 1) Numerical type; 2) of high speed, instantaneous current operated and high impedance type; 3) having a current setting range of 5-200% of 1 Amp.; 4) tuned to the system frequency. It shall have high rejection of DC component of fault current; 5) having suitable non-linear resistor to limit the peak voltage to 1000 Volts.

Over fluxing protection :

The relay shall monitor the voltage (volts)/frequency (Hertz) and shall have a continuous adjustable setting between 100 to 130% of nominal volts/ hertz ratio. Relay shall have inverse time characteristic compatible with transformer over fluxing. The Relay shall be energized by two separate time delay Relays to work in two stages for a time delayed alarm and time delayed trip. The variable time setting of alarm shall be in the range of 2-5 secs. and that for trip in the range of 5-30 secs. The Relay shall have a high resetting ratio of 98% or better.

Transformer overload relay :

Transformer overload relay shall be provided with two stages. One stage as non-trip alarm & the second stage is to extend trip command to breakers to have required load relief.

Auxiliary Relay :

The transformer protection panel shall be wired for buchholz alarm and trip, oil temperature alarm and low oil level. The auxiliary flag relays shall be provided for contact multiplication wherever they are needed for buchholz alarm/trip, winding temperature alarm/trip, oil temperature alarm/trip, pressure relief device trip, oil surge relay trip. Current operated relays shall be preferred to voltage operated relays.

Note : REFT, Over flux Relay & auxiliary Relays can be inbuilt features of differential Relay.

Numerical Back-up Over Current & Earth fault protection scheme with high set feature for Power Transformer :

It shall have 1) Three over current and one earth fault element (s) which shall be either independent or composite unit (s); 2) The scheme shall include necessary VT fuse failure relays for alarm purposes; 3) Over current Relay; 4) Relay Shall have threshold setting range of 1-35% of rated current; 5) The Relay shall have a settable characteristic angle of -180 to 180 degree in step of 1 degree; 6) Includes hand reset flag indicators or LEDs; 7) Earth fault Relay; 8) The Relay Shall have threshold setting range of 3-35% of rated current; 9) Relay shall have a settable characteristic angle of -180 to 180 degree in step of 1 degree; 10) Include hand reset flag indicators or LEDs; 11) Include necessary separate interposing voltage transformers or have internal feature in the relay for open delta voltage to the relay; 12) The relay shall offer a USB serial port as standard on the front of all units. All of the relays functions can be set on a PC using suitable

software via the USB port. The connection is made with a USB cable and operates with a 'plug and play' connection, so no pre-setting of the relay is required. The relay shall support user selectable communications protocols DNP-3.0, MODBUS-RTU, IEC : 60870-5-103 with RS-485 connection possibility or shall support IEC : 61850 edition 2 protocol with either electrical or optical redundant ports. Relay with IEC : 61850 ports shall support site selectable Parallel redundancy protocol (PRP)/ High-availability Seamless Redundancy (HSR) shall be provided for rear communication. 12) The relay shall have a disturbance feature to record graphic form of instantaneous values of current in all two/three winding transformer analog channels, during faults and disturbances for pre fault and post fault period. 13) The Fault records & Disturbance analysis : a) Event Logs

> 1000, b) Trip Logs / Fault records >100, c) Oscillograph Fault recordings > 50; 14) The maximum fault recording with total capacity minimum 100 sec. Site selectable sampling rate up to 1 / 2 Kilo Hz.; 15) Relay shall have 9 programmable function keys;

16) The Relays should be modular in construction with possibility of future addition of BI, BO's , protection functions by using additional sub modules / cards without complete replacement of the main relay / base module of the Relay; 17) All the protection relays shall have graphical Large Screen display with dedicated open & close control keys;

18) The Relay shall be Cyber Secured according to IEC : 62443 and BDEW Whitepaper;

19) Relay shall be suitable for simulated testing of various protection functions via Relay configuration software without actual secondary injection kit; 20) Easy access to process and device information via a standard WEB-Browser for displaying operational measuring values, operational and fault logs, setting values and device information; 21) Upgradable to process bus in future as per IEC : 61850-9-2 standard; 22) The Relay shall be conformal coated as per ISA-71.04, IEC: 60068-2-42, IEC : 60068-2-43 and IEC

: 60068-2-60 suitable for G3 environment.

66 KV Line Panel :-

Directional Overcurrent and Earth fault protection scheme for 66kV Lines :

1) Shall have three over current and one earth fault element (s) which shall be either independent or composite unit (s); 2) Shall be of Numerical type; 3) Over current relay; 4) The Relay Shall have threshold setting range of 1-35% of rated current; 5) The Relay shall have a settable characteristic angle of -180 to 180 degree in step of 1 degree; 6) Include hand reset flag indicators or LEDs; 7) Earth fault Relay; 8) The Relay Shall have threshold setting range of 3-35% of rated current; 9) The Relay shall have a settable characteristic angle of -180 to 180 degree in step of 1 degree; 10) Include hand reset flag indicators or LEDs; 11) Include necessary separate interposing voltage transformers or have internal feature in the relay for open delta voltage to the relay; 12) The relay shall offer a USB serial port as standard on the front of all units. All of the relays functions can be set on a PC using suitable software via the USB port. The connection is made with a USB cable and operates with a 'plug and play' connection, so no pre-setting of the relay is required. The relay shall support user selectable communications protocols DNP-3.0, MODBUS-RTU, IEC : 60870-5-103 with RS-485 connection possibility or shall support IEC

: 61850 edition 2 protocol with either electrical or optical redundant ports. Relay with IEC

: 61850 ports shall support site selectable Parallel redundancy protocol (PRP)/ High- availability Seamless Redundancy (HSR) shall be provided for rear communication; 13) The relay shall have a disturbance feature to record graphic form of instantaneous values

of current in all two/three winding transformer analog channels, during faults and disturbances for pre fault and post fault period; 14) Fault records & Disturbance analysis : a) Event Logs > 1000, b) Trip Logs / Fault records >100, c) Oscillograph Fault recordings > 50; 15) The maximum fault recording with total capacity minimum 100 sec. Site selectable sampling rate up to 1 / 2 Kilo Hz.; 16) The Relay shall have 9 programmable function keys; 17) The Relays should be modular in construction with possibility of future addition of BI, BO's , protection functions by using additional sub modules / cards without complete replacement of the main relay / base module of the relay; 18) All the protection Relays in shall have graphical Large Screen display with dedicated open & close control keys; 19) The Relay shall be Cyber Secured according to IEC : 62443 and BDEW Whitepaper; 20) The Relay shall be suitable for simulated testing of various protection functions via Relay configuration software without actual secondary injection kit; 21) Easy access to process and device information via a standard WEB-Browser for displaying operational measuring values, operational and fault logs, setting values and device information; 22) Upgradable to process bus in future as per IEC : 61850-9-2 standard; 23) The Relay shall be conformal coated as per ISA-71.04, IEC : 60068-2-42, IEC : 60068-2-43 and IEC : 60068-2-60 suitable for G3 environment.

66 KV Bus Coupler Panels :-

Overcurrent and Earth fault protection scheme for 66kV Bus Coupler:

A) Numerical Back-up Protection Relays shall have the following features :

- 1) Shall be microprocessor-based design, fully Numerical, programmable/ configurable & having self-supervision (monitoring) feature with watch dog contact for alarm; 2) Shall be configurable for BI/BO, LEDs, functional settings etc.; 3) Shall comprise of three O/C elements and one E/F element; 4) Shall have total Four independent stages of O/C protection, out of which 3 stages shall be of definite time Directional O/C and One Stage shall be of IDMT directional O/C with standard IEC and user defined curves. Further relay should have total four Stages of E/F protection out of which 3 stages shall be of definite time directional E/F protection and One stage shall be of IDMT directional E/F with standard IEC and user defined curves. Measured and calculated earth fault stages shall be separately available; 5) The Relay shall have 4 CT , 4 VT and user configurable a) 18-DI b) 11-DO inclusive of watchdog c) 14 LED's; 6) Shall be function independent of the main protection and shall be capable of clearing the fault correctly even when the main protection fails to operate; 7) Shall have facility for enabling/disabling any functions & directional feature; 8) Shall be compliant to site selectable IEC-61850 edition1 & edition 2 communication standard; 9) Shall have front USB port for local communication & rear redundant RJ-45/ FO ports for Remote communication on IEC : 61850 supporting site selectable Parallel redundancy protocol (PRP) and High-availability Seamless Redundancy (HSR). Goose transmission time between two IED's shall be <10 milli-sec; 10) The Relay shall support at least 6 IEC : 61850 clients; 11) Shall have front graphical HMI for Singleline diagram or minimum 8-line alphanumeric display see with clearly visible various measurements e.g. Primary/secondary values and access to settings etc.; 12) The Relay Shall have 4 stages under voltage; 13) The Relay shall have 4 stage overvoltage; 14) The

Relay shall have 6 stages for under and over frequency selectable; 15) The Relay shall have 6 stages for rate of change of frequency protection; 16) The Relay shall have voltage dependent overcurrent protection; 17) The Relay shall have undercurrent; 18) The Relay shall have Power Protection (under Power & overpower); 19) The Relay shall have vector shift; 20) The Relay shall have Power factor protection; 21) Relay shall have CBF with 2 times; 22) The Relay shall have Broken conductor based on NPS/PSS ratio;

23) The Relay shall have I²t based wear monitoring for breaker shall be possible; 24) The Relay shall have load blinder feature used with directional overcurrent protection elements to block tripping during sustained heavy reverse load current flow in networks; 25) The Relay shall also have site-selectable High impedance and low impedance Restricted earth fault; 26) The Relay shall have fault locator feature; 27) The Relay shall have 4 setting group; 28) 1A/5A shall be site selectable; 29) The Relay shall have suitable per defined site selectable Binary input threshold selection options; 30) The Relay shall have minimum heat dissipation levels. Ventilation holes in relay top & side surfaces are not acceptable. **66 KV Bus-bar Protection :**

Numerical Centralized, low Impedance biased Busbar Differential Relay :

1) The Bus-bar protection scheme shall be fully numerical, phase segregated type & site selectable IEC : 61850 edition 1 & 2 compliant. It shall be capable of providing extensive protection for the busbar irrespective of the CT location; 2) The Bus-bar protection scheme shall be suitable for accommodating all the existing bays with provision for future bays in the substations. The scheme shall be capable of accommodating different types of Bus-bar arrangements/ configurations used in the substations. Provision of adding new bays in future shall be possible, i.e. the system shall be scalable. The scheme should have provision for easy adaptation for different bus configurations; 3) The Bus-bar protection shall be high speed, low impedance, Centralized, biased differential type and shall provide protection for all types of phase & ground faults selectively for each zone of protection. The operating speed shall be independent of the no. of bays and the protection functions/features configured in the Busbar protection system; 4) The Relay shall be of modular construction, having features of self-monitoring, supervision and diagnostic capabilities to ensure maximum availability of the scheme. Continuous self- diagnostics tests shall be carried out by the relay(s) & watchdog contact should be made on any abnormalities; 5) It shall be possible to include future bays as and when they are added. In such cases, the system shall be easily extendable by adding modules for the new bays and activating the same in the Bus-bar protection; 6) The scheme shall be of centralized architecture only. Phase wise bus-bar Protection relays are not acceptable. The Bus-bar protection scheme shall include protection "IN/OUT" switch for each zone. The scheme should have facility to block zone/feeder during maintenance; 7) To enhance security, the Bus-bar protection scheme shall have at least two independent measurement & tripping criteria (Check Zone and Bus Zone). A trip signal shall be initiated only if the criteria are simultaneously satisfied. Neither criterion

(for tripping) shall be voltage dependent; 8) The protection scheme shall be able to accommodate different/heterogeneous CT classes, constructions, secondary resistances, saturation factors, ratios etc. without the need of auxiliary CTs for ratio matching; 9) The scheme shall incorporate continuous phase wise supervision of CT secondaries against any possible open circuit and if it occurs, scheme shall render the relevant phase of protection inoperative, shall also indicate phase segregated LED/Alarm on the relay & give facia annunciation; 10) The scheme shall be insensitive to transients& harmonics, be fully reliable & selective even under CT saturation conditions; 11) The main current transformer secondary circuits should not be switched. The scheme shall not include any external CT switching relays or additional module for completion of the scheme; 12) No region within the Bus-bar zone should be left un-protected by the offered scheme. Fault between breaker & CT in bus section or in any feeder during breaker open condition should be detected by the scheme. The scheme thus should have capability to detect & clear the fault in dead/end zone dynamically depending on system condition. The scheme should also send inter-trip command to the other end of the line when Bus-bar protection operates; 13) The Bus-bar protection scheme shall have built in LBB protection for each feeder. The built-in LBB feature should be phase segregated & have a provision of single-phase initiation with alarm. The protection shall have the option to take LBB trip from external discrete/the built-in LBB of other protective Relays in the feeder. It shall be ensured that even when the Bus-bar protection is kept 'out' due to any reason; the operation of LBB (which are part of Bus-bar protection) will not be hampered. Furthermore, under the 'BBP blocked/out' mode also, the operation of LBB trip, if any coming from the external LBBs shall be selectively extended to all the breakers of concerned zone through the trip bus of BBP. External wiring, if any required to achieve this shall be provided. This may be achieved through 'Goose' logic, if required & feasible; 14) At least 32 programmable LEDs for various protection functions should be available; 15) Relay shall have graphical HMI which shall also permit reading of important parameters/information etc. such as currents, zone differential current, zone bias current, alarm conditions, trip conditions, setting values etc.; 15) The maximum operating time up to initiation of trip relay should be 10 milliseconds or less; 16) Shall have front USB port for local communication & rear redundant RJ-45/FO ports for Remote communication on IEC : 61850 supporting site selectable Parallel redundancy protocol (PRP) and High-availability Seamless Redundancy (HSR). Goose transmission time between two IED's shall be <10 milli-sec.; 17) The Relay shall support at least 6 IEC : 61850 clients; 18) The Relay shall have suitable per defined site selectable Binary input with threshold selection options; 19) The Relay shall have minimum heat dissipation levels. Ventilation holes in relay top& side surfaces are not acceptable.

General Points for all the Numerical Relays :

- 1) The Manufacturer should have service and repair center in India for analysis & repair of relays.
- 2) The Manufacturer of Relays shall have min. 10 years experience in implementation of 61850 protocol-based protection and automation systems in India.
- 2) The Relay shall have web monitor/browser feature to get connected to relay via ethernet port from SCADA system to access important data in device.
- 3) The Certified Service center must be located within India.

Tripping Relay :

Each panel shall be provided with instantaneous DC operated tripping Relay. The relay shall have adequate number of normally open and normally close contacts to meet the requirement of scheme, other functions like auto re-closing relay, LBB relay, fault locator disturbance recorder, event logger wherever applicable. The maximum operating time of the relay shall not exceed ten milliseconds and reset within 20 milliseconds. Relay shall be provided with operation indicator for each element coil.

Tripping Circuit Supervision Relay :

- 1) Each trip coil of circuit breaker shall be provided with an independent trip circuit supervision relay. These relays shall be mounted in the control panel associated with the circuit breakers.
- 2) These relays shall monitor the healthiness of each phase of the trip circuit while the breaker is in open or closed position and give an alarm for the loss of DC supply or for faults in the trip coil or for faults in the trip circuit such as leads, auxiliary contacts. The relay shall have a time delay on drop off of not less than 200 milliseconds and be provided with operation indication.
- 3) Trip supervision relay shall be located in the panel.

The relay shall have adequate contacts for providing connection to alarm and event logger.

DC Supply monitoring relay :

The relay shall be capable of monitoring the failure of DC supply to which it is connected. Separate DC supply monitoring relay shall be provided for DC main circuit, control circuit of tripping relay and protection circuit of each panel. It shall have adequate potential free contact to meet the scheme requirement. The relay shall have a time delay on drop off of not less than 100msecs and be provided with operation indicator/flag. Indicating lamp and separate alarm for DC fail shall be provided and shall be operated by 230V AC single phase supply. Push buttons for test and accept shall be provided.

A) Specification for a IEC 61000-4-30 compliant Multifunctional Power Meter : The multifunctional device is used to collect, display, and transmit measured electrical variables such as AC current, AC voltage, power types, harmonics, etc.

It shall have below features.

- Comprehensive acquisition of relevant network parameters for early identification of supply quality problems.
- Measured value acquisition according to the IEC 61000-4-30 power quality measurement standard.
- Easy operation via integrated web server for parameterization, diagnosis, evaluation, and reporting.
- Interoperability is guaranteed by using standard interfaces and IEC : 61850 protocol and standard data (PQDiff, Comtrade).
- Memory capacity of 2 GB for storage of the data.
- Use in the IT, TT and TN power systems.
- External time synchronization via the Network Time Protocol (NTP).

Housing :

It shall be Flush mounting devices with graphical display and size of 96 mm. X 96 mm.

Basis function :

The following measurements shall be collected or calculated by the device from the measured variables:

- True RMS AC voltage and AC current
- 2,048 sampled values per 10 / 12 system periods
- Line frequency
- Active, reactive and apparent power
- Active, reactive and apparent energy
- Power factor and active power factor
- AC voltage and AC current unbalance
- Harmonics of AC voltage and AC current are stored up to the 40th order for evaluation
- THD (Total Harmonic Distortion) of AC voltage and AC current
- Phase angle.

8. Technical Specification of Item No. 6

This includes Supply, Installation, Testing and Commissioning of SCADA System with largemonitor, switches, PLC, office furniture etc. complete in all respects, as per requirementand as directed. The SCADA System shall be associated with latest state of art technology and shall be user friendly. One expert shall be kept for 06 (Six) months after commissioning the system. It shall cover the existing 11 KV GIS with new 11 KV & 66 KVGIS with supply & laying of mono-mode OFC with a spare. There shall be redundancy inall the layers, i.e. hierarchies. The PLC System should be modular and shall have future expandability with addition of module. The system protocol shall be such that, it shall match with any protocol for having accessibility. Also, if any upgradation happens in the Software/Hardware within 05 (Five) years, the same shall be arranged by the contractorfree of cost to DPA. Further, the contractor shall supply all kind of spares with their required quantities, as recommended by the manufacturer. However, the system shall comply with the latest Cyber Security norms/rules/directions with time to time upgradations.

9. Technical Specification of Item No. 12

This includes Supply, Installation, Testing and Commissioning of CCTV System with large monitor, switches, PLC, office furniture etc. complete in all respects, as per requirementand as directed. The system protocol shall be such that, it shall match with any protocol for having accessibility. However, the system shall comply with the latest Cyber Security norms/rules/ directions with time to time upgradations.

10. Structure Work at the 66 KV Yard :-

This includes Supplying, Installation, Connection, Tapping, erection, making, grouting and commissioning of galvanized steel structure for following items mentioned below and structure shall be as per GETCO practice (All foundation drawing will be given by contractor as per GETCO specifications and same will be approved by structure & electrical consultants). Steel structure drawing shall be given by vendor for approval by structural consultants giving wind pressure, bending moment etc. with proper drawings.

11. 66 KV Metering side Equipment for Item no. 4 :-

Installation of outdoor type 60 KV, 10 KA Lightning Surge Arrestor (1 Phase) complete in every way with outdoor junction boxes suitable, connectors, hardware, accessories, terminals for LV wiring complete in every way.

12. Installation, of outdoor type 66 KV (3 Phase) double Break Isolator :- 1250 A, 26.1 KA, Isolator with one E/S complete in every way with outdoor junctionboxes, terminals for LV wiring, all suitable connectors, hardware, accessories complete in every way.

Installation of Indoor type 72 KV SF-6 Circuit Breaker (3 phase)

2500 A, 31.5 kA SF-6 CB complete in every way with operating kiosk, complete pedestal and mounting supports, terminals for LV wiring inside kiosk, suitable connectors, hardware, and accessories complete in every way.

Installation of outdoor type 66 KV (3 core) Current Transformer (1 Phase)

150/1 A, 31.5 KA 10 VA CT class 0.2 S for metering class complete in every way with outdoor junction boxes, terminals for LV wiring. (suitable for 12.5 MVA), connectors, hardware, accessories complete in every way.

150/1+1+1+1 A, 30 VA 31.5 KA CT 5P20 protection class for main protection, PS class for differential, PS class for distance protection, 5P20 class as spare complete in every way with outdoor junction boxes, terminals for LV wiring. suitable connectors, hardware, Accessories complete in every way.

Installation of outdoor type Potential Transformer (1 Phase).

66 KV/ $\sqrt{3}$ /110 V/ $\sqrt{3}$ /110 V/ $\sqrt{3}$ outdoor type single phase PT class 0.2/3P, 100 VA burden complete in every way with outdoor junction boxes, terminals for LV wiring, suitable connectors, hardware, accessories complete in every way.

- 2 sets of outdoor Current Transformers (6 Nos.)
- 2 sets of outdoor Potential Transformer (6 Nos.)
- 2 sets outdoor Isolators with earthing blades.
- 2 sets Lightning Arrestor

13. 66 KV Switchyard Civil Work :-

New Substation 66 KV Gas Insulation Switchgear Civil Work with Material Supply and Working of all Foundations, Fabrication, Contraction, Beam/Row Colum, Plaster, Fencing,

Plumbing, Painting, RCC Road Work by Contractor as per direction of Engineer-In-charge of DPA.

1	GIS, AHU, SCADA, Office, Control Room, Auxiliary Tr. Room, DG Room, Diesel Storage, Meter Room etc. complete in all respects.	1	No.
2	66/11 KV Transformer Foundation	3	Nos.
3	Oil Sock Pit	2	Nos.
4	RCC Fire Wall	2	Nos.
5	NIFPS Foundation	4	Nos.
6	NGR Foundation	3	Nos.
7	66 KV LA Foundation	23	Nos.
8	66 KV CT Foundation	6	Nos.
9	66 KV PT Foundation	6	Nos.
10	66 KV PI Foundation	2	Nos.
11	66 KV Isolator Foundation	2	Nos.
12	Underground Water Tank	1	No.
13	Septic Tank	1	No.
14	Metal Spreading	930	SMT
15	Compound Wall-cum-Retaining Wall	140	RMT
16	Main Gate & Wicket Gate	15	RMT
17	RCC Road	420	RMT
18	Lighting Mast Foundation	3	Nos.
19	Storm water Drainage for Switchyard	60	RMT
20	Cable Trench 1200 X 1200 mm.	50	RMT
21	Cable Trench 900 X 1000 mm.	60	RMT
22	RCC NP-3 Hume Pipe 300 mm.	20	RMT
23	Earth Filling in the Yard from Outside	1800	CMT
24	Survey the Site Preparing & Leveling	1	JOB
25	Soil Classification	1	JOB
26	11 KV 2 Tier RCC Cable Trench 1.0 X 1.0 Mtrs. Outside the Yard	1100	RMT

14. Technical Specification of Station Transformer 500 KVA for Item No. 3.5:

Disconnection, Removal, Loading, Shifting, Unloading, placing, erection on foundation, testing and commissioning of 500 KVA oil filled, 11 KV/415 V, copper wound outdoor type, weather proof type transformer (Impedance 4%-5%) with bushing & terminal on HT & LT side and with +5% to -10% tap on HT side. HT side will have bushing and LT side will have cable box.

This shall have oil temperature gauge along with all safeties and provide all protection control wiring working by contractor given direction of Engineer-in-charge of DPA.

15. Technical Specification of LT Panel for Station Transformer Item no. 10:

Supply, Installation, Testing and Commissioning of Main LT Panel. This will be installed in

the First floor, free standing, indoor duty, Dust & Vermin proof. The Main LT Panel shall be suitable for 415 V AC, 50 Hz., 3 phase 4 wire supply. Each incoming & outgoing breakers shall have microprocessor based releases & provide all Indication and protection relay & control system with energy meter. LT Panel connection of DG Incomer and UPS/Inverter & all outgoing Feeders.

Cable :

2R X 3 C X 400 Sq. mm., 1100 V AL. XLPE Cable

The Panel will be made as per detailed specifications & drawings forming part of this document.

LT Panel Out Goings Feeder Details

1. GIS Hall Crane
2. Fire Panel
3. Control Relay
4. General Lighting
5. AHU or VRF System
6. Battery Charger Supply
7. UPS or Inverter System
8. PLC, SCADA, RTU
9. Camera Network Server
10. DG Room Supply
11. Filtration Machine Supply
12. Spare Feeder

16. Technical Specification of LT DG 150 KVA for item no. 16

Supply, Installation, Connection, Testing and Commissioning of 150 KVA LT DG with AMF Panel, Protection & LT Panel including providing of Foundation.

DG have to provide all interlock system and meter voltmeter ammeter diesel Engine HMI to be Controlled by remote/local system to be provide by contractor as per guide line Engineer-in-Charge.

17. Technical Specification of 11 KV HT Capacitor Bank for item no. 7:

Supply, Installation, Connection, Testing and Commissioning of 03 (Three) Nos. of 11 KV, 400 kVaR Indoor Fixed Type Capacitor Bank complete with Disconnecting Isolator, HT Contactor, Series reactor, RVT with Auto/Manual Control Power Factor Correction to be connected with HT GIS 11 KV Panel Board HMI Control Panel with all meter/protection.

18. Technical Specification of DC Distribution Board for item no.9

Supply, Installation, Testing & Commissioning of DC Distribution board with 01 (One) set of 63 A, MCB as incomer and 06 (Six) Nos. of suitable rated MCBs (as per coil rating of SF-6) on outgoing side enclosed in metal sheet enclosure of 2 mm. thick and suitably painted. The unit will be complete with bus bars, accessories, links, terminal strip, clamps etc along with cables up to incoming & outgoing to GIS panel board complete with all

indication /Control Relay / Circuit Breaker. Connection of DCDB Panel shall be with Protection & all Metering.

Supply Voltage : 110 V/48 V/24 V DC

19. Technical Specification of Cable Trench for item no. 19

Supply, installation, laying of 11 KV, 2 Tier Cable Trench of 1.0 X 1.0 MT Outside the Yard.

One side of the wall or on two sides of the wall or at other places and paint with one coat of red oxide primer and two coats of synthetic enamel paint grey afterward

L = 3000 mm.

W = 900 mm.

H = 1000 mm.

T = 90 mm.

New to Old 66 KV Substation distance: 1100 Meter.

The cable laying shall be as per direction of engineer In-charge of DPA. If required road crossing /railway crossing the cable shall be pass through suitable size of HDD.

[Cable Size : 3R X 3C X 300 Sq. mm. XLPE Al., i.e. 09 (Nine) Nos.

20. Technical Specification of EOT Crane 5.0 Ton for item no. 17:

Supply, Installation & Commission of 5.0 Ton EOT Crane in the 66 KV GIS Hall with all Protections and Indication Lamps. EOT Crane can be Controlled by Remote/Local System provided with Main Hoist/LT/CT Auxiliary Motor and connection shall be made by the Contractor with Bus-bar Protection in EOT crane.

21. Technical Specification of Battery & Battery Charger for item no. 8:

Supply, Assembling, Installation, Electrolyte filling, carrying out the recommended cycles of charges and discharges before final charging, connecting up, battery bank forming, testing, rectification and commissioning of all the equipment for the 110 V DC. The rated voltage output equals to 110 V DC consisting of lead acid cell of 2 V each and shall be provided with specific gravity tester.

- Capacity will be 250 Amp-Hours

- The supply includes treated wooden fabricated free standing floor mounted rack with Acid resistant finished for housing the batteries complete with series connecting electrical leads and output connection box, Electrolyte for the batteries.

- Input supply 230 V AC single phase

- Output suitable to charge lead acid battery bank of 220 V DC

- Maximum current output will be 25Amps trickle charge.

- All necessary indication

- 1 No. of moving coil ammeter and voltmeter

- Indicating light for power On, battery undercharging and trickle charging

- 1 No. DC distribution board with 8 Nos. of DP outgoing MCB's of suitable rating.

- The charger to be housed in sheet steel enclosure with louvers and cooling fans.

- 1 No. of moving coil ammeter and voltmeter

- Indicating light for Power On, battery undercharging and trickle charging

22. Technical Specification of Fire /Alarm/Sensor System for item no. 15:

The Fire detection system shall be such that all the smoke/fire sensors installed in the system should be given individual ID and if any of the sensors observe any abnormality, its ID should display on LCD screen of detection panel with alarm and annunciation, so that, the operational personnel target that particular place for fire extinction covering all the rooms in GIS Building /Control Room/DG Room/Transformer Sprinkler

- Carbon-di-oxide type fire extinguisher of 2 Kgs. Capacity, CO2 gas as per IS : 15222
- Carbon-di-oxide type fire extinguisher of 4.5 Kgs., Capacity, CO2 gas as per IS : 15222
- ABC powder type fire extinguisher of 6 Kgs./Fire buckets with stand (Set of 4)

23. Technical Specification of AHU/VRF System for item no. 15.1:

Ventilation System for 66 KV GIS Hall as per GETCO Specification.

All the Control Room Buildings are to be provided with AHU/VRF System as per Cooling Purpose with all with Motor, duct system and pipe line to be installed by the contractor as per following.

- Control Room Building
- GIS 66 KV Hall Room
- GIS 11 KV Panel Room

24. Technical Specification of Inverter with Battery for Emergency Lighting for item no. 11:

Installation, Supply, Connection of Inverter system provided with battery bank with 115Nos. of Batteries to connect in LT Panel supply for Emergency Lighting Failure in all the Control and GIS Panel Rooms for all Breaker/ HT/LT Panel Alarm/Relay/ Indicator System.

25. Technical Specification of Lighting for item no.13:

All 66 KV Substation Lightings shall be provided with Connection/Fitting/Mounting/ Foundation work by the Contractor as per the locations shown by Instruction Engineer-in-Charge of DPA.

26. Technical Specification of CCTV System for item no. 12 :

All the 66 KV Substation Cameras shall be provided with Connection/Fitting/Mounting/ Foundation work by the Contractor as per the locations shown by Engineer-in-charge of DPA.

A. GENERAL DESIGN FEATURES OF CURRENT TRANSFORMERS:

This section covers this design, manufacture, assembly, testing at manufacturer's works, supply and delivery of outdoor, **dead tank type**, oil impregnated paper, single phase, 50 Hz., oil immersed, self-cooled, current transformer suitable for

operation in the climate conditions specified. The current transformers shall be complete in all respects.

STANDARDS:

CURRENT TRANSFORMERS:

SR. NO.	STANDARD NO.	TITLE
1	IS:2165	Insulation co-ordination for equipment of 100 KV and above
2	IS:16227(I to III)	Instrument Transformers
3	IS:2099	High voltage porcelain bushings
4	IS:3347	Dimensions of porcelain transformer bushings
5	IS:2071	Method of high voltage testing
6	IS:335	Insulating oil for transformers and switchgears
7	IEC 60529	Degrees of protection provided by enclosures (IP Code)
8	IEC-61869-1 to 3	Instrument Transformers
9	IEC-61869-1 to 3	Instrument Transformers (VT)
10	IEC-270	Partial discharge measurement
11	IEC-44(4)	Instrument transformer measurement of PDs
12	IEC-171	Insulation co-ordination
13	IEC-60	High voltage testing techniques
14	IEC-8263	Method for RIV test on high voltage insulators
15	--	Indian Electricity Rules 1956
16	IS:16227(I to III)	Voltage Transformer

Equipment meeting with the requirement of other authoritative Standards, which ensure equal or better performance than the standards mentioned above, shall also be considered. When the equipment offered by the Bidder conforms to other standards, salient points of difference between standard adopted and the standards specified in this specification shall be clearly brought out in the relevant schedule. Four copies of such standards with authentic translation in English shall be furnished along with the bid.

All parts of below shall be of stainless steel only.

The core of current transformers to be used for metering and instrumentations shall have saturation factor, low enough to avoid damage to the instruments, in the event of maximum short circuit current.

- a) The C.T. core, to be used for protective relays shall be of accuracy class, specified or appropriate class suitable for back up, over current and earth fault, differential and bus-bar protection.
- b) The tenderer shall give assurance for trouble free and maintenance free performance for a period of 60 months from the date of receipt at store;

during which period, the CTs shall be repaired / reconditioned / replaced free of cost, immediately in case of any trouble. Therefore, the tenderer shall ensure that sealing of current transformer is properly achieved. In this connection, the arrangement provided by the tenderer at various locations including the following ones shall be described supported by sectional drawings.

- i) Location of emergence of primary and secondary terminals.
- ii) Interface between porcelain housing and metal tank.
- iii) Cover of the secondary terminal box.
- iv) G.A. drawing complete with details of primary and secondary windings overall dimensions, weight, nameplate, porcelain insulator, primary & secondary terminals, terminal connectors, etc.

c) Nuts and bolts (or screws used for fixation of interfacing porcelain bushings for taking out terminals) shall be provided on flanges, cemented to the bushing and not on the porcelain i.e. Flange type 66 KV bushing for CT, shall be provided.

Winding and Terminals:

The rating of the secondary winding shall be as specified under Section II of this specification. Ratio changing arrangement shall be provided on secondary winding for multi-ratio design, either a number of identical secondary winding may be provided to achieve desired ratios by series / parallel connection for the secondary winding or the secondary winding may be tapped. However, identical secondary's for tapped secondary winding shall meet requirement as specified.

Primary and secondary windings shall be of electrolytic grade copper and shall have continuous thermal rating as specified for all ratios. The primary winding is to be designed for continuous extended primary current at 120 % of rated primary current. The secondary winding wherever tapped, shall be adequately reinforced to withstand normal handling without damage.

The primary terminals shall be of standard size of 30 mm. dia. X 80 mm. length for all CTs rated upto 1200 Amps. For higher values of primary current, each

Terminal shall be made out of two such rods of 30/40/50 mm. dia. (as applicable) X 80 mm. length in parallel. The primary terminals shall be of heavily tinned electrolytic copper. The maximum thickness of tinning shall be 15 microns.

The secondary terminals shall be brought out in a compartment for easy access. Secondary terminal studs shall be provided with at least three nuts and adequate plain and spring washers for fixing the leads. The studs, nuts and washers shall be of brass, duly nickel-plated. The minimum outside diameter of the studs shall be 6mm. The length of at least 15mm shall be available on the studs for inserting the leads. The horizontal spacing between centers of the adjacent studs shall be at least 1.5 times the outside circum dia. of the units.

The current transformer shall be provided with suitable test tap for measurement of capacitance, tan delta as well as partial discharges, in factory as well as at site. Provision shall be made of a screw on cap for solid and secured earthing of the test tap connection, when not in use. **Tan delta test tap shall measure tan delta value of whole mass of insulation.** A suitable caution plate shall be provided duly fixed on the cover of the secondary terminal box, indicating the purpose of the test tap and necessity of its solid earthing as per prescribed method, before energizing the CT.

TERMINAL BOX OF CURRENT TRANSFORMERS:

The exterior of the secondary terminal box shall be hot dip galvanized. A cable box along with necessary glands for receiving control cables suitable for mounting on bottom plate of the terminal box shall be included in the scope of supply. A door with locking arrangement shall be provided on the front of the terminal box. The secondary terminals shall be taken out through composite epoxy or FRP Mould having single gasket packing & shall be provided by suitable link with dummy secondary leads. For control cable connections, separate terminal connector block to be provided. Secondary jumpers shall be terminated at one side of this terminal connector block. The secondary terminal box shall comply with Degree of Protection (IP-55) standards and type test report shall be furnished with technical bid.

TEMPERATURE RISE:

The maximum temperature rise of the current transformer and its oil, winding and external surface of the core and other parts shall be as specified in Table V of IS: 16227(Part I) 2016 with upto date amendment.

BUSHING AND INSULATORS:

The porcelain hollow insulator used shall be homogenous, free from lamination cavities and other flaws or imperfection that might affect the mechanical or dielectric qualities. The hollow insulator shall conform to the latest edition of IS: 62155. The puncture strengths of the hollow insulator shall be entirely free from external and internal corona. The total creep-age distance of the hollow insulator shall be suitable for heavily polluted atmosphere i.e. the total creep-age distance shall be 1810 mm. (minimum).

TESTS AND TEST REPORTS:

Reports of all type tests as stipulated in the latest edition of IS: 16227 & IEC 61869 for current transformers shall be submitted along with the tender.

The type test reports for the type tests carried out as per IS: 16227 (latest edition) & IEC 61869-2 for specified CTs and those for offered insulators shall be submitted. **The type test reports shall not be older than SEVEN years and shall be valid as on the last date of submission of bid.**

Following test reports shall be submitted.

1. Chopped Impulse voltage withstand test on Primary terminal (350kVp)
2. **High voltage power frequency wet withstand test on Primary winding**
3. **Temperature rise test**
4. Short Time Current test
5. Test for Accuracy
6. Measurement of dielectric dissipation factor
7. Degree of protection IP55 for secondary terminal box
8. STC test on primary terminal connector
10. Mechanical tests
11. Thermal stability test (IEEMA-22-2005)
12. **Temperature coefficient test (IEEMA-22-2005)**

INSTRUMENT TRANSFORMERS

- a. All current transformers shall be ring type (epoxy/cast resin) whereas voltage transformers (PT) shall be cast resin insulated type. Must provide details of ratio, output, class and accuracy for all CTs & PTs in its supply on the panel itself
- b. Instrument transformers shall be suitable for continuous operation at the ambient temperature prevailing inside the switchgear enclosure, when the switchboard is operating at its rated load and the outside ambient temperature is 50° C. The class of insulation shall be E or better.

CT TECHNICAL PARAMETERS

Sl. No.	ITEM	Core-I	Core-II	Core-III
i.	Purpose	Metering	protection	Special
ii.	Primary Current rating	300-150 Amps	300-150 Amps	300-150 Amps
iii.	Secondary Current rating	1Amps	1Amps	1Amps
iv.	Rated Burden	5 VA	5 VA	5 VA
v	Accuracy Class	0.5 S	5P10	PS Vk 300V, Ie Max 30ma at Vk
vi	Accuracy Limit Factor/ Instrument Security factor	10	10	

PT Technical Parameters

Sl. No.	ITEM	11 KV
i.	Voltage class	11 KV
ii.	Rated primary voltage (kV rms)	11000/ $\sqrt{3}$
iii.	Secondary voltage (volts)	110/ $\sqrt{3}$
iv.	Rated Burden	Core I : 20 VA (metering) Core II : 20 VA (protection)
v	Accuracy Class	Core I : 0.5 Core II : 3P
vi	Class of Insulation	E or better
vii	One minute power frequency withstand voltage for Secondary wiring (kV rms)	1.2 continuous and 1.9 for 30seconds
viii	Method for earthing the system	Impedence earthed

Technical Particulars for 11 KV Current Transformers

01.	Manufacturer's Name and country of origin	SIEMENS/ABB/GE
02.	Manufacturer's design Ref/ Model	T1-T3
03.	Applicable Standards	As Per Specification
04.	Type	Window type LT CT (Ring CT)
05.	Rated Primary current	400-200 A
06.	Rated secondary current	5A
07.	Rated frequency	50 HZ
08.	Transformation ratios	As per Specification
09.	Number of cores	2
10.	Rated Insulation Level of Current Transformer	0.72KV
11.	Class of insulation	Class –E
12.	Class of Accuracy Core1 Accuracy core 2	0.5 5P10
13.	Short circuit current rating and its duration	21KA/ 3Sec.
14.	One minute power frequency dry withstand voltage	
15.	1.2/50 micro sec. Impulse withstand test voltage	12KV
16.	One minute power frequency withstand test voltage on secondary	12KV
17.	Type of Insulation Housing of current Transformer	Resin Cast
18.	Material used for primary/secondary winding	SE Copper

B. Technical Particulars for 11 KV Potential Transformers

01.	Manufacturer's Name and country of origin	SIEMENS/ABB/GE
02.	Manufacturer's design reference	T20-22
03.	Applicable Standards	GIS 11KV Panel
04.	Type	Indoor resin cast
05.	Ratio	11KV / $\sqrt{3}$ / 110V/ $\sqrt{3}$
06.	Rated Primary voltage	11000
07.	Rated secondary voltage	110
08.	Rated frequency	50
09.	Class of accuracy	M1
10.	No. of phase and method of connection	Star-Delta
11.	Type of Contacts	Rotary contact
12.	One min. power frequency dry flash over voltage	28KV
13.	Operating Time	<10 Sec.
14.	Class of insulation	Class- A

C. Technical Specification for Cable termination

C.1 Cable Terminations

Technical Specifications for 66 KV (Cross Linked Polyethylene Insulated) Power Cable :

C.1.1 Scope:

The scope under this section covers design, engineering, manufacture, testing, packing, supply of 66 KV, 630 Sq.mm, XLPE, insulated power cable for use with solidly grounded distribution systems.

The XLPE cable and its accessories shall be complete with all fittings and components necessary for the satisfactory performance and ease of maintenance.

C.1.2 Standards:

Unless otherwise specified, the cables shall conform, in all respects, to IEC : 502, IEC : 60840 and IS : 7098 (Part-III) / 1993 with latest amendment or latest edition for cross linked polyethylene insulated Thermoplastic High Density Polyethylene sheathed cable for working voltage of 66 KV.

C.1.3 Climatic Conditions:

The climatic conditions under which the cable shall Operate satisfactorily are as follows:

- a) Maximum ambient temperature of air in shade : 50°C
- b) Minimum ambient temperature of air in shade : 4°C
- c) Maximum daily average ambient temperature : 40°C

- d) Maximum yearly average ambient temperature : 30°C
- e) Maximum relative humidity % : 95
- f) Average number of the thunder storm days per annum : 15
- g) Average annual rainfall Cm. : 150
- h) Maximum wind pressure Kg/m² : 150
- i) Altitudes not exceeding above MSL Meter : 1000
- j) Max. Soil temp. at cable depth : 30°C
- k) Max. Soil thermal resistivity ohm-cm: 150

D. Technical Specification for LT Panel

D.1 Technical Particulars for LT Panel

The design, manufacture, identification, installation, testing and Commissioning of the equipment and materials covered by this Specification shall conform to the latest editions (amended up to date) of the following standards unless otherwise stated in this Specification

1. IS: 3043 - Code of practice for earthing.
2. IS : 4237 - General requirements for low voltage Switch gear and control gear assemblies
3. IS : 2147 - Degree of protection provided by enclosures for L.V. Switch gear.
4. IS : 375 - Marking and arrangements for switchgear bus bars, Main connections and auxiliary wiring.
5. IS: 2208 - H.R.C. Cartridge fuses.
6. IS: 1554 - Part – I: PVC Insulated cables.

D.2 LV Bus-bar

The L.V. side should be designed to the following:

Low voltage Bus bar system

The equipment shall have all the following features

1.	LV bus bar	From transformer LV bushing to ACB and from ACB to MCCBs Feeder
2.	Bus bar size for phase & neutral	Tinned copper bus-bar, size shall be as per manufacturer design. All the phases and neutral bus-bar shall be same rating/size. Bus-bar size for phase & neutral Suitable spreader to be provided at outgoing side of MCCB to connect 185 Sq. mm. cable through aluminum Lug.
3.	Bus bar support	Insulators 1 kV voltage Class, SMC Epoxy
4.	Bus bar sleeve	Insulation Color coded, for 1kv
5.	Bus bar rated current	Suitable for 1000A continuous current rating within the 10 K class enclosure@ 400°C ambient temp.
6.	Bus bar short circuit	Withstand 50 kA for 1 sec.
7.	Make	Siemens ABB Schneider

D.3 LT Panel with ACB 1000 AMP and Feeder & Starter

The equipment shall have all the following features -

1.	Rated operational voltage (V) at 50 Hz.	440V
2.	Rated frequency (Hz.)	50Hz.
3.	Current rating Amps (rms)	1000 Amps
4.	Rated insulation voltage (V) at 50 Hz.	440 V
5.	Number of poles	4
6.	Rated impulse withstand voltage (kV)	8
7.	Rated Ultimate Short circuit breaking capacity at 415 V, 50 Hz (kA rms) Icu	50
8.	Rated Service Short circuit breaking capacity at 415 V, 50 Hz. (kA rms), Ics	50
9.	Rated short circuit making capacity at 50 Hz. (kA peak), expressed as multiples of Icu	105
10.	Rated short time withstand current for 1 sec at 50 Hz. (kA rms), Icw, expressed as percentage of Icu	50
11.	Category of utilization	B
12.	Shutter's 'Trip' & 'Close' push button with sealing facility	Yes
13.	Accessory mounting	Accessories shall be front accessible plug in type with Energy Meter Accessories namely motor shunt trip & closing coil, UVT etc. should be common for the entire range & shall be suitable for both AC & DC voltage
14.	Operating mechanism	Spring charging stored energy type, manual & Automatic
15.	Minimum Mechanical life (Operating cycles)	20000
16.	Indications	Breaker shall have following mechanical indications: 1. ON, 2. OFF, 3. TRIP 4. SPRING CHARGE STATUS
17.	Sensing	True RMS based
18.	Type	Microprocessor based
19.	Control Terminal	Should be front accessible and minimum NO/NC contacts shall be provided for electrical interlocking.
20.	Protection	Overload protection Pick up 0.4 to 1.0 Time delay 0.2 to 40 sec Short Circuit Pick up 2 to 10 Time delay 20 to 400 Micro sec. Instantaneous Overcurrent Pick up 4 to 16 & OFF Earth Fault Pick up 0.2 to 0.6 & OFF Time delay 100 to 400 m sec

21.	Metering required	Multi-Function meter for measuring 3 Ph current, 3 Ph Voltage, KWH, KVAH, Power Factor, Max Demand (KVA), Fault History of Minimum Events,
22.	Indication	Release shall give individual indication for each type of fault
23.	Feeder Details;	LT PANEL 1) ACB Breaker-1000A 2) DG Incomer 3) Building Light 4) CRP Panel Supply 5) Battery Charger Supply 6) Control Room Light Supply 7) VRF / AHU Supply 8) UPS/Inverter Supply 9) PLC, SCADA Supply 10) CCTV Server Supply 11) General Supply 12) GIS Hall Supply 13) Spare Feeder 14) EOT Crane 15) Spare Supply 16) Fire Alarm System 16 bay Feeder as Per Requirement in LT load Connection, Tapping, Lugging
24.	Analog/Digital	Voltmeter, Ammeter
25.	Energy Meter	Elite Secure
26.	Bus bar Capacity	1000 A
27.	Make	Siemens, Schneider

E. DIESEL ENGINE (DG) 150 KVA (ITEM NO. 16 OF BOQ)

The Diesel Engine shall be fully tested for routine tests of regarding capacity.
 Diesel Engine with AMF panel and all parameter monitor in display

1.	Diesel Engine capacity	150 KVA
2.	Primary voltage	24 V/DC
3.	Secondary Voltage	380-440 V
4.	Frequency	50 Hz.
5.	No. of Phases	3
6.	Panel	AMF 440 V
7.	Temperature	Max 115 C by RTD
8.	Make	CUMMINS/KIRLOSKAR/SUDHIR/CG

F. ELECTRIC OVERHEAD CRANE (EOT) 5.0 TON (Item No. 17 of BOQ)

The capacity of the crane shall be sized to lift the heaviest GIS switchgear component. The Crane shall be used for the erection and maintenance of the GIS switchgear components installed in the GIS switchgear room. On completion of erection of the switchgear, the Contractor shall completely service the crane before the Taking Over Certificate is issued.

- Crane hook approaches shall be of the minimum possible dimensions to ensure maximum coverage of the GIS building area.

- The crane(s) shall be capable of lifting and accurately positioning all loads ranging from full crane rated capacity to at least 10% rated capacity.

- Crane shall be designed for operation under following variable speeds through VVVF drives at full load:

 - Hoisting: 0.3 – 3 Meters per Minute

 - Cross Travel: 1.6 – 16 Meters per Minute Long

- The electric overhead cranes shall be provided with walkways, platforms. shall be provided along the bridge rails and on the crab of EOT crane to facilitate cleaning/maintenance of the crane and to give access to the GIS room high bay lighting and ventilation duct and grilles. The platform and walkways shall be designed to support any weight to be imposed upon them during crane overhaul.

- The Capacity of Cranes to be provided for GIS Hall shall confirm following.

- The following tests shall be carried out on EOT 5.0 Ton Crane.

- 1.** The crane shall be tested at manufacturer work under full load and 25 percent overload of hoisting and cross transverse motions as a routine test.

- 2.** Further the following tests may be done at site after installation of the crane at site a) Check all the accessories for proper function

 - a) No load test

 - b) Load test as per site conditions

- EOT cranes for 66 kV GIS hall of suitable capacity shall be provided for erection & maintenance of largest/heaviest GIS component/assembly. The crane shall consist of all special requirements for erection & maintenance of GIS equipment.

G. HVAC /VRF System (Item No. 13 of BOQ)

G.1 General

G.1.1. This specification covers supply, installation, testing and commissioning and handing over to

Customer of Air conditioning system for the Local Control rooms & Maintenance Room in the GIS halls.

G.1.2. Air conditioning system shall be designed to maintain the inside DBT below 24°C. Bidder shall submit necessary design calculations for customer's approval.

G.1.3. At least 50 % spare Air-Conditioning capacity shall be provided for Local Control rooms in the GIS halls.

G.1.4. Controllers shall be provided in Local Control room inside GIS hall for controlling and monitoring the AC units in these rooms.

G.1.5. Each Local Control room inside GIS hall shall be provided with temperature transducer to monitor the temperature of the Local Control rooms in the GIS halls. The Temperature transducer shall have the following specification:

Sensor : Air temperature sensor (indoor use)

Output : 4 to 20mA

Temperature range : - 5°C to 60°C

Resolution : 0.1°C

Accuracy : 0.5°C or better

G.2 Air Conditioning System Requirements

G.2.1. Air conditioning requirement of the buildings shall be met using a combination of following types Air Conditioning units as required.

a) Cassette type split AC units of 3TR.

b) High wall type split AC units of 2TR.

G.2.2. Type & Capacity of air conditioners shall be so chosen such that quantity of air conditioners in the room is optimized keeping the necessary air flow.

H. DC Voltage System, Battery and Charger (Item No. 8 of BOQ)

H.1 DC Voltage System, Battery and Charger

H.1.1 Batteries

1. Batteries shall be sealed maintenance free type. Each battery shall be rated for 100 % load design margin. 110 V DC Batteries shall be sized to meet the load duty cycle requirement below.
2. Momentary loads for 1 minute. (Closing/tripping of breakers, starting of emergency loads etc.)
3. Emergency loads for 2 hours. (Emergency DC drives, emergency lighting, etc.)
4. Continuous loads for 5 hours. (Indication lamps, Annunciation, aux relays, etc.)
5. The battery shall be designed for maximum durability during all service conditions including high rate of discharge and rapid fluctuation no float.
6. The Battery shall normally be permanently connected to the loading parallel with a charger and shall supply the load during emergency conditions when AC supply is lost.
7. Batteries shall be suitable for a long life under continuous float operations and occasional discharges.
8. DC system shall operate a sun grounded system.
9. The maximum voltage variation allowed at the loaded shall be + 10 % to - 15% at all operating conditions for 110 V DC system.
10. The battery shall be size accordance with the IEEE: 485-1983 considering temperature correction factor, contingency and ageing factors. Battery shall be suitable for being boost charged to fully charged condition from fully discharged
11. Continuously carrying the 30 minutes discharge current of their perceive batteries and through fault short circuit urgent which the battery can produce and with stand for the period declared,

Contractor shall furnish necessary sizing calculations to prove compliance to the same.

H.1.2 Battery Charger

1. The float cum boost charger shall be suitable for float charging as well as boost charging the battery. Battery charger shall be capable off load charging the battery while supplying the station normal DC load. The design shall be such that, in case the load exceeds the charger capacity, the excess load current shall be supplied by the battery.
2. The battery charger shall be suitable or 415 V \pm 10%, 3 phase, 50 Hz. + 3%, -5% Incoming supply. The voltage regulation shall be within \pm 1% for 0-100% load variation and 10% combined Input AC voltage and frequency variation on the AC side. The charger shall be provided with 2 X 100% capacity cooling fans.
3. The ripple content in charger output shall not exceed 1% (rms) 4. The battery in circuit. The charger shall be self-protecting against all AC and DC transients and steady state abnormal currents and voltages

**Signature & Seal
Of the Contractor**

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

Section –VII

Bill of Quantities

Name of Work : "Design, Manufacturing, Supply, Installation, Erection, Testing and Commissioning of 66/11 KV GIS Substation and Shifting of 11 KV Power Transformers to New GIS Substation at DPA"

Sr. No.	Description	Unit	Qty.	Supply Rate	Installation, Testing and Commissioning Rate	Supply Amount	ITC Amount
A	Main Equipment 66/11 KV GIS Sub-Station						
1	66 KV GIS Equipment						
1.1	66 KV Indoor Type Double BUS SF-6 GAS Insulated Switchgear.						
	Supply, Installation, Testing and Commissioning of 66 KV 2500 A, 31.5 KA for 3 Sec. Indoor type GIS Switchgear suitable for monitoring and controlling from SCADA over IEC : 61850 Protocol with Double Bus Arrangement, in line with the tender SLD, with all required accessories, first fill SF-6 Gas, PD Sensors, Blanking Plates, Test Plugs, Conforming to the Tech. Spec. No. 1, relevant latest standards & latest GETCO specifications, as applicable. Offered GIS shall be supplied with all required accessories/modules to facilitate the future expansion on both the sides. Configurations shall be as below : Incomer : 2 Nos. Outgoing Transformer Feeder : 3 Nos. BUS Coupler : 1 No. BUS PT - 1 & 2 : 2 Nos.						
1.2	Incomer Module	Set	2				
	3- Ø 66 KV, 2500 A, 31.5 KA-						

	3 sec, Metal Enclosed SF-6 Gas Insulated Switchgear Line Bay Module comprising of (a) Circuit Breaker (b) Current Transformer (c) Line side Disconnecter with one maintenance Free Earthing Switch (d) High speed/Fast Acting Line Earthing switch (e) Voltage Transformer, 66 KV/ $\sqrt{3}$ //110 V/ $\sqrt{3}$, 3C (f) Bus Disconnecter with Earthing Switch (Bus side common earthing switch for two Buses) (g) Bus Disconnecter without Earthing Switch (h) LCC Panel (i) 66 KV Power Cable Module (j) All other items including control cables as per Tech. Spec. No. 1.						
1.3	Outgoing Transformer Module	Set	3				
	3- Ø 66 KV, 2500 A, 31.5 KA- 3 Sec, Metal Enclosed SF-6 Gas Insulated Switchgear - Line Bay Module comprising of (a) Circuit Breaker (b) Current Transformer (c) Line side Disconnecter with one maintenance Free Earthing Switch (d) High Speed/Fast Acting Line Earthing switch (e) Voltage Transformer, 66 KV/ $\sqrt{3}$ //110 V/ $\sqrt{3}$, 3C (f) Bus Disconnecter with Earthing Switch (Bus side common earthing switch for two Buses) (g) Bus Disconnecter without Earthing Switch (h) LCC Panel (i) 66 KV Power Cable Module (j) All other items including control cables as per Tech. Spec. No. 1.						
1.4	Main Bus-Coupler	Set	1				

	3- Ø 66 KV, 2500 A, 31.5 KA- 3 Sec., Metal Enclosed SF-6 Gas Insulated Switchgear - Bus Coupler Bay Module						
	comprising of (a) Circuit Breaker (b) Current Transformer (c) Bus Dis-connector with one Earthing Switch (d) LCC Panel (e) All other items as per Tech. Spec. No. 1.						
1.5	BUS VT Module	Set	2				
	3 - Ø 66 KV, 31.5 KA-3 Sec., Metal Enclosed SF-6 Gas Insulated Switchgear - Bus VT Module comprising of (a) 3 X Single Phase Voltage Transformer 66 KV/ $\sqrt{3}$ //110V/ $\sqrt{3}$ - segregated from Bus Bar Unit (b) High Speed/Fast Acting Earthing Switch (c) Bus Disconnecter with Earthing Switch (d) All other items as per Tech. Spec. No. 1.						
I.	1C X 630 Sq. mm. 66 KV, XLPE, Poly Al. Armoured Cable.	Mtrs.	1550				
II.	66 KV GIS Termination suitable for 1C X 630 Sq. mm. AL. 66 KV Cable with Male and Female Contacts.	Set	15				
III.	66 KV Outdoor Termination suitable for 1C X 630 Sq. mm. AL. 66 KV Cable.	Set	25				
IV.	66 KV Outdoor Termination suitable for 1C X 630 Sq. mm. AL. 66 KV Cable with 66 KV Metal Oxide Lightning Arrestor, Hardware, Accessories suitable for Mounting on Tower of D/C Transmission Line.	Set	6				

v.	3 phase Link box with SVL	Set	5				
VI.	3 phase Link box without SVL	Set	5				
VII.	Co-Axial Cable	Mtrs.	200				
2	11 KV Indoor GIS Switchboard						
	Supply, Installation, Testing and Commissioning of 11 KV, 2500 A, 26.3 KA for 3 Sec. Indoor type GIS Switchgear with Numerical Protection relays suitable for monitoring and controlling from SCADA over IEC : 61850 Protocol, in line with the tender SLD, with all required accessories, first fill SF-6 Gas, test plugs, Conforming to the Tech. Spec. No. 2. Offered GIS shall be supplied with all required accessories / modules to facilitate future expansion on both the sides.						
2.1	Incomer Module	Set	3				

	3- Ø, 11 KV, 2500 A, Short Circuit Current Rating of 26.3 KA for 3 Sec., Three Phase encapsulated Unit, SF-6 Gas Insulated, Metal enclosed Bus Bars, Bus Enclosures running along the length of the Switchgear to interconnect each of the Feeder Modules in Single Main Bus System. Each Phase shall be complete with Inductive Voltage Transformers (VTs) / Current Transformer (CTs), Isolator / Disconnect-cum-Earth Switches and Safety Grounding Switch, Capacitive Voltage Detector, Surge Arrestor, Numerical Protection Relays and all others, complete with Manual & Motor Driven Operating Mechanisms and Accessories etc. complete in all respects Connection, Tapping, Lugging etc.						
2.2	DG 11 KV Incomer	Set	1				
	Module						

	3- Ø, 11 KV, 2500 A, Short Circuit Current Rating of 26.3 KA for 3 Sec., Three Phase encapsulated Unit, SF-6 Gas Insulated, Metal enclosed Bus Bars, Bus Enclosures running along the length of the Switchgear to interconnect each of the Feeder Modules in Single Main Bus System. Each Phase shall be complete with Inductive Voltage Transformers (VTs) Current Transformer (CTs), Isolator / Disconnect-cum-Earth Switches and Safety Grounding Switch, Capacitive Voltage Detector, Surge Arrestor, Numerical Protection Relays, all, complete with Manual & Motor Driven Operating Mechanisms and Accessories etc. complete in all respects, Connection, Tapping, Lugging etc.						
2.3	BUS Coupler Module	Set	2				
	3- Ø, 11 KV, 2500 A, Short Circuit Current Rating of 26.3 KA for 3 Sec., Three Phase encapsulated Unit, SF-6 Gas Insulated, Metal enclosed Bus Bars, Bus Enclosures running along the length of the Switchgear to interconnect each of the Feeder Modules in Single Main Bus System. Each Phase shall be complete with Current Transformer (CTs), Isolator / Disconnect cum Earth Switches and Safety Grounding Switch, Capacitive Voltage detector on both the sides, Numerical Protection relay/s all, complete with						

	Manual and Motor Driven Operating Mechanisms and Accessories etc. complete in all respects, Connection, Tapping, Lugging etc.						
2.4	Outgoing Line New Feeder Module	Set	16				
	3- Ø, 11 KV, 1250 A, Short Circuit Current Rating of 26.3 KA for 3 Sec., Three Phase encapsulated Unit, SF-6 Gas Insulated, Metal enclosed Bus Bars, Bus Enclosures running along the length of the Switchgear to interconnect each of the Feeder Modules in Single Main Bus System. Each Phase shall be complete with Current Transformer (CTs), Isolator / Dis-connector-cum-Earth Switches and Safety Grounding Switch, Capacitive Voltage Detector, Surge Arrestor, Numerical Protection Relay/s, all, complete with Manual & Motor Driven Operating Mechanisms and Accessories etc. complete in all respects, Connection, Tapping, Lugging etc.						
2.5	11 KV Capacitor Feeder Module	Set	3				
	3- Ø, 11 KV, 1250 A, Short Circuit Current Rating of 26.3 KA for 3 seconds, Three Phase encapsulated Unit, SF-6 Gas Insulated, Metal enclosed Bus Bars, Bus Enclosures running along the length of the Switchgear to						

	interconnect each of the Feeder Module in Single Main Bus System. Each Phase shall be complete with Current Transformer (CTs), Isolator / Disconnect-cum-Earth Switches and Safety Grounding Switch, Capacitive Voltage detector, Surge Arrestor, Numerical Protection Relay/s, all, complete with Manual & Motor Driven Operating Mechanisms and Accessories etc. complete in all respects, Connection, Tapping, Lugging etc.						
3	Power / Distribution Transformer						
3.1	Supply, Installation, Testing and Commissioning of 12.5 MVA, 66/11 KV, Dyn-11, KNAN Power Transformer with Ester Oil, OLTC, RTCC, first fill Oil, NIPS, Soak Pit & all Accessories, suitable for running in parallel with existing Power Transformers, as per Tech. Spec. No. 3 and Standards.	No.	1				
3.2	Disconnection from existing Services, Cables, Oil Draining, Dismantling from existing Substation with all Accessories, Packing, Loading & Unloading, Shifting, Re-Installation at new Substation with new Soak Pit with all Accessories, Testing and Commissioning of 10 & 12.5 MVA, 66/11 KV, Dyn-11, ONAN Transformer with Ester Oil, OLTC, RTCC, NIFPS, NGR, Accessories, Oil Re-filling and Filtration, Supply of Consumables, Minor Fabrication / Repair works, as per Tech. Spec. No. 4 and	Nos.	2				

	standards.						
3.3	Supply, Installation, Testing and Commissioning of NGR of 11/ $\sqrt{3}$ kV, 656A, 9.68 Ohm suitable for Outdoor installation as per the Tech. Spec. No. 6.	No.	1				
3.4	Supply, Installation, Testing and Commissioning of Nitrogen based Fire Prevention and Protection System for 12.5 MVA 66/11 KV, KNAN Transformer with Ester Oil as per the Tech. Spec. No. 7.	No.	1				
3.5	Disconnection from existing services, Cables, Dismantling from existing Substation, Loading & Unloading, Shifting, Re-Installation at the new Substation with all Accessories, Testing and Commissioning of 500 KVA, 11/0.415 KV, ONAN Indoor Duty Distribution Transformer.	No.	1				
4	66 KV Outdoor Equipment for Metering Yard						
4.1	Dismantling, Packing, Loading, Shifting, Unloading, Installation, Testing and Commissioning of 66 KV, 1250 A, Isolators with Earth Switch for Incoming 66 KV Lines, including Insulators, Support Structures, Accessories etc.	Set	2				
4.2	Dismantling, Packing, Loading, Shifting, Unloading, Installation, Testing and Commissioning of 66 KV, Lightning Arrestor for Incoming 66 KV Lines, including Support Structures, necessary Fabrication / Modification for fixing 66 KV Cables,	Nos.	12				

	Hardware and Accessories etc.						
4.3	Disconnection, Dismantling, Packing, Loading, Shifting, Unloading, Installation, Testing and Commissioning of 66 KV, Oil type Tariff Metering PT for Incoming 66 KV Lines, including Support Structures, Hardware and Accessories etc.	Nos.	6				
4.4	Disconnection, Dismantling, Packing, Loading, Shifting, Unloading, Installation, Testing and Commissioning of 66 KV, Oil type Tariff Metering CT for Incoming 66 KV Lines, including Support Structures, Hardware and Accessories.	Nos.	6				
4.5	Supply, Fabrication, Modification of additional Cross-Arm for 66 KV Cable Termination, 66 KV Metal Oxide Lightning Arrestor with necessary Hardware on existing D/C Transmission Line Tower with all metal parts Hot Dip Galvenised as per GETCO Standards.	Job	1				
4.6	Supply, Installation, Testing and Commissioning of PS Type D/C Transmission Line Tower with additional Cross Arm, Structure, Hardware, Accessories suitable for connecting 66 KV Cable, Lightning Arrestors, Cable Tray, etc. All metal parts shall be of Hot Dip Galvenised as per GETCO Standards.	No.	1				
4.7	Foundation of PS Type D/C Transmission Line Tower. It shall be on Pile Foundation as per GETCO Standards.	No.	1				

4.8	Supply, installation, testing and commissioning of ACSR Panther Conductor as per GETCO Standards and Specifications with all the test certificates.	Mtrs.	250				
4.9	Supply, Installation, Testing and Commissioning of 66 KV Bus Post Insulator including Support Structures with necessary Hardware and Accessories etc.	Nos.	2				
4.10	Supply, Installation, Testing and Commissioning of 66 KV, Polymeric Metal Oxide, Class-II Lightning Arrestor for Power Transformer, including support Structures, necessary, hardware and accessories etc. as per GETCO Specifications and Standards.	Nos.	11				
5	66 KV C & R Panel as per Technical Specification.						
	Control and Protection Panels with Numerical Relay, Bay Control Unit all with latest state of art technology suitable for Control & Monitoring of GIS Switchgear Modules from SCADA over IEC : 61850 Communication Protocol as per Technical Specifications and latest GETCO specifications & practice.	Nos.	2				
5.1	Control and Protection Panels for 66 KV Line Bays as per GETCO Standards and Specifications.	Nos.	2				
5.2	Control and Protection Panels for 66/11 KV Transformer Bays as per GETCO Standards and Specifications.	Nos.	3				
5.3	Control and Protection panels for 66 KV Bus Coupler as per GETCO Standards and Specifications.	Set	1				

6	Substation Automation System (SCADA)						
6.1	Supply, Erection, Testing and Commissioning of SCADA equipment and materials as per respective Tech. Spec. No. 8 and suitable for Control & Monitoring of 66 KV GIS Switchgear Modules, 11 KV New GIS Switchboard, 11 KV Existing GIS Switchboard with Switches & OFC (02 lengths), Station Auxiliaries, etc. from SCADA over IEC : 61850 Communication protocol with UPS for SCADA with at least 1 Hr. back up, all required Hardware, Accessories, Communication Cables, Patch Cables, SCADA Furniture, etc. as per Tech. Spec. No. 8 and latest GETCO specifications & practice with minimum spec, but not limited to it.	LOT	1				
6.2	Supply, Laying, Termination & Commissioning of 6-F, Double Sheath Armoured Outdoor, Single Mode Optic Fiber Cable fully compliant with IEC: 60794-3, with heavy duty HDPE duct.	Mtrs.	3000				
6.3	Ethernet Switch, Necessary Hardware, Modification / wiring if required, Communication Cable for Existing 11KV GIS for integration with SCADA under the scope of this tender	LOT	1				
7	11 KV HT Capacitor Bank						
	11 KV, 400 KVAR Indoor Fixed type Capacitor Bank complete with Disconnecting Isolator, HT Contactor, Series reactor, RVT etc. as per GETCO specifications & standards.	Set	3				
8	110 V DC Batteries and Battery Charger as per technical specification.						

I.	Supply, Installation, testing and commissioning of 110 V, 240 AH VRLA DC Battery set along with mounting racks.	Set	1				
II.	Supply, Installation, testing and commissioning of Electronic, SCADA Compatible Float and Float-cum-Boost Charger of 110 V DC, with mandatory Protections including Surge Protection and Annunciation as per latest GETCO Specifications and Standards.	Set	1				
9	110 V DCDB						
	Supply, Installation, Testing, & Commissioning of DC Distribution Board with 20 OG Feeders.	No.	1				
10	LT AC Distribution Board as per technical specification						
10.1	Supply, Installation, Testing and Commissioning of SCADA compatible 415 V, Main LT Distribution Board for Station Auxiliaries as per SLD and Tech. Spec. Incomer Feeder shall be fixed type 1000 A, ACB with LSIG Numerical Protection Relay suitable for controlling & monitoring from SCADA. Outgoing shall be MCB/MCCB as per required ratings with status monitoring Indicating Lamps on Panel.	Set	1				
10.2	415 V, Main Lighting Distribution Board as per requirement for the new Substation.	Set	1				
10.3	415 V Emergency Lighting Distribution Board as per requirement for the new Substation.	Set	1				
10.4	415 V Normal Lighting Distribution Board with Timer						

	Control as per requirement for the 66 KV Metering Bays, Road, at new Station.	Set	1				
10.5	415 V Distribution Board for Air Conditioner of New Substation.	Set	1				
10.6	110 V DC Emergency Lighting Distribution Board for new substation.	Set	1				
11	Inverter with Battery for Emergency Lighting as per technical specification						
	Inverter System provided with Battery Bank with total of 115 Nos. of Batteries to connect in LT Panel Supply for Emergency Lighting failure.	Set	2				
12	Visual Monitoring System – CCTV as per Technical Specification.						
	Visual Monitoring System (CCTV) as per the Tech. Spec. No. 9 along with local PC monitoring set up, State of the Art Night Vision HD Camera of 20 Nos., necessary Panels, Hardware, Accessories, etc. for the complete new Substation Building.	Set	1				
13	Illumination, Air Conditioners System, Switch Board with Receptacles etc. as per Technical specification.						
13.1	SS Building / HT DG Room / Diesel Store Room / Meter Room.						
I.	100 W LED High Bay Light Fixtures (GIS Hall)	Nos.	14				
II.	36 W LED - 600 X 600 Recess Mounted Light Fixtures - CRP / SCADA / Office	Nos.	20				
III.	22 W LED Tube light.	Nos.	70				
IV.	Split Type Cassette AC - 3 Ton - CRP Room.	Nos.	3				

V.	Split Type AC - 1.5 Ton - Office, SCADA Room.	Nos.	4				
VI.	Split Type AC - 1.0 Ton - Meter Room.	No.	1				
13.2	Outdoor						
I.	High Mast for Outdoor Illumination with necessary accessories, Control Panel and required Light Fixtures.	Set	3				
II.	470 W LED Flood Lights.	Nos.	30				
13.3	Power Sockets						
I.	230 V Single phase Earth (16 or 20 A) Power Sockets.	Nos.	18				
II.	3 phase (415 V), 63 A Power Sockets with plugs (Industrial Socket)	Nos.	5				
13.4	Ceiling Fans						
	1200 mm. Sweep Fan with 5 Star Rating as per BEE.	Nos.	6				
13.5	Exhaust Fans						
	Higher capacity Industrial Standard Exhaust Fans.	Nos.	10				
13.6	Lighting DB's						
I.	8 Ways Lighting DB (24 Nos. SP MCB).	Nos.	6				
II.	6 Ways Lighting DB (18 Nos. SP MCB).	Nos.	4				
III.	4 Ways Lighting DB (12 Nos. SP MCB).	Nos.	6				
IV.	Industrial Lighting Distribution Board.	Nos.	10				
13.7	Conduits/Flexible Wires						
1.	Conduits for Illumination	Mtrs.	300				
2.	Flexible Wires - 4 / 2.5 Sq. mm. with all the wirings shall be concealed.	Mtrs.	5000				
14	LT Power and Control Cables (FRLS)						
14.1	LT Power Cables						
I.	4C X 400 Sq. mm. XLPE AL. Cable	Mtrs.	200				
II.	4C X 70 Sq. mm. XLPE AL Cable.	Mtrs.	250				
III.	1 X 35 Sq. mm. Copper Flexible Cable (Battery)	Mtrs.	150				
IV.	4C X 16 Sq. mm. AL Cable	Mtrs.	500				
V.	4C X 6 Sq. mm. AL cable	Mtrs.	1000				

VI.	2C X 6 Sq. mm. AL cable	Mtrs.	750				
14.2	Glands						
I.	4 X 400 Sq. mm. XLPE AL. Cable.	Nos.	4				
II.	4 X 70 Sq. mm. XLPE AL Cable.	Nos.	6				
III.	1 X 35 Sq. mm. Copper Flexible Cable (Battery).	Nos.	8				
IV.	4C X 16 Sq. mm. AL Cable	Nos.	40				
V.	4C X 6 Sq. mm. AL Cable.	Nos.	40				
VI.	2C X 6 Sq. mm. AL Cable	Nos.	34				
14.3	LUGS						
I.	400 Sq. mm. Al Cable	Nos.	16				
II.	70 Sq. mm. Al Cable	Nos.	24				
III.	35 Sq. mm. Al Cable	Nos.	8				
IV.	16 Sq. mm. Al Cable	Nos.	160				
V.	6 Sq. mm. Al Cable	Nos.	228				
14.4	Control Cable (Copper)						
I.	12C X 4 Sq. mm.	Mtrs.	500				
II.	4C X 2.5 Sq. mm.	Mtrs.	500				
III.	12C X 2.5 Sq. mm.	Mtrs.	750				
IV.	19C X 2.5 Sq. mm.	Mtrs.	750				
V.	27C X 2.5 sq.mm	Mtrs.	1000				
14.5	Glands						
I.	12C X 2.5 Sq. mm.	Nos.	30				
II.	12C X 4 Sq. mm.	Mtrs.	32				
III.	4C X 2.5 Sq. mm.	Mtrs.	40				
IV.	19C X 2.5 Sq. mm.	Mtrs.	30				
V.	27C X 2.5 sq.mm	Mtrs.	30				
14.6	LUGS						
1.	2.5 Sq. mm.	Nos.	3000				
2.	4 Sq. mm.	Nos.	500				
15	Mechanical Auxiliary System						

I.	Ventilation System for 66 KV GIS Hall as per GETCO Specifications.	No.	1				
II.	Portable Aluminium/FRP Ladder Extendable type of adequate height (as directed) for Maintenance.	Nos.	5				
III.	Water Cooler with purifier.	No.	1				
IV.	Office furniture	LOT	1				
V.	1.0 MT, Manual operated Chain Pulley Block with mono rail.	Set	1				
VI.	Rubber Insulating Mat Confirming to IS : 15652 : 2006 of Size 2000 X 1000 X 3 mm.	Nos.	60				
VII.	Fire Alarm System as per technical specification: - Fire detection should be such that all the smoke / fire sensors installed in the system should be given individual ID and if any abnormality is observed in any of the sensors, its ID should display on LCD Screen of the Detection Panel with Alarm and Annunciation, so that, the operational personnel can target that particular place for fire extinguishing covering all the Rooms in the GIS Building.	LOT	1				
VIII.	Carbon-di-oxide type fire extinguisher of 2 Kgs. Capacity, CO2 gas as per IS : 15222.	Set	2				
IX.	Carbon-di-oxide type fire extinguisher of 4.5 Kgs., Capacity, CO2 gas as per IS : 15222.	Nos.	12				
X.	Mechanical Foam type fire extinguisher 9 Lts.	Set	2				
XI.	ABC powder type fire extinguisher of 6 Kgs.	Nos.	5				

XII.	Fire buckets round bottom type enamel painted, white inside & Red outside and Letter "FIRE" in black outside and handle with mounting bracket.	Nos.	12				
XIII.	Fire Buckets with Stand (Set of 4).	Set	1				
16	DG Set as per technical specification.						
	Supply, Installation, Connection, Testing and Commissioning of LT DG 150 KVA With AMF Panel & Protection & LT Panel from Old Substation to new Substation.	Set	1				
17	EOT Crane (Supply, Installation etc.) as per technical specification.						
	66 KV GIS Hall 5.0 MT with permanent fixed ladder from ground to EOT Crane.	Set	1				
18	Earthing & Lightning System and Accessories (Supply, Installation etc.)						
I.	Copper Bar Electrodes 32 mm. dia. (3 M rod)	Nos.	10				
II.	Copper Bar Rod 32 mm. dia. for Main earthing.	Ton	7				
III.	75 X 12 mm. G. I. Flat.	Ton	1.86				
IV.	24 mm. Dia. 3000 mm. long Copper bonded Maintenance free Chemical Earthing.	Nos.	32				
V.	25 X 3 mm. GI Flat for horizontal and down conductor for control building	Mtrs.	300				
VI.	25 mm. dia. 1000 mm. Long Air Termination Spike.	Nos.	8				
VII.	Epoxy Fixing Clamps for down conductors	Nos.	150				
III.	Check Pits	Nos.	8				
19	66 KV Outdoor Equipment (Supply, laying etc.)						
I.	Cable trench/ Hardware Fittings/Spacers/Clamp &	Mtrs.	1100				

	Connectors						
II.	66 KV Long Rod suspension insulators	LOT	6				
III.	66 KV Long rod Tension Insulators	Nos.	6				
IV.	Tariff Metering Panel and RTU system as per GETCO Specification (Main & Check per Set).	Set	2				
V.	11 KV, 3C X 300 Sq. mm. XLPE AL. Conductor Cable.	Mtrs.	13000				
VI.	11 KV Indoor Termination Kit suitable for 3C X 300 Sq. mm. XLPE, AL. Cable suitable for 11 KV GIS with Boots	Nos.	48				
VII.	11 KV Indoor Termination Kit suitable for 3C X 300 Sq. mm. XLPE, AL. Cable suitable for Power Transformer Cable Box	Nos.	10				
III.	11 KV Indoor Termination kit suitable for 3C X 300 Sq. mm. XLPE, AL. Cable Suitable for APFC / DG Set	Nos.	4				
IX.	11 KV St. Through Joint Kit suitable for 3C X 300 Sq. mm. XLPE, AL. Cable.	Nos.	36				
X.	Portable Earthing Rod	Nos.	6				
XI.	HDPE Pipe (150 mm. Diameter)	Mtrs.	3000				
	TOTAL-A						
B Testing & Maintenance Equipment							
1	Portable partial Discharge Monitoring Kit.	No.	1				
2	Meggar 5 KV (Motorized)	No.	1				
3	Meggar 1 kV (Motorized)	No.	1				
4	Digital Multi meter	No.	1				
5	Circuit Breaker CB Analyzer with 6-Channel DCRM Kit with all required accessories, Laptop, Transducer - 1 Set, required software.	No.	1				
6	Digital Manometer	No.	1				

7	Micro Ohm Meter Portable Type suitable for measuring Contact Resistance of High Voltage Equipment	Set	1				
8	Automatic Capacitance and Tan Delta Kit	No.	1				
9	Automatic Turn Ratio Tester.	Set	1				
10	DC Winding Resistance Kit.	Set	1				
11	Primary Current Injection Set (1000 A).	Set	1				
12	Circuit Breaker Time Analyzer.	Set	1				
13	Universal Relay Testing Kit	Set	1				
14	SF-6 Gas Purity, Dew Point Measuring Kit with gas components like SO ₂ , H ₂ O, CF ₄ , HF, Air, purity, etc.	Set	1				
15	Gas leakage detector	Set	1				
16	SF-6 Gas Filling, Recovery and purification unit with all required accessories DILO make : Model B-057-R17 having Compression - 4.8 M ³ /Hr., Vacuum Pump - 40 M ³ /Hr., Storage Tank - 280 Ltrs. WIKA make : Model GFU 20 having Compression - 6 M ³ /Hr., Vacuum Pump - 40 M ³ /Hr., Storage Tank - 300 Ltrs.	Set	1				
17	Oil BDV Testing Kit with measuring gauge (GO and NO-GO) as per IS from following make and model. Megger make : Model OTS100AF/ BAUR make: Model DTA100C/ Motwane make : Model OTA100S.	Set	1				
18	Hydraulic Pallet Truck with all required accessories Wont Ind. Equip Make : Model W-HOPT 30 (Four Clip).	Set	1				

19	Digital Earth Resistance Tester with all required accessories from following make and model - GE-OHM C Make: Model no EN 61557/VDE 0413 (Made in Germany) / Megger make : DET3D, Motwane make :	Set	1				
	DET20 / DECT20						
	TOTAL -B						
C Mandatory Spares							
	Mandatory Spares for Power Transformer						
1	66 KV bushing complete in all respects.	No.	1				
2	11 KV bushing complete in all respects.	No.	1				
3	Bucholz Relay complete with float and contact (Main Tank).	Set	1				
4	Local and Remote Winding Temperature Indicator with contact and sensing device.	Set	1				
5	Oil Temperature Indicator with contact and sensing device (Local and Remote).	Set	1				
6	Set of Valves of all sizes (Complete set for 1 Transformer)	Set	1				
7	Complete set of Gaskets used per Transformer.	No.	1				
8	Pressure relief device.	Nos.	2				
9	Magnetic Oil Level Gauge	Nos.	2				
10	Oil surge Relay	No.	1				
11	Plank/dummy plates for radiators opening.	L/S	1				
12	Oil temperature sensing cable with capillary.	Nos.	2				
13	Pressure relief device for OLTC.	No.	1				
14	Breather Assembly (for Conservator and OLTC).	Set	1				

20	Common Spares, Maintenance Tools for 66 / 11 KV GIS						
20.1	Spares for 66 KV GIS.						
I.	SF-6 Gas Pressure Relief Devices 03 Nos. of each type.	Set	1				
II.	Pressure Gauge along with Coupling Device Rubber Gaskets, "O" Rings and Seals for SF-6 gas.	No.	1				
III.	Density Monitor for SF-6 Gas.	No.	1				
IV.	All Types of Control Valves for SF-6 Gas.	No.	1				
V.	Molecular Filter for SF-6 Gas with Filter Bags.	No.	20				
VI.	SF-6 Gas - Quantity be weight.	No.	20				
VII.	Locking Device to keep the Dis-connectors (Isolators) and Earthing Switches in CLOSE or OPEN.	Set	1				
III.	Coupling device for pressure gauge cum switch for connecting gas handling plant (03 Nos. of each type).	Set	1				
IX.	Relays, Power Contactors, push Buttons, timers & MCB etc. of each type and Rating.	Set	1				
X.	Operation Counter	No.	1				
XI.	Spring operating mechanism, complete with all necessary connecting apparatus.	Set	1				
XII.	Spring Charging Motor	Set	1				
III.	Motor for drive Dis-connector / Earth Switch / Fast Acting Earth Switch of each rating and type.	Set	1				
XIV.	Indicating lamps of each make and type.	No.	10				
XV.	Complete set of 3 phase dis-connector including main circuit, enclosure, driving mechanism etc. for one bay	No.	1				

XVI.	High speed/Fast acting fault making grounding switch including main circuit, enclosure and driving mechanism etc. for one complete Bay.	No.	1				
VII.	Three phase Earthing Switch including main circuit, enclosure, driving mechanism etc.	No.	1				
III.	66 KV, single phase current transformer complete with mounting hardware of each type and rating	Nos.	2				
XIX.	66 KV, single phase Voltage Transformer ratio, 66 KV/ $\sqrt{3}$ /110 V/ $\sqrt{3}$ /110 V/ $\sqrt{3}$ with mounting hardware	Nos.	2				
20.2	Spares for 11 KV GIS Board						
I.	Each type and rating complete with interrupter, main circuit enclosure, with marshalling box and operating mechanism.	No.	1				
II.	Rubber gasket, 'O' rings and seals of SF-6 gas of each type.	Set	1				
III.	Trip Coils with Resistor as applicable (3 Nos. of each type)	Set	1				
IV.	Closing Coils with resistor as applicable (3 Nos. of each type).	Set	1				
V.	Molecular Filter for SF-6 Gas with Filter Bags.	No.	10				
VI.	Density / Gas pressure monitor (3 Nos. of each type)	Set	1				
VII.	Relays, Power Contactors, push Buttons, timers & MCB etc. of each type and Rating	Set	1				
VIII.	Operation Counter	No.	1				

IX.	Spring operating mechanism, complete with all necessary connecting apparatus.	Set	1				
x.	Spring Charging Motor	Set	1				
XI.	Coupling device for pressure gauge cum switch for connecting gas handling plant (3 Nos. of each type).	Set	1				
XII.	Indicating lamps of each make and type	No.	10				
XIII.	Numerical Protection Relay / BCPU of each make and model no.	No.	1				
XIV.	Relay Programming and configuration Software with necessary and suitable cables for each make and type.	No.	1				
xv.	Trip Relay / Supervision Relay / Auxiliary Relay / Contact Multiplier / Timers, of each make and Type.	No.	1				
xvi.	MCB / Control Switch of each make and type.	No.	1				
VII.	Annunciator of each make and type	No.	1				
VIII.	Semaphore of each make and type	Nos.	3				
XIX.	Multifunction Meter of each make and type	No.	1				
XX.	Indicating lamps of each make and type.	No.	10				
21 Spares for 66 KV Isolator and Earth Switch.							
I.	Complete set of 3 Phase Isolator Main Power components / contacts including operating rods and driving Mechanism of each make and type	Set	1				
II.	Complete set of three phase earthing switch main Power components contacts, operating rods and driving mechanism of each make and type.	Set	1				

III.	Limit switches and auxiliary switches for complete three phase equipment.	Set	1				
IV.	For isolator	Set	3				
V.	For earth switch	Set	1				
VI.	Relays, Power Contactors, Push Buttons, Timers & MCB etc. of each type and rating	Set	1				
VII.	For Isolator	Set	3				
VIII.	For Earth switch	Set	1				
IX.	Auxiliary Switch Assembly with NO + NC (3 Nos. of each type).	Set	1				
X.	Drive Motor for Isolator	Set	1				
XI.	Annunciator of each make and type.	Nos.	2				
22	11 KV GIS Switchgear Mandatory spares & Tools						
I.	11 KV single phase current transformer complete with mounting hardware of each type and rating.	No.	1				
II.	11 KV single phase voltage transformer of each type and rating.	No.	1				
22.1	Circuit Breaker						
I.	Tripping coil	No.	1				
II.	Closing coil	No.	1				
III.	Spring charge motor	No.	1				
IV.	3-ph Vacuum Circuit Breaker Module.	No.	1				
V.	Annunciator of each make and type	Nos.	2				
22.2	Spares for 110 V DC Battery Charger & DCDB						
I.	Set of Relays (1 No. of each type).	Set	1				
II.	Set of contactor (1 No. of each type).	Set	1				
III.	Set of switches (1 No. of each type).	Set	1				
IV.	DP MCB (five nos. of each type and rating).	Set	1				
22.3	Spares of LT Switchgear						

I.	Auxiliary Relays (1 No. of each type)	Set	1				
II.	CTs and PTs (1 No. of each type).	Set	1				
III.	Switches/Push buttons (1No. of each type).	Set	1				
IV.	MCCB (1 No. of each type and rating)	Set	1				
v.	Voltmeters	No.	1				
VI.	Ammeter	No.	1				
VII.	O/C & E/F relay	No.	1				
VIII.	Auxiliary contactors (1 No. of each type)	Set	1				
	Bus-bar						
a)	Bus-bar insulators	Nos.	5				
b)	Inter-phase barrier	Nos.	2				
c)	Bus-bar strip (Aluminium)	Mtrs.	5				
22.4	Spares for 66 KV Control Relay and Protection Panels / SCADA						
I.	Numerical Protection Relay of each make and model no.	No.	1				
II.	Bay Control Unit of each make and model no.	No.	1				
III.	Relay Programming and configuration Software with necessary and suitable cables for each make and type	No.	1				
IV.	Trip Relay / Supervision Relay / Auxiliary Relay / Contact multiplier / Timers, of each make and Type	No.	1				
v.	MCB / Control Switch of each make and type	No.	1				
VI.	Semaphore of each make and type	Nos.	3				
VII.	Multifunction Meter of each make and type	No.	1				
VIII.	Ethernet switch of each type	No.	1				
IX.	LIU of each type/ configuration	No.	1				
X.	Communication Cable of each type	No.	20				
XI.	Indicating lamps of each make and type	No.	10				

XII.	Convertors of each make and type	No.	1				
	Total - C						
Total of Electrical Work (A+B+C)							

D	Civil Work				
Sl. No.	Description of item	Qty.	Rate	Unit	Amount
1	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 Sqm. on plan) including getting out and disposal of excavated earth lead up to 50 m and lift up to 1.5 m, as directed by Engineer-in-charge.				
A	All kinds of soil / GSB filled area / Ashphalted surface	3093.00		m3	
b	Extra for every additional lift of 1.5 m or part thereof in excavation / banking excavated or stacked materials.				
i	All kinds of soil	937.00		m3	
2	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m.	773.00		m3	
3	Filling in Foundation with Black Trap stone Boulder including supply of Boulder and preparing surface complete.	645.00		m3	
4	Supplying and filling in plinth with sand under floors, including watering, ramming, consolidating and dressing complete.	330.00		m3	
5	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level :				
a	1:3:6 (1 Cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size).	714.00		m3	

6	Providing and laying in position machine batched and machine mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping / placing of concrete to site of laying including the cost of centering, shuttering, finishing but excluding the cost of reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge.				
A	All works up to plinth level for Raft, Tie Beam, Plinth Beam, Column, Wall Slab etc.	1712.60		m3	
B	All works above plinth level up to floor V level for Sill, Lintel, Beam, Column, Slab , Wall	758.83		m3	
7	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete .				
A	Thermo-Mechanically Treated bars of grade Fe-500D or more.				
I	UPTO PLINTH LEVEL	211344.30		KG	
II	ABOVE PLINTH LEVEL	110027.00		KG	
8	Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with :				
I)	Cement mortar 1:6 (1 cement : 6 coarse sand)	197.00		m3	
9	Brick work with common burnt clay machine moulded perforated bricks of class designation 12.5 conforming to IS: 2222 in superstructure above plinth level up to floor five level in cement mortar 1:6 (1 cement : 6 coarse sand) :				
i	Cement mortar 1:4 (1 cement : 4 coarse sand)	290.00		m3	
10	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia. & length (hold fast lugs or dash fastener shall be paid for separately).				
a	Second class teak wood	1.27		m3	

11	Providing and fixing ISI marked flush door shutters conforming to IS :2202 (Part I) decorative type, core of block board construction with frame of 1st class hard wood and well matched teak and laminate with sunmica sheet 1mm thick on both faces & side of shutters.				
a	45 mm thick	45.29		m2	
12	Providing and fixing Cromium plated brass butt hinges with necessary screws etc. complete :				
a	125x85x5.5 mm (heavy type)	54.00		each	
13	Providing and fixing Cromium plated brass 125 mm mortice latch and lock with 6 levers and a pair of lever handles of approved quality with necessary screws etc. complete.	16.00		each	
14	Providing and fixing Cromium plated Brass tower bolts, of approved quality with necessary screws etc. complete.				
a	250x10 mm	33.00		each	
15	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc.	9.00		each	
16	Providing and fixing bright finished brass door latch with necessary screws etc. complete :				
a	300x16x5 mm	11.00		each	
17	Providing and fixing aluminium die cast body tubular type universal hydraulic door closer (having brand logo with ISI, IS : 3564, embossed on the body, door weight up to 35 kg and door width up to 700 mm), with necessary accessories and screws etc.	15.00		each	

18	Providing and fixing factory made uPVC white colour sliding glazed window comprising of uPVC multi- chambered frame with in-built roller track and sash extruded profiles duly reinforced with 1.60 ± 0.2 mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile),appropriate dimension of uPVC extruded glazing beads and uPVC extruded interlocks, EPDM gasket, wool pile, zinc alloy (white powder coated) touch locks with hook, zinc alloy body with single nylon rollers (weight bearing capacity to be 40 kg),G.I fasteners 100 x 8 mm size for fixing frame to finished wall and necessary stainless steel screws etc. Profile of frame & sash shall be mitred cut and fusion welded at all corners, including drilling of holes for fixing hardware's and drainage of water etc. & cost of roller, Lock and all other fixtures required for window & filling the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealant over backer rod of required size and of approved quality, all complete as per direction of Engineer-in- Charge.				
a	Two track two panels sliding window made of (small series) frame 52 X 44 mm & sash 32 X 60 mm both having wall thickness of 1.9 ± 0.2 mm and single glazing bead of appropriate dimension.	46.00		m2	
19	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1mm), with wall thickness 2.0 mm (± 0.2 mm), corners of the door frame to be Jointed with galvanized brackets and stainless steel screws, joints mitred and Plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 X 19 mm and 1mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineer-in-charge				
a	Extruded section profile size 48x40 mm	52.25		mtr.	
20	Providing and fixing to existing door frames.				

a	24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness, fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge. (For W.C. and bathroom door shutter).	15.40		m2	
21	Providing and fixing factory made uPVC white colour casement/casement cum fixed glazed windows comprising of uPVC multi-chambered frame, sash and mullion (where ever required)extruded profiles duly reinforced with 1.60 \pm 0.2 mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile), uPVC extruded glazing beads of appropriate dimension, EPDM gasket, stainless steel (SS 304 grade) friction hinges, zinc alloy (white powder coated) casement handles, G.I fasteners 100 x 8 mm size for fixing frame to finished wall, plastic packers, plastic caps and necessary stainless steel screws etc. Profile of frame & sash shall be mitred cut and fusion welded at all corners, mullion (if required) shall be also fusion welded including drilling of holes for fixing hardware's and drainage of water, Louver glass for ventilator, and filling the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealant over backer rod of required size and of approved quality, all complete as per a direction of Engineer-in- Charge.				
	Note: For uPVC frame, sash and mullion extruded profiles minus 5% tolerance in dimension i.e. in depth & width of profile shall be acceptable.				

A	Casement window single panel with S.S. friction hinges (300 x 19 x 1.9 mm), made of (small series) frame 47 x 50 mm & sash 47 x 68 mm both having wall thickness of 1.9 ± 0.2 mm and single glass pane glazing bead of appropriate dimension.	4.00		m2	
22	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.	10000.00		kg	
23	Providing & fixing UV stabilised fiberglass reinforced plastic sheet roofing up to any pitch, including fixing with polymer coated 'J' or 'L' hooks, bolts & nuts 8mm dia. G.I plain/bitumen washers complete but excluding the cost of purlins, rafters, trusses etc. The sheets shall be manufactured out of 2400 TEX panel rovigis incorporating minimum 0.3% ultra-violet stabiliser in resin system under approximately 2400 psi and hot cured. They shall be of uniform pigmentation and thickness without air pockets and shall conform to IS 10192 and IS 12866. The sheets shall be opaque or translucent, clear or pigmented, textured or smooth as specified.				
a	2 mm thick flat	155.00		m2	
24	Plastering with cement mortar 1 : 4 including racking out joints, scrubbing & cleaning, finishing smooth curing including racking out joints etc. complete for interior / exterior plastering upto floor five level.				
a)	12 mm cement plaster of mix : 1:4 (1 cement: 4 fine sand)	7324.00		m2	
25	Providing and fixing 18 mm thick gang saw cut, mirror polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations of required size, approved shade, colour and texture laid over Kotah stone base / 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels.(excluding cost of Kotah stone) Granite of any colour and shade				
A	Area of slab over 0.50 sqm	113.00		m2	

26	Kota stone slab flooring over 20 mm (average) thick base laid over and jointed with grey cement slurry mixed with pigment to match the shade of the slab, including rubbing and polishing complete with base of cement mortar 1 : 4 (1 cement : 4 coarse sand) :				
a	25 mm thick	594.00		m2	
27	Providing and laying Full body vitrified double charge floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS: 15622, of approved make, in all colours and shades, laid on 20mm thick cement mortar 1:4 (1 cement : 4 coarse sand), jointing with grey cement slurry @ 3.3 Kg./Sqm including grouting the joints with white cement and matching pigments etc., complete.				
A	Size of Tile 600 x 600 mm (9 mm thick or as specified by manufacturer)				
	Grouting the joints of flooring tiles having joints of 3 mm width, using epoxy grout mix of 0.70 kg of organic coated filler of desired shade (0.10 kg of hardener and 0.20 kg of resin per kg), including filling /grouting and finishing complete as per direction of Engineer-in-charge.	298.00		M2	
28	Providing and laying Vitrified tiles in different sizes (thickness to be specified by the manufacturer), with water absorption less than 0.08% and conforming to IS: 15622, of approved brand & manufacturer, in all colours and shade, in skirting, riser of steps, laid with cement based high polymer modified quick set tile adhesive (water based) conforming to IS: 15477, in average 9 mm thickness, including Grouting the joints of flooring tiles having joints of 3 mm width, using epoxy grout mix of 0.70 kg of organic coated filler of desired shade (0.10 kg of hardener and 0.20 kg of resin per kg), including filling /grouting and finishing complete as per direction of Engineer-in-charge.				
a	Size of Tile 600 x 600 mm	549.80		M2	
29	Providing and laying Ceramic glazed floor tiles of size 300x300 mm (thickness to be specified by the manufacturer) of 1st quality conforming to IS : 15622 of approved make in colours such as White, Ivory, Grey, Fume Red Brown, laid on 20 mm thick cement mortar 1:4 (1 Cement :4 Coarse sand), jointing with grey cement slurry @ 3.3 Kg./Sqm including pointing the joints with	18.00		M2	

	white cement and matching pigment etc., complete.				
30	Providing and fixing Ist quality ceramic glazed wall tiles conforming to IS: 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer-in- Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3kg per Sqm., including pointing in white cement mixed with pigment of matching shade complete.	36.00		M2	
31	Providing & fixing one side polished Kota stone slab 18 to 20 mm thick of approved shade & size set on wall face in cement mortar 1:3 (1 cement 3 sand) 25 mm thick. Pointing the joints complete as directed.	2.70		M2	
32	Providing and laying integral cement based water proofing treatment including preparation of surface as required for treatment of roofs, balconies, terraces etc consisting of following operations and With average thickness of 120 mm and minimum thickness at khurra as 65 mm.				
a	Applying a slurry coat of neat cement using 2.75 Kg./Sqm of cement admixed with water proofing compound conforming to IS. 2645 and approved by Engineer-in charge over the RCC slab including adjoining walls up to 300 mm height including cleaning the surface before treatment.	506.60		m2	
b	Laying brick bats with mortar using broken bricks/brick bats 25 mm to 115 mm size with 50% of cement mortar 1:5 (1 cement : 5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge over 20 mm thick layer of cement mortar of mix 1:5 (1 cement :5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge to required slope and treating similarly the adjoining walls up to 300 mm height including rounding of junctions of walls and slabs.				

c	After two days of proper curing applying a second coat of cement slurry using 2.75 kg/ Sqm. of cement admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge.				
d	Finishing the surface with 20 mm thick jointless cement mortar of mix 1:4 (1 cement :4 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge including laying glass fibre cloth of approved quality in top layer of plaster and finally finishing the surface with trowel with neat cement slurry and making pattern of 300x300 mm square 3 mm deep.				
e	The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing and for final test. All above operations to be done in order and as directed and specified by the Engineer-in-Charge :				
33	Providing and fixing on wall face un-plasticised Rigid PVC rain water pipes conforming to IS : 13592 Type A, including jointing with seal ring conforming to IS : 5382, leaving 10 mm gap for thermal expansion,(i) Single socketed pipes.				
a	75 mm diameter	28.00		mtr	
b	10 mm diameter	28.00		mtr	
34	Providing and fixing white vitreous china pedestal type water closet (European type W.C. pan) with seat and lid, 10 liter low level white P.V.C. flushing cistern, including flush pipe, with manually controlled device (handle lever), conforming to IS : 7231, with all fittings and fixtures complete, including cutting and making good the walls and floors wherever required :				
a	W.C. pan with ISI marked white solid plastic seat and lid	3.00		each	
35	Providing and fixing water closet squatting pan (Indian type W.C. pan) with 100 mm sand cast Iron P or S trap, 10 liter low level white P.V.C. flushing cistern, including flush pipe, with manually controlled device (handle lever) conforming to IS : 7231, with all fittings and fixtures complete, including cutting and making good the walls and floors wherever required:& its accessories.				
a	White Vitreous china Orissa pattern W.C. pan of size 580x440 mm with integral type foot rests	2.00		each	

36	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:				
(a)	White Vitreous China Wash basin size 550x400 mm with a pair of 15 mm C.P. brass pillar taps	4.00		each	
37	Providing and fixing C.P. brass bib cock of approved quality conforming to IS:8931 :				
a	15 mm nominal bore	7.00		each	
38	Providing and fixing C.P. brass stop cock (concealed) of standard design and of approved make conforming to IS:8931.				
a	15 mm nominal bore	8.00		each	
39	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply, including all CPVC plain & brass threaded fittings, i/c fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and the cost of cutting chases and making good the same including testing of joints complete as per direction of Engineer in Charge.				
a	Open / Concealed work, including cutting chases and making good the walls etc.				
i	15 mm nominal outer dia. Pipes	60.00		mtr	
ii	20 mm nominal outer dia. Pipes	60.00		mtr	
iii	25 mm nominal outer dia. Pipes	60.00		mtr	
40	Providing, laying & jointing PVC pipes of required working pressure as per I.S.I. 4985 including cutting and jointing the pipe ends as per manufacturer's instructions including the cost of specials wherever required and, excavation and refilling of the trenches or fixing on walls or similar structures with clamps and testing the joints etc. complete as directed.				
a	Pipe 75 mm outer dia. working pressure 4kg/cm ² .	60.00		Mtr	
b	Pipe 110 mm outer dia. working pressure 4 kg/cm ² .	100.00		Mtr	

41	Providing and placing on terrace (at all floor levels) polyethylene water storage tank, IS : 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.	5000.00		ltr	
42	Applying priming coats with primer of approved brand and manufacture, having low VOC (Volatile Organic Compound) content.				
A	With water thinnable cement primer on wall surface having VOC content less than 50 grams/liter	5357.00		M2	
43	Providing and applying white cement based putty of average thickness 1 mm, of approved brand and manufacturer, over the plastered wall surface to prepare the surface even and smooth complete.	2608.00		m2	
44	Wall painting with acrylic emulsion paint of approved brand and manufacture to give an even shade :				
a	Two or more coats on new work	2990.00		m2	
45	Finishing walls with water proofing cement paint of required shade :				
a	New work (Two or more coats applied @ 3.28 ltr./10 Sqm.) over and including priming coat of exterior primer applied @ 2.20kg/10 Sqm.	2750.00		M2	
46	Supplying, testing, commissioning RO Plants of 150 Liter per hour capacity (including required PVC water tank) of approved make which consists of all necessary parts viz. motor pump of required capacity, multipart valve, 20" bowl & filter silver process of high pressure pump of required capacity, multipart valve, 20" bowl & filter silver process of high pressure pump of required capacity, membrane, Rotameter, pressure meter, electric panel with M.S. Cabinet all necessary Electric & other connection required to commissioned the RO Plant which gives the required TDS complete with loading, unloading & Transportation, Installation including all taxes with one year warrantee and maintenance free.	2.00		Each	

47	Painting wood work with Deluxe Multi Surface Paint of required shade. Two or more coat applied @ 0.90 ltr./10 Sqm. over an under coat of primer applied @ 0.75 ltr/10 Sqm of approved brand and manufacture	12.00		m2	
48	Providing and laying 60mm thick factory made cement concrete interlocking paver block of M - 30 grade made by block making machine with strong vibratory compaction, of approved size, design & shape, laid in required colour and pattern over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), filling the joints with line sand etc. all complete as per the direction of Engineer-in-charge.	3837.00		M2	
49	Collection, spreading and Consolidation of Black stone dust / Grit by Power vibratory roller of required capacity in a layer of av. 20 CM including cost of Excavation ,Royalty, loading, unloading and transportation at the site of work.	5452.00		M3	
50	Manufacturing, supplying and fixing retro reflective overhead signage boards made up of 2 mm thick aluminium sheet, face to be fully covered with high intensity and encapsulated lens type heat activated retro reflective sheeting conforming to type - III of ASTM-D-4956-01 as approved by Engineer-in-charge, letters, borders etc. as per IRC : 67-2001 in silver white with blue colour back ground and with high intensity grade, pasted on substrate by pressure sensitive adhesive backing which shall be activated by applying pressure conforming to class II of ASTM-D-4956-01 and fixing the same to the plate of structural frame work by means of suitable sized aluminium alloys, rivets or bolts & nuts @ 300 mm center to center all along the periphery as well as in two vertical rows along with theft resistant measures, including the cost of painting with two or more coats of epoxy paint in grey colour on the back side of aluminium sheet including appropriate priming coat. The rate includes the cost of rounding off the corners, lowering down the structural frame work from the gantry, fixing and erecting the same in position all complete as per drawings, specification and direction of the engineer-in-charge.(Structural frame work including M.S. plate to be provided separately. Rectangular area of the sheet only shall be measured for payment).				
a	Overhead informatory road signage	14.40		m2	

51	Providing and fixing signs board with a corrosion resistance 2mm thick aluminium alloy sheet with high intensity peismatic (HIP) grade retro reflective sheet, including fixing on structure as directed including lettering overhead sign etc. complete all labours and materials as directed by engineer-in-charge (excluding cost of frame work).	9.00		m2	
52	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.				
a	On steel work	169.00		m2	
53	Collection and spreading of manure (goat dropping & cow dung dried) free from foreign materials subject to the approval of Engineer-in-Charge including loading, unloading, transport & stacking at site of work.	24.00		m3	
54	Collection and spreading of sweet earth including cost of excavation, royalty, loading, unloading, transport & stacking at site of work	480.00		m3	
55	supplying and fixing (Planting) green trees in said position including digging the soil for planting and providing necessary support to plant and wattering the plant till the completion of work and ensure the survival of plant till than.				
a	Different type of Palm, Coconut of 5 to 6 foot height above Ground Level	50.00		Each	
56	Providing & fixing of S.S. Staircase Railing Of 304Q grade with all required accessories for fixing . The pipes should be of 10 gauge thickness. The main railing pipe of 32 mm square box at 900 mm to 1200 mm c/c , with top railing of 50 mm dia. and three lower horizontal railing pipe of 15 to 25 mm dia. as directed. The height of railing is about 1.00 mtrs. The railing is to be provided as approved by the Engineer In Charge. The work includes all labour ,materials & tools/Plants etc.				
a	Matt / Glossy finish S S Railing	28.00		mtr	

57	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.				
a	80x1.25 mm M.S. laths with 1.25 mm thick top cover	210.00		m2	
58	Extra for providing mechanical device chain and crank operation for operating rolling shutters.				
a	Exceeding 16.80 Sqm in area	210.00		m2	
59	Extra for providing grilled rolling shutters manufactured out of 8 mm dia. M.S. bar instead of laths as per design approved by Engineer-in-charge,(area of grill to be measured).	210.00		m2	
60	Providing and fixing of Self Supported Structure Less Roofing systems with proper overlapping and seaming between different sheets without making holes or preventing the overturning the roof by wind addition made up from Regular Modified Polyster Imported Color Coated Galvalume Cold Rolled Structural Steel Sheet Coils of superior quality structural steel. Base metal width 912 mm, and profiled width of 625 mm +/-10mm. The works includes design, supply, & fabrication of self supported single span arch roof fabricated by mechanically seamed in American Machines to profiles as per standard ASTM A792, Steel Sheet, Aluminum-Zinc Alloy Coated by Hot-Dip process. The work should be carried out by specialize and approved agency only. The rate of item is including fitting as per standard specification. (Only net area of sheet to be measures i.e. clear length without corrugation & curved/sloping width. No extra measurements/ payments shall be given for corrugation/profile & over lapping. The area of skyligh sheet/turbo ventilators will be deducted.)				

(A)	For main roof of shed with c/c span Supporting beam up to 12 m. Minimum thickness of sheet 1.60 mm BMT, 1.65 mm APT with tolerance of +/- 0.04 mm	480.00		m2	
61	Providing and fixing of hangers/clamps as per manufacturers specifications for laying of cables and hanging of bulbs/light fixtures etc. from Self Supported Systems Roofing	9.00		Each	
62	Providing and fixing of modules of 1 no of 24" dia. Wind operated Aluminium Turbo Ventilators at required intervals in Self Supported Roofing Systems on center as per manufacturers specifications	3.00		Each	
63	Manufacturing and supplying of 60 Kg (IU) Rails 13M/26M/260M, as per IRS specification T-12 with latest ammendments, if any. Item includes inspection and transportation of Rail to site with all leads & lifts etc. Rates are all inclusive transportation at their final location of laying as directed by Engineer and Final rate includes inspection charges for inspected by RITES / OR any other approved agency of Railway.	9.6		MT	
64	Procuring and Supply of 60 Kg (Wider Mono Block Pre-Stressed Concrete (PSC) Sleepers) to RDSO Drg. No. T-8527-8746. Item includes of material to site with all leads & lifts etc. complete. Rates are all inclusive transportation at their final location of laying as directed by Engineer and Final rate includes inspection charges for inspected by RITES / OR any other approved agency of Railway.	135		Nos.	
65	Supply of 1m long Fish plate 60 Kg to RDSO Drg. No. T-5916 (Comprises of 2 No. of Fish Plates & 6 Nos. of fish bolts & nuts to RDSO Drg. No. T-1899 at final location of linking/laying as directed by Engineer. Final rates include inspection charges for inspection by RITES/DFCCIL/Any other approved agency.	7		Pairs	

66	Manufacturing and Supply of Grooved Rubber Sole Plates 10mm thick to suit 60 kg PSC sleeper to RDSO Drg. No. T-8528 to T-8747 at final locaton of linking/laying as directed by Engineer. Final rates includes inspection charges for inspection by RITES/DFCCIL/Any other approved agency.	270		Nos.	
67	Manufacture & supply of GFN Liners to RDSO Drg. No. T-8751 at final locaton of linking/laying as directed by Engineer. Final rates includes inspection charges for inspection by RITES/DFCCIL/Any other approved agency.	540		Nos.	
68	Manufacturing and Supply of Elastic Rail clips (ERC) flat toe Mk. V to suit 60 kg PSC sleeper to RDSO Drg. No. T-5919 at final locaton of linking/laying as directed by Engineer. Final rates includes inspection charges for inspection by RITES/DFCCIL/Any other approved agency.	540		Nos.	
69	Track Linking (Laying and Linking of turnouts of all types including diamond crossing & Drealing switches with 52 Kg / 60 Kg rail section on PSC sleepers on prepared ballast bed for New Lines or during total closure of section at indicated location as per standard drawing, duly leading sleepers, rails, switches, crossings, fastenings including rail cutting, drilling, fixing of all components, fittings with housing of tongue rails as per requirement of signaling, preparing ballast bed, filling and spreading of ballast as required, linking, of turnouts with track, attending track parameters including lifting, providing one round of packing to make track fit for 20 Kmph spped including lubrication of fitting/fastening, complete as directed by Engineer in-charge.				
a	Handling, assembling, linking and laying of Railway Track with 60 Kg Rails	80		TRM	
b	Drilling of holes 32mm/ 28mm/ 26.5mm dia. with drill twist in the foot of guard rails for fixing guard rails on In 60 Kg. / 52 Kg. 90 UTS rails.	42		Nos.	
c	Cutting of 60 Kg./52 Kg. 90 UTS rails in main track/ yard	4		Nos.	
	Total - D				

Important Note:

- I. Any item is not quoted by the bidder, but required for successful completion & commissioning of the scope of work shall be deemed to have been covered in other items cost and the contractor shall not be paid extra cost on the same account.
- II. The above Quantities are tentative and may vary during detailed engineering of Project. However, these shall be considered for Evaluation of Bid.
- III. The payment to the Contractor shall be made as per approved Bill of Material after detailed engineering on the Unit Rates quoted, hence the Bidder is advised to quote for Items that in his opinion are required in addition to above Items for successful completion and commissioning of the Scope of Work.

TOTAL of ELECTRICAL WORKS (A+B+C)	
TOTAL of CIVIL WORKS (D)	
GRAND TOTAL of ALL WORKS (A+B+C+D)	

(In Words: Rupees)

(Note: The rates should be inclusive of all taxes, duties, fees, cess, all incidentals Charges etc. but exclusive of GST)

**Signature & Seal
Of Contractor**

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

Section - VIII

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) The 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]

Section-IX
Evidence towards Site Visit

I, Shri _____ authorized representative of M/s. _____
_____ (authorization letter issued by the firm with my specimen
signature and passport size photo and adhaar card are enclosed) have visited the site
on _____ with DPA representative Shri _____ (Designation) for the work of "Design,
Manufacturing, Supply, Installation/Erection, Testing and commissioning of 66/11 KV GIS system
in Sub-Station and Shifting of 11 KV Power Transformer to New GIS Sub-Station at DPA" and
inspected the site and other issues related to tender to my satisfaction.

Seal, name and signature of the bidder	Name, designation and signature of DPA representative who assisted bidder during site visit.	Seal, name and signature of XEN (E)

Section – X

Format for submitting information of Bid Capacity

Annexure - A for calculating “A” of the formula.

Sr. No.	Financial Year	Value of work undertaken	Multiplying factor	Value updated to the price level of the year (Col C x col D)
A	B	C	D	E
1				
2				
3				
4				
5				
6				
7				

Annexure-B For calculating “B” of the formula

For calculating “B” of the formula Sr. No.	Name of client	Name of work	Work order no. and date	Schedule period of completion as per work order with start date	Contract value	Value of work done	Remaining value of work done	Anticipated date of completion	Remaining value of work done (Completion period of the work for which bids are invited by DPA) from the date of opening of preliminary bid of opening of preliminary bid

Signature & Seal of Contractor

Section-XI

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. EL/WK/2803. 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. 129-139)
 - 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. 129 to 139).

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 Contract 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 recuses 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)

अधिशारी अभियंता (विद्युत)
(Office Seal)
दीनदयाल पोर्ट प्राधिकरण
Executive Engineer (Elect.)
Deendayal Port Authority

(For & on behalf of the Bidder/Contractor)

(Office Seal)


Signature of Witness:

(Name & Address)

Richard J. Andrade
Nimara Bldg
New Kandla

Place: Gandhidham

Date: __/__/2024

Signature of Witness:

(Name & Address)

Note: The bidder has to execute Integrity Pact agreement with Deendayal Part Authority (as per Bid Response Sheet No. 10 and Dr. S.K. Sarkar, IAS (Retd.) and Shri Saurabh Chandra, IAS (Retd.) have been appointed by DPA as independent External Monitors and whose address are as under:-

Dr. S K Sarkar, IAS (Retd.),
B-104, Nayantara Aptt.,
Plot 8 B, Sec 07, Dwarka,
New Delhi - 110 075.
Mobile No. 98111 49324
email: sksarkar1979@gmail.com

Shri Saurabh Chandra, IAS (Retd.)
A-9, Sector -30,
Noida (UP) 201301.
Mobile No. 9871322133
email: saurabh7678@yahoo.co.in"