TENDER DOCUMENT
FOR
SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF HVAC SYSTEM IN CONNECTION WITH PROPOSED 15.0 M DIA. DOME PLANETARIUM AT GOVT. POLYTECHNIC CAMPUS, DUMKA, JHARKHAND

TENDER NO. CMD007.12.19(WORKS)/23-24/11, DATE: 12.07.2023

.....

(Name of the Company)

CREATIVE MUSEUM DESIGNERS

(Section 8 company guaranteed by National Council of Science Museums)

NCSM Campus, 33, Block- GN

6th Floor, CRTL Building – II, Sector-V

Bidhan Nagar, Kolkata-700091

Website: www.cmdncsm.in

TENDER DOCUMENT

FOR

SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF HVAC WORK

FOR

CONSTRUCTION OF 15.0 M DIA. DOME PLANETARIUM, DUMKA

FOR

CREATIVE MUSEUM DESIGNERS

ISSUED TO: .....

INDEX OF TENDER DOCUMENT

NOTICE INVITING TENDER

Tender No. CMD007.12.19(WORKS)/23-24/11

No. CMD007.12.19(WORKS)/23-24/11 **Date: 12.07.2023**

1. The Creative Museum Designers is a Section 8 Company guaranteed by National Council of Science Museums, Kolkata.

2. Sealed tenders are hereby invited from reputed and experienced Engineering/Technical contractors capable of carrying out the work of **"Supply, Installation, Testing & Commissioning of HVAC system in connection with Proposed 15.0 M Dia. Dome Planetarium at Govt. Ploytechnic Campus, Dumka, Jharkhand**" having resource and adequate past experience during the preceding five years in executing works successfully of similar nature to that referred herein above.

3. The place of work would be **15.0 M Dia. Dome Planetarium Project at Govt. Polytechnic Campus, Dumka, Jharkhand.**

4. Estimated cost of the work is approximately ₹**89.32 Lakhs (excluding GST)**

5. Time of completion of work will be **06 (Six)** months from the date of issuance of Letter of Intent excluding fire diffusers (R/A). Supply, fabrication & installation of all ducting works & laying of Copper tubes etc. in the building premises to be completed within 02 (Two) months time from issuance of Letter of Intent (LOI).

   Defect Liability Period will be up to 01 (One) year after successful completion of SITC of HVAC system under scope of the tender.

6. Contract documents consist of the NIT, General Conditions of the Contract, Special Condition of Contract, one set of tender drawings, Technical Specifications, schedule of quantities and rates of various items, Summary of Price etc.

7. The set of tender documents will be issued between 11.00 AM and 6.00 PM on any working day from **17.07.2023** to **07.08.2023 and also available in CMD website (www.cmdncsm.in) and/ or from NCSM website (www.ncsm.gov.in) from 17.07.2023.** Completed tender documents will be received **up to 07.08.2023 till 11.00 AM** and will be opened on the same day at 03.00 PM in the conference hall of CMD in the presence of the tenderers or their authorized representatives who may like to attend. Tenderers may note that opening of the tenders in their presence or in the presence of their authorized representatives is not obligatory on the part of the Company. In case the tenderers or their authorized representatives are not present, tenders will be opened as per rules and on scheduled time and date unless it is notified otherwise by the Company earlier. The Company reserves the right to alter the dates of issue, receipt and or opening of tenders etc. if so necessary.
   Corrigendum, Addendum etc. pertaining to this tender, if any, will be available in the website of CMD & NCSM.

7.1 **Prebid Discussion**: Prebid discussions will be held on **26.07.2023** at **11.00 AM in the office of Creative Museum Designers, Saltlake, Kolkata – 700091** in presence of Consultants and the intending bidders.

8. BIDDER QUALIFICATION CRITERIA:

Bidders intending to participate shall fulfil the following qualification criteria:

8.1 **Experience Criteria (techno- Commercial)**

8.1.1 Bidders shall fulfil the following experience criteria

The bidders should have experience of executing similar work i.e. Supply, Installation, testing & commissioning of HVAC System of having minimum contract values as indicated below in last 07 (seven) years reckoned from the due date for submission of bid. Bidders have to submit copies of Work Order (s)/ Letter of Intent(s), Job Completion Certificate(s) / relevant documents etc. confirming proof of execution of work/ executed value of work of similar in nature.

a) One contract having minimum value of 80% of estimated value **(₹71.46 Lakhs)**
b) Two contracts each having minimum value of 50% of estimated value **(₹44.66 Lakhs)**
c) Three contracts each having minimum value of 40% of estimated value **(₹35.73 Lakhs)**

Similar work means supply, installation,testing & commissioning of HVAC System at site both high side and low side works for educational institution / software IT park/office buildings, multi storied buildings/ industrial projects etc. successfully with high quality of workmanship & time. Similar works means the agency should also have experience in supplying and installing the AHUs with ducted systems.

Bidder should have to submit their Bid as an individual agency but not as Joint Venture or Associate / Consortium with other agency. Bidders in the form of Direct or Indirect Joint Venture / Consortium/ Special Purpose Vehicle (SPV)/ Special Purpose Entity (SPE) are not permitted.

8.2 **Financial Criteria**

8.2.1 **Annual turnover :** Bidder must have minimum average annual financial turnover **₹89.32 Lakhs (Rupees Eighty Lakh Thirty Two Thousand Only)** during the last three financial years ending 31st March, 2023 i.e, 2020-2021, 2021-2022 & 2022-2023. The copies of audited balance sheet / Certificate of Chartered Accountant to be submitted.

8.2.2 **Bank Solvency** : Bidder must have a Latest Bank Solvency of **₹44.66 Lakhs.** The Bidder shall have to submit in original/ attested copy of the Latest Bank Solvency Certificate, not older than 03 (three) months prior to date of issue of this Tender., issued by any Nationalized/ Scheduled Bank.

8.2.2a**) Net worth** : Bidder shall not have incurred any loss in more than two years during the last five years ending 31.03.2023. Bidder should submit net worth certificate duly certified by a practising Chartered Accountant.

b) The bidder must have PAN issued by the Income Tax Department of India.

c) Bidder should have GST, PF & ESI registration with the concerned authority.

9. Bidder having pending Litigation / Court Case with CMD/ NCSM against previous Tender/ Contract, will not be considered.

''ANNEXURE –A''

10. Bidders are requested to furnish the following details in seriatim as under, in support of Prequalification criteria

Conditions for Qualification:

Sl. No.	Description	To be filled by agency
1.	Name of the Agency	
2.	Year of Establishment	
3.	Registered office with full address	
4.	Full Postal Address of communication	
5.	Telephone Number(s) of office	
6.	Contact person Name with Mobile No.	
7.	Fax number	
8.	E-Mail ID	
9.	Website if any	
10.	i. Nature of Entity - Limited Company, Partnership etc. (attach copy of partnership Deed/ Certification of incorporation as applicable) ii. Date of Incorporation	
11.	The bidder should have to submit their Bid as an Individual Agency i.e. not as Joint Venture or Associate/ Consortium with other Agency. Bidders in the form of Direct or Indirect Joint Venture/ Consortium/ Special Purpose Vehicle (SPV) / Special Purpose Entity (SPE) are not permitted	
12.	Name (s) of Director / Proprietor / Partners with address and telephone nos.	
13.	Technical Staff employed (Attach a separate of sheet of the employees with qualifications)	

14.	**Qualification Criteria:** **<u>A. Techno Commercial Criteria:</u>** **The bidders should have experience of executing similar work i.e. Supply, Installation, Testing & Commissioning of HVAC work in any educational institution / software IT Park/ office buildings, multi storied buildings/ industrial projects etc. of having minimum contract value as indicated below in last 7(seven) years reckoned from the due date for submission of Bid document** **i. One contract having minimum value of 80% of estimated value <u>(₹71.46 Lakhs)</u>** **ii. Two contracts each having minimum value of 50% of estimated value <u>(₹44.66 Lakhs)</u>** **iii. Three contracts each having minimum value of 40% of estimated value <u>(₹35.73 Lakhs)</u>**	
	<u>B. Financial Criteria:</u> **i. Average Annual Turnover for last 5 (five) years** **ii. Net worth** **iii.Bank Solvency Certificate from Nationalized Bank/ Scheduled Bank**	
15.	**PAN of Bidder with supporting document**	
16.	**PF/ ESIC/ GST Registration etc. of Bidder with documentary evidence**	
17.	**Copy / copies of completion certificate(s) of similar type of work(s) (Notarised Copy) stated in Sl. No. 14.A above duly certified by respective Owner(s) / Client(s) mentioning name and nature of work(s), date(s) of commencement**	

	and value(s) of the job(s) executed in last 7(seven) years.	
18.	**Yearly Sales Turnover and Audited Balance Sheet duly signed by Chartered Accountant with his / her Seal, Signature & Registration Number for Last 3 (three) years i.e. 2020-2021, 2021-2022 and 2022-2023.**	
19.	**P.F. Registration No. (if not registered with PF Department, successful Bidder have to take Registration within one month from the date of Award).**	
20.	**Current Income Tax Deposition Acknowledgement.**	
21.	**Constitution and legal status along with attested copies of Deeds / Articles and Memorandum of Association etc. as applicable.**	
22.	**Power of Attorney in favour of the Signatory, signing the bid document (In case of other than Proprietor / CEO / Partner etc.).**	
23.	**Whether any Civil Suit / Litigation arisen in the contracts executed during the last 5 years / being executed. If yes, please furnish the name of the contract, employer, nature of work, contract value, work order and date & details of litigation briefly**	
24.	**Details of work in hand and current commitment. (As per enclosed ANNEXURE – A2)**	
25.	**No Deviation Certificate in Bidder's Letter Head (ANNEXURE – C1)**	
26.	**List of Plant & Machineries & other construction equipment's owned by the Firm. (As per ANNEXURE – A3)**	

27.	**List of Clients (Details with Location)** **As per enclosed ANNEXURE – A1**	

Important Notes:

1. **Bidder is liable to be disqualified, even though they meet the qualifying criteria, if they :**

a) **Made misleading or false representations, statements and attachments submitted in proof of the qualification requirements, and / or**

b) **Record of poor performance such as abandoning the works, not properly completing the supply order, inordinate delays in execution or supply, litigation history, or financial failures etc.**

c) **If the tenderer deliberately gives wrong information / submit fake, false, fabricated, forged documents in his tender, CMD reserves the right to reject such tender at any stage or to cancel the contract if awarded and forfeit the Earnest Money / Security Deposit / any other money due.**

2. **The Bidder must provide any further details required for the review upon request from CMD. Failure to comply with any request of CMD for such information will result in rejection of their offer.**
3. **CMD may, in its absolute discretion suspend or disqualify a Bidder/ Bidders who, at any time, is considered to have breached any of the qualification conditions or has performed in an unsatisfactory manner without assigning any reason whatsoever.**
4. **CMD will not be liable for any loss or damages incurred by the bidder/ bidders in the above exercise.**

I / We hereby solemnly declare that all the information / statements are true to the best of my / our knowledge. I / We also declare that my / our firm is not involved in any Litigation or Arbitration with any company for last 5 years. I / We further declare that the decision of Creative Museum Designers regarding finalization of Empanelment of contractors shall be final and binding on me/ us.

Place:

Date:

(Signature with date & seal)

N.B.: All the documents shall be submitted in Hard Copies.

''ANNEXURE – A1''

TABLE A: DETAILS OF ALL WORKS OF CLASS/ NATURE COMPLETED DURING THE LAST SEVEN YEARS

S. No.	Name of work/ project and location (Give brief of nature of work)	Name of the Owner/organization and designation Name of officer signing agreement	Cost of works in crores of rupees Estimated cost put to tender Tendered Cost	Stipulated date of start as per agreement Actual date of start	Stipulated date of completion Actual date of completion	Litigation/ Arbitration Pending / inprogress withdetails*	Name and Address and Phone no. of officer to whom reference may be made	Give brief reason for delayin execution, if any	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

* Indicates gross amount claimed and amount awarded by arbitrator

Signature of applicant(s)

''ANNEXURE – A2''

TABLE-B: PARTICULARS OF CURRENT PROJECTS IN PROGRESS/AWARDED

PARTICULARS OF PROJECTS UNDER EXECUTION OR AWARDED

S. No.	Name of work/ project and location (Give brief of nature of work) Role in project (as main contractor or Sub Contractor, State name of maincontractor)	Name of client Owner or organization	Cost of Works in crores of rupees Estimated cost put to tender Tendered Cost	Stipulated date of start as per agreement Actual dateof start	Stipulated date of completion	Up to date percentage progress of work	Slow progress if any and reasons thereof	Name and Address/ Phone no.of officer to whom reference may be made	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

Certified that the above list of works is complete and no work has been left over and that the information given is correct.

Signature of applicant(s)

TABLE-C: PARTICULARS OF SIMILAR PROJECTS COMPLETED IN THE LAST SEVEN YEARS

DETAILS OF ALL WORKS OF SIMILAR CLASS COMPLETED DURING THE LAST SEVEN YEARS ENDINGLAST DAY OF THE MONTH AS ON 31/03/2023

S. No.	Name of work/ project and location (Give brief of nature ofwork)	Owner or organization name and designation Of officer signing agreement	Cost of Works in crores of rupees Estimated cost put to tender Tendered Cost	Stipulated date of start as per agreement Actual dateof start	Stipulated date of completion Actual date of completion	Litigation/ Arbitration Pending in progress with details*	Name and Address and Phone no. of Officer to whom reference may be made	Give brief reason for delay in execution	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

Signature of applicant(s)

''ANNEXURE – A3''

TABLE-D: LIST/DETAILS OF PLANT & EQUIPMENT LIKELY TO BE DEPLOYED/ USED ON THE PROJECT/ WORKSHOP

S. No.	Name of equipment	Capacity / specification	Age	Condition	Quantity	Ownership Status			Current Location	Remarks
						Personally owned	Leased	To be purchased		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)

Signature of applicant(s)

11. **Earnest Money**:

a) The Earnest Money amounting to **Rs.2,23,300.00/- (Rupees Two Lakh Twenty Three Thousand Three Hundred Only)** being approx.2.5% of the estimated value of the work (rounded off to the nearest hundred), only in the form of **Bank Guarantee/ Pay Order/ Demand Draft/ Banker's Cheque/ NEFT** from any Nationalized Bank/Scheduled Bank. For NEFT, the details of our Banker is furnished as below:

Details of Bankers:		
Bank Name:	**:**	**INDIAN OVERSEAS BANK**
Beneficiary Name:	**:**	**CREATIVE MUSEUM DESIGNERS**
Bank Address:	**:**	**Indian Overseas Bank, GN 34/2, Sector - V, II Studio, Saltlake, Kolkata - 700091, West Bengal, India**
A/c No.:	**:**	**164201000001214**
IFSC Code:	**:**	**IOBA0001642**

Bank Guarantee/ Pay order/ Demand Draft/ Banker's Cheque / NEFT to be drawn in favour of **Creative Museum Designers payable at Kolkata**. Demand Draft/ Banker's Cheque/ Documents confirming NEFT(amount must be credited to CMD's account as mentioned above on or before the last date of submission i.e. **07.08.2023 up to 11.00 AM**) for the Earnest Money Deposit must accompany the part I of tender as indicated in Clause 20 below. All the tenderers must submit their complete document within the last date of submission i.e. **07.08.2023 up to 11.00 AM**. Tenders received after the due date and/ or without Earnest Money Deposit (EMD) will be summarily rejected. No deviation from the mode of depositing Earnest Money stipulated above will be permissible and any deviation will render the tenders liable for rejection.

The validity period of Bank Guarantee (EMD) shall be minimum 120 (One hundred twenty) days from the due date of opening of tender with claim period up to 12(Twelve) months. This validity period of B.G may be extended with mutual consent, if required by CMD for any unavoidable reason(s).

b) **Demand Draft / Pay Order/ Banker's Cheque/ NEFT** must be drawn only on Nationalized Bank/Scheduled Bank at the place mentioned in Clause 11 above, failing which the Earnest Money deposited shall be deemed as inadequate, and the tender shall be liable for rejection.

c) EMD of unsuccessful bidders/ tenderers shall be returned upon finalisation of the Tender, without any interest.

11.1 **Tender Fees** : Tenderers / Bidders to submit **Rs. 2,360/- (Rupees Two Thousand Three Hundred Sixty Only) including GST,** towards the cost of Tender Document By **Demand Draft / Banker's Cheque/ Pay order/ NEFT** and to be drawn in favour of Creative Museum Designers , payable at Kolkata as per details given in Clause 11 above.

Tender Fees is NON- REFUNDABLE.

12. **Security Deposit (SD):**

The successful bidder shall deposit **10%** of total contract value as **Security Deposit/Retention Money in the form of Demand Draft or Bank Guarantee**.

The EMD submitted by the successful bidder will be returned after receiving total 10% of contract value as security deposit in the form of Demand Draft/ Bank guarantee. The security deposit so submitted in the form of Demand Draft will be retained till completion of Defect Liability Period without any interest. **The security deposit so submitted in the form of Bank Guarantee shall have validity period up to completion of Defect Liability Period (DLP) plus 01 (one) year claim period**. Please refer to the Clause 17 of General Conditions of Contract.

13. Tenderers, who do not fulfil any of the above conditions or are incomplete in respect of any document(s) supporting the above qualification criteria are liable for summary rejection.

14. The company does not bind itself to accept the lowest tender and reserves to itself the authority to reject or partially accept any or all the tenders, tendered items or schedules received without assigning any reason whatsoever.

15. Canvassing in connection with tenders is strictly prohibited and the tenders submitted by the tenderers who resort to canvassing will be liable for rejection on that ground alone.

16. Tenders incorporating additional conditions are liable to be rejected.

17. The tenderers must declare in writing that they are no way related to any official(s) in the Creative Museum Designers (CMD), Kolkata and National Council of Science Museums (NCSM), Kolkata.

18. All Applicable Statutory Taxes and Duties on equipments, GST on materials & services, freight & transit Insurance F.O.R. site and any other payments to be made to the local authorities for the completion of the job will be inclusive in the rate offered by the successful tenderer & payable by them. Nothing extra will be payable for increase in such taxes or duties even if imposed or levied either before or after the tenders are opened or during currency of contract.

19. Before submitting the tender, the tenderer shall examine all specifications, drawings, conditions of contract and inspect the site. The tender must be balanced in respect of individual items so that the rates quoted shall remain in force even if the quantities deviate before or during the execution of the work.

20. The tender must be submitted [in two separate sealed covers marked Part I (Techno-Commercial bid) and Part II (Financial bid)] and addressed to the Company and each envelope super scribed ‘‘Tender for **Supply, Installation, Testing & Commissioning of HVAC System in connection with Proposed Construction of 15.0 M Dia. Dome Planetarium, Govt. Polytechnic Campus, Dumka, Jharkhand** ----Part I (Techno-Commercial bid) Due Date on…….’’ and ‘‘Tender for

Supply, Installation, Testing & Commissioning of HVAC System in connection with Proposed Construction of 15.0 M Dia. Dome Planetarium, Govt. Polytechnic Campus, Dumka, Jharkhand -------Part II (Financial bid) Due Date on……..'' and finally both PartI & Part II to be sealed in a separate sealed envelope supercribing ''Tender for **Supply, Installation, Testing & Commissioning of HVAC System in connection with Proposed Construction of 15.0 M Dia. Dome Planetarium, Govt. Polytechnic Campus, Dumka, Jharkhand.** ''

The contents of Part I & II will be as follows:

(a) The sealed cover marked Part I shall contain the following documents only:

(i) Earnest Money and Tender Fees in the form as described in Clause 11 of the Notice Inviting Tender (NIT).
(ii) Documents in support of Bidders qualification criteria as per Clause 8 above.
(iii) An up to date and valid Income Tax Clearance Certificate/ Return for last 03 (three) years of the bidder in original or true copy thereof duly attested by a Gazetted Officer/ Chartered Accountant and the Permanent A/C No. Of the bidder.
(iv) Forwarding letter (in duplicate) clearly indicating the documents attached therein. The tenderer has to clearly state in the forwarding letter that he has not quoted any extra condition along with the tender in title Part II sealed envelope.
(v) Each and every pages if the tender document to be duly signed and stamped by the tenderer.
(vi) Necessary Power of Attorney/ Authorization in favour of the person, signing the tender document to be submitted.
(vii) Declaration as per **ANNEXURE – C2**.
(viii) Declaration for No-Deviation of Tender as per **ANNEXURE – C1**

(b) The sealed cover marked Part II shall contain the Offer Form complete with financial bid i.e. Schedule of Quantities & Rates (As per **ANNEXURE – D**) and Summary of Price Sheet (As per **ANNEXURE - E**) duly signed and stamped by the tenderer on each and every pages and should not have any additional condition whatsoever. If any such additional conditions found in this cover it will not be taken into consideration and will not form part of the tender.

21. For the purpose of opening of the tenders as described in Clause 7 of the Notice Inviting Tender (NIT) it is clarified that only the sealed envelope marked Part I will be opened first. Initially the documents contained in Part I will be opened & scrutinized and agencies will be shortlisted for opening the Part II. The shortlisted agencies will be informed about the opening date & time of Part II. In case documents in envelope marked Part II are not opened at all, the same will be returned to the tenderer treating it as invalid and his/their acknowledgements will be obtained in token of receipt of the same.

22. However, after opening Part I, if required, CMD may send communications through email to tenderers seeking necessary documents, clarifications etc. for the purpose of qualification.

23. Earnest Money is liable to be forfeited if the successful tenderer selected for the work fails to submit the acceptance of Letter of Intent (LOI) within 07 (seven) days & sign the formal agreement along with submission of Security Cum Performance Guarantee within 30 (Thirty) days from the date of issue of Letter of Intent (LOI) by the Company.

24. The successful tenderer will be issued a Letter of Intent by the Company and will be given 15 (fifteen) days mobilisation time which shall be counted from the date of issue of the Letter of Intent (LOI). Within the mobilisation time the tenderer must scrutinise all the drawings, CPM/PERT/ BAR CHART, specifications, etc. and obtain clarifications from the authority wherever necessary and submit a revised & detailed BAR CHART. During the mobilisation time, the tenderer shall also mobilise all his resources including men and materials, obtain the supply of water and electricity necessary for construction, erect a temporary office/godown at site and sign an Agreement with the Company in approved format on a non-judicial stamp paper of Rs. 100/- (Rupees One Hundred only). **The date of commencement of work shall be the date of issue of Letter of Intent (LOI).**

25. The validity period of the tender shall be **120 (One hundred twenty)** days from the date of opening of tenders. This period may be extended with mutual consent if required by CMD for any unavoidable reason(s).

APPENDIX TO NOTICE INVITING TENDER

(a) SUMMARY CONDITIONS OF CONTRACT		
Name of Work	:	Supply, Installation, Testing & Commissioning of HVAC System in connection with Proposed 15.0 M Dia. Dome Planetarium, Govt. Polytechnic Campus, Dumka, Jharkhand
Architect	:	Kothari & Associates, 14B, Camac Street, Kolkata - 700017
Scope of Work	:	Supply, Installation, Testing & Commissioning of HVAC System.
Defect Liability Period (DLP)	:	**01 (One)** Year from the date of completion as certified by the Company.
Undertaking Letter/ Comfort Letter from OEM	:	Tenderer will have to furnish Undertaking Letter/ Comfort Letter from the Original Equipment Manufacturer (OEM) regarding their responsibility for providing minimum 10 (ten) years of Comprehensive Annual Maintenance Contract (CAMC)/ Annual Maintenance Contract (AMC) and will provide all the necessary spare parts after Defect Liability Period (DLP) as per requirement of CMD/ Owner. **The Undertaking Letter/ Comfort Letter from OEM is mandatory for considering the tender**.
Time of Completion	:	**06 (Six)** months from the date of letter of intent as per Clause 5 & 24 of NIT. [Out of above 06 (six) months, for Supply, fabrication, erection & installation of all ducting materials & laying of copper tubes etc. to be completed in the building premises within 02 (two) months from the date of issuance of Letter of Intent (LOI)]
Minimum value of work for Interim Payment (Running Account Bill)	:	**25 (Twenty five)** lakhs only and 01 (one) running account bill will be processed in a month.
Cost of Tender (Non Refundable)	:	**Rs. 2,360/- (including GST).**
Earnest Money to be deposited with the tender	:	**Rs. 2,23,300/- (Rupees Two Lakh Twenty Three Thousand Three Hundred only).**
Liquidated damages for non-completion of work in time [Clause 61d of the General Conditions of Contract (GCC)]	:	0.5 (Zero point Five) percent per week of the contract value subject to a maximum of 10% (ten percent) of the contract value awarded.
Payment terms	:	

		➢ All payments will be made on actual measurement/ work done basis. ➢ 60% payment of the ordered value will be made against delivery of materials/ equipment at site within 30 (thirty) days after submission of bills along with delivery challan and full detailed measurements and as certified by the Consultant/ CMD, Kolkata. ➢ 30% payment of the ordered value will be made against installation of materials/ equipment as per specifications and to the satisfaction of CMD, Kolkata within 30 (thirty) days after submission of bills along with delivery challan and full detailed measurements as certified by the Consultant/ CMD, Kolkata. ➢ 5% payment of the ordered value will be made against testing and commissioning of entire system as per specifications and to the satisfaction of CMD, Kolkata within 30 (thirty) days after submission of bills along with delivery challan and full detailed measurements as certified by the Consultant/ CMD, Kolkata. ➢ 5% on completion of total work in all respects and issuance of completion certificate etc.
(b) RETENTION MONEY FOR INTERIM PAYMENT		
Security Deposite/ Retention Money/ Performance Guarantee	:	10% of the Contract Value including Earnest Money Deposit (EMD) as follow, i. EMD: 2.5 % of the tender value. ii. Performance Guarantee: 7.5% (including 2.5% EMD) of contract value. iii. Balance amount 2.5% of Contract Value to be deducted from each Running Account Bill & Final Bill and shall be kept as Retention Money. Or Total 10% by Bank Guarantee to be submitted upon award of work.
		On receipt of the L.O.I from CMD by the successful tenderer shall furnish a Bank Guarantee or Demand Draft (From Nationalized Bank/Scheduled Bank) in favour of Creative Museum Designers, Kolkata of an amount equivalent to 10% (including 2.5% EMD) of the

		contract value towards Security Cum Performance Guarantee, valid up to completion of Defect Liability Period plus 12 (twelve) calender months. The same shall be submitted within 30 (thirty) days from the date of issuing Letter of Intent (LOI).
Release of Security Deposit/ Retention Money/ Performance Guarantee	:	Shall be released after completion of Defect Liability Period (DLP) of the contract, without any interest.
Escalation Clause	:	Not applicable for this contract
Period of submitting final bill by the successful bidder	:	Within 03 (three) months from the date of virtual completion of SITC of HVAC Work

INSTRUCTIONS TO BIDDERS

1.	**SINGLE PERCENTAGE BASED** Bids are invited by CMD in **two part system** from resourceful & capable tenderers fulfilling the Qualifying Criteria furnished in **ANNEXURE – A, ANNEXURE – A1, ANNEXURE – A2 & ANNEXURE – A3** of the NIT by Creative Museum Designers (CMD) for the work : "**Supply, Installation, Testing & Commissioning of HVAC System in Connection with 15.0 M Dia. Dome Planetarium at Govt. Polytechnic Campus, Dumka, Jharkhand."**
	Procedure for Submission of Bid:
	Tender Fee – The Tenderer must submit **₹ 2,360.00 (Rupees Two thousand Three Hundred Sixty only) including GST** as cost of Tender Document (TD) (non-refundable) in the form of A/c Payee **Demand Draft (DDs) / Pay Order/ Banker's Cheque/ NEFT** in favour of Creative Museum Designers (CMD) payable at Kolkata as cost of Tender Document (Non-refundable) along with their offer.(No A/c Payee Cheque/ Cash shall be considered).Tax Invoice shall be prepared by CMD, Kolkata Office for cost of tender document. The Offer of the Bidder shall not be considered further if the Cost of Tender Document and EMD are not submitted in the form and manner as stated above and their offer is liable to be rejected.
	In case of non-submission of Tender Fee, EMD and any other documents (Hard-copy) specified in NIT /Tender Document, the offer will be summarily rejected.
	Under no circumstances the Tenderers should incorporate any changes/ modifications etc., in the Tender Document itself to avoid rejection of their Tenders.

	If any tenderer withdraws or make any changes in his offer already submitted before the expiry of the above validity period or any extension thereof without the written consent of the company, the offer may be liable to be cancelled and the amount submitted by the bidder against EMD will be forfeited.
	Prebid Discussion: Prebid discussions will be held on **26.07.2023** at **11.00 AM** in the office of **Creative Museum Designers, Saltlake, Kolkata** in presence of Consultants and the intending bidders.
	Bid shall be submitted **in two part system**:

	Part I (Techno – Commercial):	Containing one Copy each of following documents :
		(i) Bidder should submit the Tender Fee, Letter of Submission (in Company's letter head); Detail of information to be furnished by the bidder and Power of Attorney in favour of the person who has signed the bid, Earnest Money Deposit (EMD).
		(ii) No Deviation Certificate (as per **ANNEXURE – C1**), Format for declaration & undertaking (as per **ANNEXURE – C2, ANNEXURE – C3 & ANNEXURE – C4**) in Bidder's Letter Head to be furnished by the bidder.
		(iii) Documents pertaining to Qualifying Criteria furnished in Clause 10 of the NIT.
		(iv) Signed & Stamped **NIT, ITB, GCC, SCC, Technical Specification, Un-priced SOQR** with the word **" Quoted"** written against each Item, Drawing i.e. complete NIT documents as a token of acceptance along with all other submittals as prescribed in the Bidding document.
	Part-II (Financial bid):	The Financial Bid format is provided in **Offer Form,** the rates offered should be entered on SINGLE PERCENTAGE RATE basis (to be applicable on all items) on the "Summary Sheet" as provided in **ANNEXURE - E**. The Financial Bid / SOQR template must not be modified / replaced by the bidder; else the bid submitted is liable to be rejected for this tender.

		Telegraphic or Fax or Email offers shall not be accepted under any circumstances.
		Due date for submission of tender document is 07.08.2023 upto 11.00 hrs. and shall be addressed to, **Head of Engineering - Civil,** **CREATIVE MUSEUM DESIGNERS** **NCSM Campus, 33, Block-GN, Building-II** **Bidha Nagar, Sector –V, Kolkata – 700091** **Phone No. 033 2357 6041** **Email:cmd.ncsm.civil@gmail.com**

2.	**<u>Tender Validity</u>** Tender submitted by tenderer shall remain valid for acceptance for a period **of 120 days** from the last date set for submission of the tender. The tenderer shall not be entitled within the said period of 120 (one hundred twenty) days to revoke or cancel or vary the tender given or any item thereof, without the consent of CMD. In case tenderer revokes or cancels or varies his tender in any manner without the consent of CMD, within this period, his earnest money/retention money will be forfeited.
3.	This Tender is Percentage based Item rate tender with estimated rates already mentioned in the Bill of Quantities (BOQ)/ Schedule Of Quantities & Rates (SOQR). Bidder has to quote percentage variation from the same (On total amount only) proposed by him either in positive or in negative or at par as the case may be in the Summary Sheet and Offer Form provided separately. Summary sheet & Offer Form and Bill of Quantities (BOQ)/ Schedule Of Quantities & Rates (SOQR) duly stamped & signed by the authorised signatory shall only be included in the PRICE BID
4.	Price Bids of those Bidders who will be Techno-commercially qualified for the subject tender on the basis of evaluation of techno commercial bids, will be opened on specified date. The date & time to opening the Financial bid (Package –II) of tender shall be **<u>intimated to the qualified bidders only through EMAIL</u>**.
5.	The complete Tender Document and all other relevent documents pertaining to this tender shall be submitted by the Tenderers duly signed and stamped as a token of Tenderer's acceptance.
6.	**<u>EVALUATION OF BIDS</u>** Technical Bids submitted by the tenderers will be opened first and evaluated based on documentary evidences submitted along with the offer for qualification. After qualification of Bidders, Price Part of the Tender will be considered for opening in respect of the qualified tenderers only for Evaluation of Price.
7.	**<u>AUTHORISATION AND ATTESTATION</u>** Tenders shall be signed by a person duly authorized/empowered to do so. An attested copy of the Power of Attorney, in case the tender is signed by an individual other than Director/ Proprietor / Partner etc. shall be submitted along with the tenders.
8.	**<u>LANGUAGE</u>**

	The tenderer shall quote the rates **in English language.**
9.	The successful Tenderer shall accept Letter of Intent (LOI) & sign the formal agreement within 30(Thirty) days from the date of issue of Letter of Intent (LOI) by the Company, failing which the award of work may be liable to be cancelled alongwith encashment of Bank Gaurantee / Demand Draft etc. as submitted towards EMD by the bidder..
10.	**Tenderers are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their tenders** about the nature of the work and site situation, environments, facilities available, position of material and labour, means of transport and access to Site (so far as is practicable), the form and nature of the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their tender. No claim will be entertained later on the grounds of lack of knowledge of any of these conditions. A tenderer shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charges consequent on any misunderstanding or otherwise shall be allowed. The tenderer shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, water, electricity, access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract document. Submission of a tender by tenderer implies that he has read these instructions and all other contract documents and has made himself aware of the scope and specifications of the work to be done and local conditions and other factors having a bearing on the execution of the work.

11	**REJECTION OF TENDER AND OTHER CONDITIONS**
11.1	CMD does not bind itself to **accept the lowest** or any other tender and reserves to itself the authority to reject any or all the tenders received without assigning any reason thereof. Tenders in which any of the prescribed condition is not fulfilled or any condition including that of conditional rebate is put forth by the tenderer shall be liable for rejection.
11.2	Conditional tenders, unsolicited tenders, tenders which are incomplete or not in the form specified or defective or have been materially altered or not in accordance with the tender conditions, specifications etc., are liable to be rejected.
11.3	Tenders are liable to be rejected in case of unsatisfactory performance of the tenderer with CMD/ NCSM, or tenderer under suspension (hold / banning / delisted) by CMD/ NCSM. CMD reserves the right to reject a bidder in case it is observed that they are overloaded and may not be in a position to execute this job as per the required schedule. The decision of CMD will be final in this regard.

11.4	If a tenderer who is a proprietor expires after the submission of his tender or after the acceptance of his tender, CMD may at their discretion, cancel such tender. If a partner of a firm expires after the submission of tender or after the acceptance of the tender, CMD may then cancel such tender at their discretion, unless the firm retains its character.
11.5	If the tenderer deliberately gives **wrong information** in his tender, CMD reserves the right to reject such tender at any stage or to cancel the contract if awarded and forfeit the Earnest Money / Security Deposit / any other money due.
11.6	Canvassing in any form in connection with the tenders submitted by the Tenderer shall make his offer liable to rejection.
11.7	Tenderer must submit the declaration as per ANNEXURE – C2 stating the non relationship with any Employee of CMD/ NCSM.
11.8	The successful tenderer should not sub-contract part or complete work detailed in the tender specification undertaken by him without written permission of CMD. The tenderer is solely responsible to CMD for the work awarded to him.
11.9	The Tender submitted by a techno commercially qualified tenderer shall become the property of CMD, which under no circumstances shall be returned to the bidder.
11.10	Unsolicited discount received after the due date and time of Bid Submission shall not be considered for evaluation.
11.11	CMD shall not be liable for any expenses incurred by the bidder for site visit and preparation of the tender etc. irrespective of whether the tender is accepted or not.
11.12	The Bidder must provide any further details required for the review upon request from CMD. Failure to comply with any request by CMD for such information will result in rejection of their Offer. CMD may, in its absolute discretion suspend or disqualify a Bidder / Bidders who, at any time, is considered to have breached any of the qualification conditions or has performed in an unsatisfactory manner without assigning any reason whatsoever.

12.	**<u>Tender Documents to be submitted to</u>**
	Head of Enginnering - Civil, **CREATIVE MUSEUM DESIGNERS** **NCSM Campus, 33, Block-GN, Building-II** **Bidha Nagar, Sector –V, Kolkata – 700091** **Phone No. 033 2357 6041** **Email:<u>cmd.ncsm.civil@gmail.com</u>**
13.	**Bidder should submit the documents only in Hard Copy** to the address as mentioned above.
(a)	Power of Attorney in favor of the person who has signed the bid.
(b)	Letter of Submission in Bidder's Letter Head as per **ANNEXURE - B**
(c)	No Deviation Certificate in Bidders letter head as per prescribed format (**ANEXURE - C1**).
(d)	Declaration & Undertaking in Bidders letter head as per prescribed format (**ANNEXURE – C2, ANNEXURE - C3 & ANNEXURE – C4**)
(e)	Documents pertaining to Qualifying Criteria furnished in Clause 10 of the NIT (as per **ANNEXURE – A, ANNEXURE – A1, ANNEXURE – A2 & ANNEXURE – A3**).
(f)	**Tender Fee: ₹2,360.00 (Rupees Two Thousand Three Hundred Sixty only) including GST** in the form of **<u>Demand Draft (DDs) / Pay Order / Banker's Cheque / NEFT</u>** in favour of Creative Museum Designers payable at Kolkata as cost of Tender Document (Non-refundable) (**in original**). Tax Invoice shall be prepare by CMD, Kolkata Office for cost of tender document.
(g)	**Earnest Money Deposit (EMD) :** The Earnest Money Deposit will be of **₹ 2,23,300.00 (Rupees Two Lakh Thwenty Three Thousand Three Hundred only).** EMD shall be submitted along with the Bid in the form of **<u>Bank Guarantee/ Pay Order/ Demand Draft/ Banker's Cheque/ NEFT</u>** valid for the period of 120 days. **(<u>No A/c Payee Cheque / Cash shall be considered</u>).**

''ANNEXURE – B''

FORMAT FOR LETTER OF SUBMISSION

UNIT RATE Tender for **SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF HVAC SYSTEM IN CONNECTION WITH PROPOSED 15.0 M DIA. DOME PLANETARIUM AT GOVT. POLYTECHNIC CAMPUS, DUMKA, JHARKHAND.**

T E N D E R

I / We have read and examined the Instructions to Bidders, General Conditions of Contract (GCC), Special Condition of Contract (SCC), Technical Specification, Schedule of Quantities & other documents and Rules referred to in the conditions of contract and all other contents in the tender document for the work.

I/We hereby tender for the execution of the work specified for the CMD within the time specified in tender viz., schedule of quantities and in accordance in all respects with the specifications and the Conditions of contract (GCC & SCC) and with such materials as are provided for, by, and in respects in accordance with, such conditions so far as applicable.

We agree to keep the tender open for **120 days** from the due date of submission of tender thereof and not to make any modifications in its terms and conditions.

The cost of tender document of value **₹2,360.00 (Including GST)** has been deposited in the shape of Demand Draft (DDs) / Pay Order/ Banker's Cheque / NEFT of a Nationalised / Scheduled Bank issued in favour of Creative Museum Designers. if I/we agree that Creative Museum Designers or his successors in office shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the said earnest money absolutely, otherwise the said earnest money shall be retained by him towards retention money to execute all the works referred to in the tender documents upon the terms and conditions of contract.

We accept that we will automatically be kept under Black Listing/Holiday List from being eligible for bidding in any contract with Creative Museum Designers during the period of bid validity from the date of occurrence, if we are in breach of our obligation(s) under the bid conditions because we:

(a) Have withdrawn our Bid during the period of bid validity specified in the letter of Bid, or

(b) Having being notified of the acceptance of our Bid by CMD during the period of Bid validity, (i) have failed or refused to execute the Contract, if required, or

(ii) have failed or refused to furnish the Performance Guarantee within prescribed period in accordance with the clause of Tender.

Further if I/we fail to commence work as specified, I/we agree that Creative Museum Designers or his successors in office shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the performance guarantee absolutely,

I/we hereby declare that I/we shall treat the tender documents, Technical Specification and other records connected with the work as secret/ confidential documents and shall not communicate information derived there from to any person other than a person to whom I/we am/are authorized to communicate the same or use the information in any manner prejudicial to the safety of the State.

Date :_____

Signature of Contractor
Postal Address

Witness:

Address :

Occupation :

''ANNEXURE – C1''

Creative Museum Designers

(Section 8 Company guaranteed by National Council of Science Museums)
Govt. of India, Block- GN, Sector-V, Bidhan Nagar, Kolkata-700 091

NO DEVIATION CERTIFICATE

[To be submitted in Bidder's Letter Head]

To, **Date:…….**
Head of Engineering - Civil,
CREATIVE MUSEUM DESIGNERS
NCSM Campus, 33, Block-GN, Building-II
Bidha Nagar, Sector –V
Kolkata – 700091

Subject : **No Deviation Certificate for "Supply, Installation, Testing & Commissioning of HVAC System in connection with Proposed 15.0 M Dia. Dome Planetarium at Govt. Polytechnic campus, Dumka, Jharkhand"**

NIT/ Tender No. : CMD 007.12.19(WORKS)/23-24/11, Dated 12.07.2023

We hereby agree to fully comply with, abide by and accept without variation, deviation or reservation all technical, commercial and other conditions whatsoever of the Biding Documents and Amendment(s)/Addendum(s) to the biding documents, if any, for subject work issued by Creative Museum Designers.

We hereby further confirm that any terms and conditions if mentioned in our Bid (un-priced) as well as price part) shall be recognised and shall be treated as null and void.

SIGNATURE OF THE BIDDER

NAME OF BIDDER

COMPANY SEAL

''ANNEXURE – C2''

Creative Museum Designers

(Section 8 Company guaranteed by National Council of Science Museums)
Govt. of India, Block- GN, Sector-V, Bidhan Nagar, Kolkata-700 091

[To be submitted in Bidder's Letter Head]

Tender No.: CMD 007.12.19(WORKS)/23-24/11, Dated 12.07.2023

DECLARATION - 1

This is to certify that neither I / We / Any of us is in anyway related to any employee in CREATIVE MUSEUM DESIGNERS, KOLKATA , or any of its constituent units.

Date: (Signature of the tenderer)

Place: with company seal/rubber stamp

''ANNEXURE – C3''

Creative Museum Designers

(Section 8 Company guaranteed by National Council of Science Museums)
Govt. of India, Block- GN, Sector-V, Bidhan Nagar, Kolkata-700 091

[To be submitted in Bidder's Letter Head]

Tender No.: CMD 007.12.19(WORKS)/23-24/11, Dated 12.07.2023

DECLARATION - 2

We, do hereby accept the General Terms and Conditions, Special Conditions of Contract, Technical Specifications etc. as provided by the CREATIVE MUSEUM DESIGNERS, KOLKATA along with tender documents for **"Supply, Installation, Testing & Commissioning of HVAC System in connection with Proposed 15.0 M Dia. Dome Planetarium at Govt. Polytechnic Campus, Dumka, Jharkhand"** and also undertake to execute the job strictly as per the specifications & drawings as provided along with the tender documents in the event of placement of any work order on us.

Signature of the tenderer / Constituted Attorney.

(With date and Official Seal)

Date:……..

Place:…….

''ANNEXURE – C4''

Creative Museum Designers

(Section 8 Company guaranteed by National Council of Science Museums)
Govt. of India, Block- GN, Sector-V, Bidhan Nagar, Kolkata-700 091

[To be submitted in Bidder's Letter Head]

Tender No.: CMD 007.12.19(WORKS)/23-24/11, Dated 12.07.2023

UNDERTAKING

This is to certify that I/we have carefully gone through the drawings/specifications, etc. given in the tender document & have clearly understood the site working conditions, time schedule given and have accordingly quoted my balanced rates after going through all details.

I/we hereby give an undertaking that I/we shall carryout the work strictly as per the given specifications, and shall complete the same within the stipulated time frame.

Date: (Signature of the tenderer)

Place: with company seal/rubber stamp

FORMAT FOR BANK GUARANTEE BOND

(For EMD only)

1. In consideration of the (Name and address of the Company) hereinafter called the Company having stipulated under Clause 11 of the Notice Inviting tender No. …….. for the work of (mention name of work as in NIT) at the aforesaid site agreed to accept payment of Earnest Money for due fulfillment of the terms and conditions contained in the said NIT (including appendix) for participation in the tender from (Name and address of the prospective tenderer) (hereinafter called the prospective tenderer) by production of a bank guarantee of (Mention amount of EMD in figure & words) only, we (Name and address of Bank furnishing guarantee (Br. Code ……..) (hereinafter referred to as "The Bank") do hereby undertake to pay to the Company an amount not exceeding (mention EMD amount in figure & Words) only against any loss or damage caused to or suffered or would be caused to or suffered by the Company by reasons of any breach by the said prospective tenderer of any of the terms or conditions contained in the said NIT (including appendix) relating to participation in the tender.

2. We, (Name of Bank), do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Company stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Company under National Council of Science Museums by reasons of any breach by the said prospective tenderer of any of the terms or conditions contained in the said NIT (including appendix) or by reason of the prospective tenderer's failure to comply with conditions contained in the said NIT relating to participation in the tender. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding (mention amount of EMD in figures and words) only.

3. We, (Name of Bank) further agree that the guarantee herein contained shall remain in full force and effect during the period as mentioned in Clauses 23 and 24 of the said NIT (including appendix) or the period stipulated under Clause 25 for deciding the tender and that it shall continue to be enforceable till the dues of the Company under or by virtue of the said NIT (including appendix) have been fully paid and its claims satisfied or discharged or the Company certified that the terms and conditions of the said NIT (including appendix) have been fully and properly honoured and carried out by the said prospective tenderer for participation in the tender and accordingly discharges the guarantee. Unless a demand or claim under this guarantee is made on us in writing on or before the periods stipulated above, we shall be discharged from all liability under this guarantee thereafter.

4. We, (Name of the Bank) further agree with the Company that they shall have the fullest liberty without our consent and without affecting in any manner our obligation hereunder to extend time of deciding the tender as may be expedient and to forbear or enforce any of the terms and conditions relating to the NIT (including appendix) and we shall not be relieved from our liability by reason of any such extension being granted to the said proposed tenderer for any forbearance, or act of omission on the part of the Company or any indulgence by the Company to the said proposed tenderer or by any such matter or thing whatsoever which under the law relating to surety.

5. We, (Name of the Bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Company in writing.

Dated, the …….. day of ……..…….

For ……..

(Authorised signatory of the Bank with Seal)

FORMAT FOR BANK GUARANTEE BOND

(For Security Deposit/ Performance Bank Guarantee only)

1. In consideration of the…….....…….. (Hereinafter called "The Company") having agreed to exempt .....…….... (Hereinafter called the "successful tenderer' from the demand, under Clause 12 of the Notice inviting tender No. …… dated …… and/or the terms and conditions of an Agreement dated ……. Made between the Company and successful tenderer(s) …… for …….(hereinafter called "the said agreement") of Earnest Money/Retention Money for the due fulfilment by the said Contract(s) of the terms and conditions contained in the said NIT or the conditions of (execution of work) or the agreement on production of a bank guarantee of Rs……(Rupees…… ……only),

2. We ……..…….(hereinafter referred to as "The Bank") do hereby undertake to pay to the Company an amount not exceeding Rs……..…….. against any loss or damage caused to or suffered or would be caused to or suffered by the Company by reasons of any breach by the said successful tenderer of any of the terms or conditions contained in the said NIT, the conditions of Contract or the Agreement.

3. We, ……. do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Company stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Company under National Council of Science Museums by reasons of any breach by the said successful tenderer of any of the terms or conditions contained in the said NIT or the conditions of contract or the Agreement or by reason of the successful tenderer's failure to perform as per conditions contained the said NIT or the condition of contract or the Agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However our liability under this guarantee shall be restricted to an amount not exceeding Rs……

   Note:**(Bank guarantee bond towards Retention Money/Security deposit as defined under Clause 17 of the General Conditions of Contract at the time of signing of agreement on award of work acceptable only if furnished by any of the Nationalised Banks/Scheduled Banks.)**

4. We, ……..further agree that the guarantee herein contained shall remain in full force and effect during the period as mentioned in Clause 5 of the said NIT read with Clause 20 of the General Conditions of Contract, or the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till the dues of the Company under or by virtue of the said NIT or the conditions of contract or the Agreement have been fully paid and its claims satisfied or discharged or the Company certified that the terms and conditions of the said NIT or the conditions of contract or the Agreement have been fully and properly honoured and carried out by said successful tenderer and accordingly discharges the guarantee.

   Unless a demand or claim under this guarantee is made on us in writing on or before the ……..

   We shall be discharged from all liability under this guarantee thereafter.

1. We,..... lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Company in writing.

Dated, the ……. day of ……

For ……

(Authorised signatory of the Bank with seal)

Creative Museum Designers

(Section 8 Company guaranteed by National Council of Science Museums)
Govt. of India, Block- GN, Sector-V, Bidhan Nagar, Kolkata-700 091

OFFER FORM

Tender No.: CMD 007.12.19(WORKS)/23-24/11, Dated 12.07.2023

I/We have read, understood and accepted all the General Terms and Conditions etc. for **"15.0 M Dia. Dome Planetarium at Govt. Polytechnic Campus, Dumka, Jharkhand"** as per enclosed specification by Creative Museum Designers, Kolkata. I/We hereby offer my/our rates for the said tender:-

1. Name of the Tenderer :

2. Permanent address (in case of Firm/: Company, address of the registered office including jurisdiction of the police station should be given)

3. Telephone Nos. a) Office :
   b) Workshop/Factory:
   c) Mobile :
4. Name of the Bankers and their address:
5. Price offer

Cost of 15.0M Dia. Dome Planetarium at Govt. Polytechnic Campus, Dumka, Jharkhand as per enclosed specification by Creative Museum Designers, Kolkata:

I/We agree to carry out the work mentioned in the schedule at……% (…….....percent) **above** the rates shown in the priced schedule of probable items with approximate quantities.

OR

I/We agree to carry out the work mentioned in the schedule at……% (…….....percent) **below** the rates shown in the priced schedule of probable items with approximate quantities.

OR

I/we agree to carry out the work mentioned in the schedule at **par** rates shown in the priced schedule of probable items with approximate quantities

6. GST No**:** **…….**

   SAC/HSN code no: …….

   GST charged separately (%) **……..**

   Total Amount (Including GST) (Rs) …….

Total amount quoted by us for (in figures) Rs.**.....** are strictly in accordance with the Creative Museum Designers, Kolkata.

Total amount including GST(In words)……

Date: Signature of the Tenderer/Authorised Official Seal

FORMAT FOR LETTER OF INTENT

…… Date……
(Mention fil number)

Sub: Letter of intent for the work of ……..

Dear Sir/Madam,

With reference to your tender dated …….. (and further clarification vide letter number …….. dated ……) # it is intended to award the aforesaid work at the tendered amount of ₹……..

You are, therefore, requested to sign an agreement as per standard format already printed in the tender documents purchased by you while tendering for this job. For this purpose, you are requested to send us a non-judicial stamp paper of appropriate value for preparing contract Agreement within a week from the date of this letter.

You are also requested to deposit Bank Guarantee (from Nationalized Bank/ Scheduled Bank) duly issued / assigned in favour of Creative Museum Designers, Kolkata of an amount of Rs……. as Security cum Performance Guarantee, which shall be submitted within 15 (fifteen) days from the date of issuing of LOI. The validity of Performance Guarantee shall be up to completion time and additional 12 (twelve) calender months from the date of completion time.

You may avail of 15(fifteen) days mobilisation time from the date of issue of this letter of intent for mobilisation your men, materials and other necessary resources for the construction. During mobilisation period, you are requested to study all the drawings and designs annexed hereto and the Bar-Chart and obtain clarifications from the architect or this office immediately.

Please note that the work has to be completed within ……. Weeks/months in which mobilisation time period of 15(fifteen) days is also included. The date of commencement of work would be reckoned as the date of issue of this letter (as per Clause 24 of NIT).

Thanking you,

Yours faithfully,

Sd/-

Administrative Officer

Letter of intent is to be issued in the letter head of the of the company and a photocopy is to be maintained as office copy on which signature of the authorised representative of the successful tender is to be obtained with date at the time of issue of original letter of intent. # Delete words within brackets if not applicable in specific case.

FORMAT FOR ARTICLES OF AGREEMENT

INSTRUCTIONS (not to be typed in Agreement)

(Articles of Agreement have to be typed on non-judicial stamp paper. The value of the stamp paper varies from state to state and is to be known form the particular place. The stamp paper will be purchased by the successful tenderer and the agreement may be typed by the Company according to the format.)

ARTICLES OF AGREEMENT made at ……

……
(Place)

This…….. day of ……...
(Date) (Month & Year)

Between the ……...

……

Hereinafter referred to as the CMD which expression shall be include its successors and assigns on the one part and……...

……
(name of the successful tenderer)

Trading in the name and style of……
……
……
……
(Name and complete address of the successful tenderer)
Hereinafter referred to as the successful tenderer which expression shall be include his/their respective heirs, executors, administrators and assigns on the other part.

WHEREAS the CMD is desirous of getting the work of

……
…… therein done and has caused
(Name of the work)

Notice Inviting Tender (Including appendix), drawings, schedule of quantities and specifications describing the work and conditions of contract to be prepared by……
……
……

…….....
(Name and address of the company)

AND WHEREAS the said NIT (including appendix) drawings as per list attached, specifications and the priced schedule of quantities and conditions of contract have been signed by or on behalf of the parties hereto. AND whereas the Successful tenderer has deposited in Cash or Bank Draft a sum of ₹…….....
(exact amount in words)

The amount being 2.5% of the estimated value of the tender rounded off to the nearest hundred with the Company as Initial Security for the die performance of this Agreement as provided in the said conditions.

NOW IT IS HEREBY AGREED AND DECLARED BY AND BETWEEN THE PARTIES HERETO AS FOLLOWS:

1. In consideration of the payments to be made to him as hereinafter provided the successful tender shall upon and subject to the conditions herein contained execute and complete the work within **06 (Six)** months form the date of issue of letter of intent (as defined under Appendix of NIT) and as per the said drawings and such further detailed drawings as may be furnished to him from time to time and described in the said specifications and the said priced schedule of quantities along with the progress of the building work.

2. The Company shall pay to the successful tenderer such sum as shall become payable hereunder at the time and in the manner specified in the said conditions.

3. Time is the essence of this agreement and the successful tenderer shall proceed with the work, throughout the stipulated period of his contract, strictly according to the CPM/PERT/BAR CHART for reasons directly attributable to the successful tenderer, he shall pay or allow the CMD to deduct from any money due to him a liquidated damage as per Clause 61 of the General Conditions of Contract.

4. This agreement comprises the work above and all subsidiary works connected therewith, even though such work may not be shown on the drawings, or described in the said specifications or the priced Schedule of Quantities.

5. The Company through the Engineer (As defined under Clause 3 of General Conditions of Contract) reserves to itself the right of altering the drawings and of adding to or omitting any item of work or of having portions of the same carried out departmentally or otherwise and such alterations or variations shall not vitiate this agreement.

6. In the case of any disputes or differences arising out of or in connection with, or concerning this Agreement, it shall be settled by arbitration. The arbitration shall be conducted by an expert as Arbitrator in the field acceptable to both the parties. In case of disagreement, it shall be through three experts in the field, one to be appointed by each party and the third presiding expert to be jointly appointed by the expert referred to. The arbitration shall be as per the provision of the Arbitration and Conciliation (amendment) Act, 2015 and the decision of the panel so appointed shall be final and binding on both the parties to this Agreement. The place of arbitration shall be normally Kolkata or any other suitable place mutually agreed.
   The provisions of the Arbitration and Conciliation Act 2015 or any statutory modification or re-enactment thereof and of the rules made there under for the time being in force shall apply to arbitration proceedings under this clause.

   In witness whereof the parties have set their respective hands the day and the year and the place hereinabove written.

Signed by for and on behalf of the company

……

In the presence of

1)…….

Seal

2)…….

Signed by the said Successful tenderer……..

In the presence of

1)……..

Seal

2)……..

GENERAL CONDITIONS OF CONTRACT

1. DEFINITION OF TERMS:

The various terms appearing in the Tender Document shall have the following meaning unless they are repugnant to the context otherwise:

(a)	**COMPANY**	**:**	**CREATIVE MUSEUM DESIGNERS – A section 8 company guaranteed by National Council of Science Museums, NCSM Campus, 33, Block-GN, Building – II,6th Floor, Bidhannagar, Sector – V, Kolkata - 700091**
(b.1)	**OWNER/CLIENT**	**:**	**M/S. JHARKHAND COUNCIL ON SCIENCE AND TECHNOLOGY (JCST)**
(b.2)	**CONSULTANT**	**:**	**M/S. KOTHARI & ASSOCIATES, 14-B, CAMAC STREET, KOLKATA - 700017**
(c)	**BIDDER/TENDERER**	**:**	**The firm/party who shall tender quotation to the company.**
(d)	**CONTRACTOR**	**:**	**The Bidder who's quoted offer will be accepted, either in full or in part, by the Company.**
(e)	**WORK(s)**	**:**	**Jobs awarded to the contractor by the Company.**
(f)	**LOI/WORK ORDER/ CONTRACT**	**:**	**The Formal letter/notification issued to the Contractor awarding the work(s) in full or in part by the Company together with the applicable terms and conditions etc. as are finally and mutually agreed to between the Company and the Contractor.**
(g)	**SITE/WORK SITE**	**:**	**The premises where the work will be executed by the Contractor and shall include the lands, buildings, structures etc. erected thereupon.**
(h)	**ENGINEER-IN-CHARGE**	**:**	**The officer/Engineer nominated and authorized by the company for the time being for the purpose of operating the contract or any work covered thereunder.**
(i)	**ACCEPTING AUTHORITY**	**:**	**MANAGING DIRECTOR of the company.**

2. INTERPRETATION:

The terms as used in the tender documents and agreement and named hereunder shall have the meanings herein assigned to them except where the subject or context otherwise requires: -

"This agreement" shall compromise of the Articles of Agreement along with the Appendix, General Conditions of Contract, Special Condition of Contract, Priced Schedule of Quantities, Technical Specifications and Drawings and CPM/PERT/BAR CHART attached hereto and including those to which only a reference is made herein.

"Work" or "Works" shall mean all work or works defined by bills of quantities, Drawings Specifications and such other work or works as the successful tenderer may be entrusted with for carrying out under this agreement as per Clause 5 of the Articles of Agreement.

Company shall mean Creative Museum Designers (CMD) which shall include the persons for the time being in management of the Company and its assigns.

"Engineer" shall mean the representative of CMD or authorized as such by the Company or in the event of his ceasing to be Engineer for the work such other firm or persons as may be appointed by the Company as Engineer for this work. (Further elaboration given in Clause 3 below):

"Successful tenderer" shall mean **Accepted Lowest Bidder** and shall include his/their respective heirs, executors, administrators and assigns.

''Site'' shall mean the site of the construction works as shown on the site plan attached hereto including any buidings and erection thereon and any other land adjoining these to (inclusive) as aforesaid allotted by the Company for the use of successful tenderer.

"Act of Insolvency" shall mean any act of insolvency as defined by the Presidency Towns Insolvency Act, or the Provincial Insolvency Act or any "Amending Statue.

"Notice in Writing" or "Written Notice" shall mean a notice or communication in written, typed or printed or printed characters sent (unless delivered personally or otherwise proved to have been received) by registered post to the last known private or business address or the registered office of the addressee and shall be deemed to have received when in the ordinary course of post it would have been delivered. "Virtual Completion" shall mean that the works carried out are fit for occupation in every respect including removal of scaffolding, plant, surplus material and rubbish and cleaning of dirt from work and site.

Words imputing persons include firms and corporations words imputing the singular only also include the plural and vice versa where the context so requires.

Short headlines are given to each Clause for convenience only and they will not limit the meaning or scope of the Clause in any way.

3. ENGINEER:

The plans, agreement and documents above mentioned shall form the basis of this agreement and the decision of the said Engineer for the time being as mentioned in the said conditions, in reference to all matters or dispute as to material and workmanship shall be final and binding on both the parties.

The term "Engineer" shall mean the firm or person(s) appointed by the Company to superintend the work. He/They will receive his/their instruction for the work from the Company.

The successful tenderer shall afford the said Engineer(s) every facility and assistance for examining the work and materials and for checking and measuring works and materials.

The Engineer or any Authorised Assistant of the Engineer shall have the power to give notice to the successful tenderer or to his Supervisor of non-approval of any work, or materials, and such work shall be suspended or the use of such materials shall be discontinued. The work from time to time be examined by the Engineer or the Engineers Assistant but such examination shall not in any way exonerate the successful tenderer from the obligation to remedy any defects due to materials or workmanship not in accordance with the contract which may be found to exist at any stage of the work or may appear within the defects liability period mentioned in Clause 37 of General Conditions of Contract (GCC).

4. SCOPE OF THE CONTRACT:

The successful tenderer shall carry out and complete the works in every respect in accordance with this contract and in accordance with the directions of the Engineer and to the satisfaction of the Engineer/ Consultant/ Owner. The engineer may from time to time issue further drawings and/or written instructions, detailed directions and explanations in regard to:

a. The variation or modification of the design, quality or quantity of works for the addition or omissions or substitution of any work.
b. Any discrepancy in the drawings or between the schedule of quantities and/or drawing and/or specification.
c. The removal from the site of any material brought therein by the successful tenderer and the substitution of any other materials there from.
d. The removal and/or re-execution of any works executed by the successful tenderer.
e. The dismissal from the works of any persons employed thereupon.
f. The opening up for inspection of any wok covered up.
g. The amending and making good of any defects under Clause 37.
h. The rectification and making good of any defects under clauses herein after mentioned and those arising during the maintenance period/defect liability period.

The successful tenderer shall comply with and duly execute any work comprised in such instructions, detailed directions and explanations, provided always that if the engineer's instructions involved variation from the priced Schedule of Quantities, such instruction shall be issued by the Company and the successful tenderer shall take the action stipulated in Clause 60.

If the work shown on any such further drawings or detailed drawings or that may be necessary to comply with any such instructions, directions, or explanations be in the opinion of the successful tenderer, extra to

that comprised in or reasonably to be inferred from the contract he shall before proceeding with such work, give notice in writing to this effect to the Engineer, and in the event of his not doing so three days before the commencement of such work the successful tenderer shall not be entitled to any allowance in respect of any such extra work. But if such notice has been duly given and the Engineer and the "successful tenderer, fail to agree as to whether or not there is any extra, then if the engineer decides that the successful tenderer is to carry out the said work, the successful tenderer shall do so accordingly, and the question whether or not there is any extra and if so, the amount thereof shall failing agreement be settled by the Arbitration as provided in Clause 52 on a reference being made by the successful tenderer.

5. A. SCOPE OF WORK:

The work consists of **"Supply, Installation, Testing & Commissioning of HVAC System in connection with Proposed 15.0 M Dia. Dome Planetarium at Govt. Polytechnic Campus, Dumka, Jharkhand"** to be carried out in accordance with the technical specification, job procedure, drawings and Schedule of Quantities & Rates. It includes furnishing all materials, labour, tools and equipment and management necessary for the incidental to the construction and completion of the work. All work, during its progress and upon completion, shall conform to the code, standard, specification, approved drawings etc.

The Contractor shall forthwith comply with and duly execute any work comprised in such CMD's instructions, provided always that verbal instructions, directions and explanations given to the Contractor's or his representative upon the works by CMD shall if involving a variation be confirmed in writing to the Contractor/s within seven days.

- The Client / Employer / PMC reserves the right to get the work executed in the best and most economical manner, and may add or may not operate any item(s) of work(s) as CMD may consider fit.
- The Client / Employer / PMC reserve the right to increase or decrease the scope of work and/or not to operate any one or more of the item(s) of work(s) of the Schedule of Quantities & Rates. It is the responsibility of the Contractor to ascertain from the Engineer–in–charge, the items to be operated with their actual quantities before making any arrangement (s) for taking up work under the item (s). No claim, whatsoever, from the Contractor will be entertained for non-operation of any of the item(s) or for variation in quantity of any of the item(s).
- The payment shall be made on the basis of actual quantities executed under various item (s) and the accepted rates thereof, and not on the quantities mentioned in the Schedule of Quantities & Rates.
- The work in general consists Percentage Based Item Rate as per "Schedule of Quantities & Rates".
- Any other related civil works i.e. foundation of Chiller Units or any other equipments etc. required for successful execution of the work as per manufacturers/ vendors approved drawings will have to be executed by the Successful bidders, as per instruction of Engineer-in-Charge (CMD)/ Consultant.
- Dismantling of existing Brickwork/R.C.C/P.C.C. etc. if required for successful execution of the work, is to be done by successful bidder as per instruction of CMD/ Consultant including rendering of the same.
- The Scope of Work may also include such other related works as covered in 'Schedule of Quantities & Rates' although they may not be specifically mentioned in the above paragraphs and all such incidental items not specified but reasonably implied and necessary for the completion of the work as a whole, shall be deemed to be directed by the Employer
- CMD also reserves the right to accept tender either for full quantity of work or part thereof or divide the works amongst more than 1 (One) Contractor without assigning any reason for any such action.
- CMD also reserves the right to take away part of initially awarded work from Contractor in case of his unsatisfactory work progress and award the same to other Agencies, in order to meet the time schedule of owner/client or for any other reason or contingency. In this regard Employer's decision will final & binding on the Contractor.

- The Contractor shall provide a detailed schedule of work along with material and labour deployment on monthly basis.
- The Contractor shall, after completion of work, clear the site of all debris and left over materials, at his own expense to the entire satisfaction of Engineer-In-Charge or his authorized representative. In case of any failure by the Contractor, the employer will get set at risk and cost of the Contractor.
- If required, Contractor shall submit to CMD / JCST the entry challan of incoming materials for verification of Stores and record.
- It should be clearly understood that it is entirely the Contractor's responsibility and liability to find, procure and use the required tools and plants and accessories at his own cost for efficient and methodical execution of the work. CMD / JCST shall have the right to check the sufficiency or quality of the Contractor's tools from time to time and the Contractor shall carry out all reasonable instructions of JCST in this respect.

B. SCOPE OF COMPREHENSIVE AMC WORK:

After the completion of warranty period, Comprehensive Annual Maintenance Contract (CAMC) including labour and spares is to be provided initially for 03 (three) years. However, Original Equipment Manufacturer (OEM) is required to confirm for their responsibility of providing such CAMC Services of their products installed at the site and provide required spare parts at least for 10 (ten) years after warranty period or more as required by the owner of the project i.e. in this case it will be JCST or his authorized representatives.

IN THIS CONTEXT, THE BIDDERS SHALL SUBMIT AN UNDERTAKING FROM THE OEM OF RESPECTIVE CHILLER UNITS WHICH THEY ARE INTENDING TO USE FOR THE PROJECT ASSURING THAT THE SERVICES INCLUDING ALL THE REQUIRED SPARE PARTS SHALL BE MADE AVAILABLE FOR A MINIMUM OF 10 YEARS ON COMPLETION OF DEFECT LIABILITY PERIOD OF THE EQUIPMENT. ALSO ALL KIND OF SUPPORTS THAT IS REQUIRED FOR SMOOTH EXECUTION OF CONSTRUCTION AND COMMISSIONING SHALL BE RENDERED TO THEIR VENDOR. The undertaking should be submitted on the letterhead of the OEM signed by not below the rank of Service Head of the Country.

i. Preventive Maintenance Services: During the CAMC period there shall be at least 04 nos of compulsory preventive maintenance routines per year to be rendered. Any emergency call or all on-call services shall be attended as and when required.
ii. Complaint call should be attended on the same day.
iii. Complaint should be resolved/ completed within a day for minor complaints and within 2 days for major complaints.
iv. Replacement of parts (as per CAMC type) including refrigerant charging, if any.
v. To keep critical spares inventory at his Store/ Customer site as per the agreement/ Contract.
vi. To keep record of all the reports for complaints/ routine services done at the customer site.
vii. Original Equipment Manufacturer (OEM) or his authorized Sales and Service Dealer (SSD) has to give declaration for the genuineness of the Parts consumed in CAMC.
viii. Any special service condition specified in the Contract/ Agreement will be applicable to OEM/ SSD.
ix. Agency is responsible for repair or complete replacement of the spare parts as required.

6. SUCCESSFUL TENDERER TO PROVIDE EVERYTHING NECESSARY:

The successful tenderer shall provide everything necessary for the proper execution of the works according to the true intent and meaning of the drawings and specification and bill of quantities taken together, whether the same may or may not be particular shown on the drawings or described in the specification or included in the bill of quantities, provided that the same is to be reasonably inferred there from and if he finds any discrepancy in the drawings or between the drawings and specification and bill of quantities, he shall

immediately refer the same to the Engineer who shall decide which shall be followed. Figured dimensions shall be followed in reference to scale.

The successful tenderer shall supply, fix and maintain at his cost during the execution of any works, all the necessary centering, scaffolding, staging, planking, timbering, shuttering, shoring, pumping, fencing, boarding, watching and lighting by night as well as by day required for the proper execution and protection of the public and the safety of any adjacent roads, streets, cellars, vaults, eves, pavement, walls, houses, buildings and all erections, matters or thing, and they shall take down and remove any or all such centering, scaffolding etc. as occasion shall require or when ordered to do so and shall fully reinstate and make good all matters and all things disturbed during the executing of the works to the satisfaction of the Engineer before a Virtual Completion Certificate is issued.

The successful tenderer shall make his own arrangements for laying temporary water and electrical power lines including excavation if necessary so as not to cause any obstruction along locations approved by the Engineer. The water supply lines, hose pipes, electrical lines, underground or overhead etc. belonging to them should not cause damage to the property of the company including gardens, plants, flowers, hedges, flower pots in the campus etc. Any expenditure incurred by the company due to damage so caused shall be debited to the successful tenderer's account. It is their complete responsibility to ensure that the garden area and its approaches and other areas not allocated to them are not encroached upon by their men and materials. They have to provide a fence at their cost to confine the activities of construction, labour and materials, to the construction area as approved by the Engineer or his representative. The bitumen carpet road in front of company's office, Science and Exhibits Laboratory, Stores and Workshop or garden paths and defined areas will not be allowed to be used by their labour, materials, trucks and other modes of transport system. Their labour is allowed to use Campus grounds for baths, calls of nature etc.

The company shall on no account be responsible for the expense incurred by the successful tenderer for hired ground or electric power or water obtained from elsewhere.

7. DRAWINGS, DESIGNS ETC.

Tender drawings are diagrammatic but shall be followed as closely as actual construction permits. Any deviations made shall be in conformity with the architectural and other service drawings.

The successful tenderer shall verify all dimensions at the site and bring to the notice of the Engineer all discrepancies or deviations noticed.The Engineer's decision shall be final and binding.

All drawings issued by the Company are its own property and shall not be lent, reproduced or used on any other works than intended without the written permission of the Company.

Large scale size details and manufacturer's dimension for materials to be incorporated shall take precedence over small scale drawings.

One complete set of drawing, specifications and schedule of quantities shall be furnished by the Engineer to the successful tenderer and the Engineer shall furnish, within such time as he may consider reasonable, one copy of any additional drawing which in his opinion may be necessary for the execution or any part of work. Such copies shall be kept on the works, and the Engineer and his representatives shall at all reasonable time have access to the same and they shall be returned to the Engineer by the successful tenderer before the issue of the certificate for the balance of this account under the contract.

Company will make all efforts to give all drawings, designs, decision etc. from time to time and the successful tenderer shall make timely requests for the same. No claim whatsoever shall however be entertained for compensation for the delay in supply of drawings, designs, decisions, running payments etc. from the

successful tenderer. Drawings shown at the time of issue of tenders and forming part of the contract shall indicate the scope of work and drawings issued subsequently during the execution of work shall be deemed to be drawings elaborating the basic scheme. If any detailed drawings show an item for execution, which in the opinion of the successful tenderer is not covered under the items of the contract, he shall immediately refer it to the Engineer, for final decision. The decision of the Engineer as to whether it is an extra item or not or whether it is covered by contracts and if not what extra rate should be paid shall be final and binding on both the parties to the contract i.e. Company and the Successful tenderer.

8. REFERENCE DRAWINGS & SHOP DRAWINGS:

Reference Drawings

The Successful tenderer shall maintain one set of all drawings issued to him as reference drawing. These shall not be used at the site.

All corrections, deviations and changes made at the site shall be shown on these reference drawings for incorporation in the completion drawings. All changes to be made shall be initiated by the Engineer.

Shop Drawings

The Successful tenderer at his own cost shall submit to the Engineer /Consultant six copies of all shop drawings related to the ducting work, foundation drawings for Chiller Units, AHUs, pumps, electrical panels, detailed electrical panel drawings, control wiring diagrams for approval. The successful agency shall prepare & submit all shop drawings and take the approval from Consultant/CMD before starting the work and also submit as-built drawings of all the works executed by the successful agency after completion of work.

9. SCHEDULE OF QUANTITIES & RATES (SOQR):

The quantities for various items of works as shown in the Schedule of Quantities & Rates of probable items of works are based on the basic design drawing prepared and issued by CMD/ Consultant. However, if quantity variations become necessary due to Design consideration / Site conditions etc. those have to be done by the Contractor at the time of execution of work as per their finally accepted rates(s). No conditional rate will be allowed in any case.

10. ERROR IN SCHEDULE OF QUANTITIES, IF ANY:

If any error appears in the schedule of quantities, other than the Tenderer's prices and calculation, it shall be rectified by the engineer after informing the Company. Such variation shall constitute a deviation of the item(s)/contract and shall be dealt with as hereinafter provided.

11. NOMENCLATURE OF ITEM:

Nomenclatures of the items of works mentioned in the priced schedule are only a brief description of the work. The work shall have to execute in accordance with the specifications/ drawings for the work to the satisfaction of the Engineer of the work. Any omission in the description will not absolve the successful tenderer from his responsibilities to complete the work in a satisfactory manner.

12. METRIC UNITS:

The schedule of quantity indicate the unit of Metric system. The mode of measurement of different items of work shall be as per details contained in the specification and special conditions with the equivalent of the units mentioned therein in Metric system.

13. CPWD/PWD SPECIFICATIONS AND I S CODES:

CPWD/PWD specifications & relevant I.S Code of practice shall be applicable, for all items of work.

14. ORDER OF PRECEDENCE:

If any discrepancy is noticed between the conditions and specifications, drawing etc. the following would be the order of precedence:

a. Schedule of Quantities.
b. Notice Inviting Tender (NIT).
c. General Conditions of Contract (GCC) & Special Conditions of Contract (SCC)
d. Drawings and notes thereon.
e. Technical Specification as provided with this document for Air-Conditioning, Ducting work etc.
f. ASHRAE standards/ ARI/ CPWD/ PWD Specification & I.S. Codes.

15. SITE INSPECTION:

The work site is at Govt. Polytechnic Campus, Dumka, 15.0 M Dia. Dome Planetarium Project, Jharkhand. Tenderers are advised to inspect and examine the site and its surroundings and satisfy themselves before submission of their offer as to the nature of the site and Sub-Soil, the quantities and nature of work and materials necessary for completion of the works and the means and access to the site, accommodation they may require and all other necessary information as to the risk contingencies and other circumstances which may influence or affect their offers and work. A tenderer shall be deemed to have full knowledge of the Site whether he inspects it or not and no extra charge consequent to any misunderstanding or otherwise shall be allowed.

16. SUFFICIENCY OF QUOTATION:

The Bidder shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his quotation for the works and of the rates and prices quoted in the Schedule of Quantities & Rates in which rates and prices shall, except as otherwise provided, cover all his obligations and liabilities under the Contract and all matters and things necessary for the proper completion and maintenance of the Works.

17. SECURITY DEPOSIT/ PERFORMANCE BANK GUARANTEE:

This shall mean and be 10% of the contract value awarded including the initial security deposit and shall be recovered from the running bills. In case of termination of contract, this retention money shall be forfeited and amount necessary to make up this amount shall be recovered from the money due to the successful tenderer under this contract, or any other contract. The successful tenderer can give retention money in the form of a Bank Guarantee from a Nationalised Bank/Scheduled Bank in approved format to the extent of 10% of the total cost of work awarded valid for a period equal to completion period plus one year (which will have to be suitably extended to cover defect liability period and extended period of contract whichever is later). Tenderers who have deposited earnest money deposited in Bank Guarantee along with the tender could get refund of earnest money in bank guarantee after the bank guarantee for the 10% of the contract value is received and accepted by the Company. The retention money in the form of Bank Guarantee will not be accepted in parts.

The successful tenderer shall have to extend the Bank Guarantee period, from time to time at least one month before the expiry of a Bank Guarantee to cover the defects liability period, reckoned from the date of virtual completion. In case they failed to extend the Bank Guarantee at least one month before its expiry, it shall be considered a breach of contract on the part of the successful tenderer and hence, the Company shall be free to demand the Guarantee money from the Bank.

18. DEVIATIONS:

The successful tenderer may when authorized and when directed, in writing by the Engineer with the approval of the company add or omit or vary the works shown upon the drawings, or described in the specifications, or included the bill of quantities but they shall make no addition, omission or variation without such authorization or direction. A verbal authority direction by the Engineer shall, if confirmed by him, in writing within 7 days , be deemed to have been given in writing.

No claim for an extra shall be allowed unless it shall have been executed under the provision of Clause 19 or by the authority of the Engineer with concurrence of the company as ther in mentioned. Any such extra if wherein refered to, as an authorize extra shall be goverened by Clause 43. No variation i.e. additions or substitutions shall be vitiate the contract.

19. PRICE FOR DEVIATIONS:

Deviation shall be valued at the net rates contained in the Tenderers original tender or where the same may not apply direct at rates analogous to the prices therein contained. If the altered, additional or substituted work included any class of work for which no rate is specified in the contract, Then the successful tenderer shall within seven days of the date of receipt of the order to carry out the work, inform the engineer with the copy to the Company the rate which the intents to charge for such class of work with proper analysis. In the event of his not doing so, within a reasonable time before the commencement of such work, he shall not be entitled to any allowance or payment in respect of any such extra work. When such notice has been duly given, the Engineer with the consent of the Company may agree to such rate but if the engineer does not agree to this rate, the Engineer may cancel his order to carry out such class of work and arrange for it to be carried out departmentally or through any other agency or in such a manner as he may consider advisable or he may decide that the Successful tenderer shall carry out such items of work and in such case he shall only be entitled to be paid in respect of the work carried out or expenditure incurred by him according to such rate or rates as shall be fixed by the Engineer as full and final and shall be binding on successful bidder.

However, in respect of the rates for extra/new items, if there are any, the opinion of the Engineer as to whether it is an extra item or not, and if so, what rate should be paid shall be final and binding on the successful tenderer and shall be derived from contract items so far as applicable and the rates of which cannot be derived from contract items will be fixed as per (i) relevant DSR items as applicable or (ii) on the basis of actual cost of materials and labour, plus 15% as successful tenderers overheads and profits on all trades except on the cost of materials supplied departmentally.

Successful tenderer shall not claim any idle and remobilization charge for interim due to late decision by the Company. Such legitimate interim delays shall however be considered for extension of time if any.

Furthermore, they shall submit analysis of rates with justifications for claiming extra on any deviation item prior to the probable date of execution of the referred item.

20. COMPLETION TIME:

Time of completion of work will be 06 (Six) months from the date of issuance of Letter of Intent (LOI).

21. TOOLS, PLANTS & EQUIPMENTS:

The Contractor shall arrange at his own expense all necessary Tools, Plants & Equipments (hereinafter referred to as T&P) such as DG Set, Welding machine, Crane of required capacity, Water Tanker etc. along with all accessories, Operator(s) & Labourers required for execution of the work, will be provided by Contractor at his own cost.

Lighting DG for area lighting if required (including operator and fuel) will also be provided by Contractor within the finally accepted rate / price.

22. MATERIALS:

The Contractor shall at his own expense, provide all materials required for the work in this Tender Documents.

- All materials to be provided by the Contractor shall be in conformity with the specifications laid down in the contract and the Contractor shall, if requested by the Engineer-in-Charge, furnish proof to the satisfaction of him that the materials so comply.
- The Contractor shall, at his own expense and without delay, supply to the Engineer-in-Charge samples of materials proposed to be used in the works. The Engineer-in-Charge shall within seven days of supply of samples or within such further period as he may require intimate to the Contractor in writing/inform the Contractor whether samples are approved by him or not. If samples are not approved, the Contractor shall forthwith arrange to supply to the Engineer-in-Charge for his approval fresh samples complying with the specification laid down in the Contract.
- The Engineer-in-Charge shall have full powers for removal of any or all the materials brought to site by the Contractor which are not in accordance with the Contract specifications or do not confirm in character or quality to samples approved by him. In case of default on the part of the Contractor in removing rejected materials the Engineer-in-Charge shall be at liberty to have them removed by other means.
- All charges on account of transportation, octroi, GST, Excise and other duties on materials obtained for the works from any source shall be borne by the Contractor.

23. FAULTY MATERIALS AND WORK:

a. The Engineer shall during the progress of the work has power to order in writing from time to time the removal from the work, within such reasonable time or times as may be specified in the order, to any materials and/or workmanship which in the opinion of the Engineer are not in accordance with the specifications or the instructions of the Engineer. The substitution of proper materials or any workmanship and the removal and proper re-execution of any work executed with materials or workmanship not in accordance with the drawings and specifications or instructions shall have to be forthwith carried out by the Successful tenderer at his own cost upon receiving such order. In case of default on the part of the Successful tenderer to carry out such order the CMD shall have the power to employ any other persons to carry out the same and all the expenses consequent thereon or incidental thereto shall be borne by the Successful tenderer and shall be recovered from them by the Company from any money due to or that may become due to the Successful tenderer or from the amount of retention money.

b. Nothing in this clause shall relieve the Successful tenderer from his liability to execute the works in all respect in accordance with those terms and upon and subject to the conditions of this contract or from his liability to make good all defects.

24. ACCESS:

The Company or its representatives shall at all reasonable time have free access to the works and/or to the workshops factories or other places where materials are being prepared or constructed for the contract and also to any place where materials are lying or from which they are being obtained and the Successful tenderer shall give every facility to them for inspection, examination and testing of the materials and workmanship. Expect the representative of Public Authorities and those mentioned above, no person shall be allowed on the works at any time without the prior written permission of the Engineering of the Company.

If any work is to be done at a place other than the site of works the Successful tenderer shall obtain the prior written permission of the Engineer for doing so.

25. LABOUR:

The Contractor shall employ labour in sufficient numbers to maintain the required rate of progress and quality to ensure workmanship of the degree specified in the Contract and to the satisfaction of the Engineer–in–Charge. The Contractor shall not employ in connection with the Works any person who has not completed his eighteen years of age.

The Contractor shall furnish to the Engineer-in-Charge at regular intervals as decided by Engineer-in-charge of CMD, a distribution return of the number & description by trades of the work people employed on the Works. The Contractor shall also submit on the 4th and 19th of every month to the Engineer–in–Charge a true statement showing in respect of the second half of the current month (i) 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.

The Contractor shall pay to labour employed by him wages not less than Minimum Wages as defined in the Contract Labour Regulations.

The Contractor shall in respect of labour employed by him comply with or cause to be complied with the Contract Labour Regulations in regard to all matters provided therein.

The Contractor shall comply with the provisions of the payment of Wages Act, 1936, Minimum Wages Act, 1948, Workmen's Compensation Act, 1923, Industrial Disputes Act, 1947, or any modifications thereof or any other law relating thereto and rules made thereunder from time to time.

The Contractor shall be liable to pay his contribution and the employee's contribution to the State Insurance Scheme in respect of all labour employed by him for the execution of the contract, in accordance with the provision of "The Employee's State Insurance Act, 1948" as amended from time to time.

The Engineer–in–Charge shall on a report having been made by an Inspecting Officer as defined in the Contract Labour Regulation have the power to deduct from the money due to the Contractor any sum required or estimated to be required for making good the loss suffered by a worker or workers by reasons of non-fulfilment of the Conditions of the Contract for the benefit of workers, non-payment of wages or of deduction made from his or their wages which are not justified by the terms of the Contract or non-observance of the said Contract Labour Regulations and Acts and Rules framed there under.

In the event of the Contractor committing a default or breach of any of the provisions of the aforesaid Contract Labour Regulations, as amended from time or furnishing any information of submitting or filling any Form / Register / Slip under the provisions of these Regulations which is materially incorrect then on the report of the Inspecting Office as defined in the Contract Labour Regulation, the Contractor shall without prejudice to any other liability pay to the Company a sum as applicable as per prevailing Rules as liquidated damages for every default, breach or furnishing, making, submitting, filling materially incorrect statement as may be

fixed by the Engineer–in–Charge & in the event of the Contractor's default continuing in this respect, the liquidated damages may be enhanced for each day of default subject to a maximum percent of the estimated cost of the Works put to tender. The Engineer–in–Charge shall deduct such amount from bills or security deposit of the Contractor and credit the same to the Welfare Fund constituted under Regulations. The decision of the Engineer–in–Charge in this respect shall be final and binding.

The Contractor shall at his own expense comply with or cause to complied with Model Rules for Labour Welfare framed by Government from time to time for the protection of health and for making sanitary arrangements for workers employed directly or indirectly on the Works. In case the Contractor fails to make arrangement as aforesaid, the Engineer–in–Charge shall be entitled to do so and recover the cost thereof from the Contractor.

The Contractor shall at his own expense arrange for the safety provisions as required by the Engineer-in-Charge, in respect of all labour directly or indirectly employed for performance of the Works and shall provide all facilities in connection therewith. In case the Contractor fails to make arrangements and provide necessary facilities as aforesaid, the Engineer–in–Charge shall be entitled to do so and recover the cost thereof from the Contractor.

Failure to comply with Model Rules for Labour Welfare, Safety Code or the provisions relating to report on accidents shall make the Contractor liable to pay to the Company as liquidated damages as applicable as per prevailing Rules for each default or materially incorrect statement. The decision of the Engineer–in–Charge in such matters based on reports from the Inspecting Officers as defined in the Contractor Labour Regulation as appended to these conditions shall be final and binding and deductions for recovery of such liquidated damages may be made from any amount payable to the Contractor.

26. POSSESSION OF SITE BY CONTRACTOR:

- The Contractor shall not be permitted to enter on (other than for inspection purposes) or take possession of the site until instructed to do so by the Engineer – In – Charge in writing. The portion of the site to be occupied by the Contractor shall be defined and / or marked on the site plan, failing which these shall be indicated by the Engineer – in – Charge at Site and the Contractor shall on no account be allowed to extend his operation beyond these areas. In respect of any land allotted to the Contractor for purposes of or in connection with the contract the Contractor shall be licensee subject to the following and such other terms and conditions as may be imposed by the licenser.

  (i) That such use or occupation shall not confer any right or tenancy of the land to the Contractor.

  (ii) That the Contractor shall be liable to vacate the land on demand by the Engineer – in – Charge.

  (iii) That the Contractor shall have no right to any construction over this land without the written permission of the Engineer–in–Charge. In case, he is allowed to construct any structure he shall have to demolish and clear the same before handing over the completed work unless agreed to the contrary.

- The Contractor shall provide if necessary, or if required, on the site, all temporary access there to and shall alter, adopt and maintain the same as required from time to time and shall take up and clear them away as and when no longer required and as and when ordered by the Engineer–in–Charge and make good all damage done to the site at his cost.

27. SETTING OUT WORKS:

The successful tenderer at his own expense shall set out the works and shall be responsible for the true and perfect setting out of the same and for the correctness of the positions, levels, dimensions and alignment of all parts thereof. If at any time any error shall appear during the progress of any part of the work, the Successful tenderer shall at his own expense rectify such error if called upon to the satisfaction of the Engineer.

28. MATERIALS OBTAINED FROM EXCAVATION:

Materials of any kind obtained from excavation on the site shall remain the property of the Company and shall be disposed of as the Engineer-in-Charge may direct.

All fossils, coins, articles of value of antiquity and structures and other remains or things of geological or archaeological interest discovered on the site shall be the absolute property of the company and the Contractor shall take reasonable precautions to prevent his workmen or any other person from removing or damaging any such article or thing shall immediately upon discovery thereof and before removal acquaint the Engineer-in-Charge with such discovery and carry out the Engineer-in-Charge's directions as to the disposal of the same at the expense of the Company.

29. WATCHING & LIGHTING:

The Contractor shall provide and maintain at his own expense all lights, guards fencing and watching when and where necessary or required by the Engineer–in–Charge for the protection of the Works or for the safety and convenience of these employed on the Works or the public.

30. WORK SUPERVISOR AND FOREMAN:

The Successful tenderer shall keep a qualified and experienced Engineer for supervision of works to ensure best quality work. He shall also give all necessary personal superintendence during the execution of the works and as long thereafter as the Engineer may consider necessary until the expiration of the "Defect Liability Period" stated in Clause 37. The Successful tenderer shall also during the whole time, the works are in progress, employ competent Foreman approved by the Engineer whose qualification must conform to the requirements specified by the Engineer. In special cases, he shall be constantly in attendance of the building while the men are at work". Any directions, explanations, instruction or notices given by the Engineer to such Foreman shall be held to be given to the successful tenderer.

31. INSPECTION AND APPROVAL:

All works embracing more than one process shall be subject to examination and approval at each stage thereof and the Contractor shall give due notice to the Engineer – in – Charge of his authorized representative when each stage is ready. In default of such notice, the Engineer-in-Charge shall be entitled to appraise the quality and extent thereof.

Employer's/ Client's representatives concerned with the Contract shall have powers at any time to inspect and examine any part of the works and the Contractor shall give such facilities as may be required for such inspection and examination.

Company's/Owner's representatives concerned with the Contract shall have powers at any time to inspect and examine any part of the works and the Contractor shall give such facilities as may be required for such inspection and examination.

32. POWERS OF ENGINEER-IN-CHARGE'S REPRESENTATIVE:

The duties of the representatives of the Engineer–in–Charge, are to watch and supervise the works and to test and examine any materials to be used or workmanship employed in connection with the works. He shall have no authority to order any work involving any extra payment by the Employer nor to make any variation in the works.

- The Engineer–in–Charge may from time to time delegate to his representative any of the powers and authorities vested in the Engineer–in–Charge and shall furnish to the Contractor a copy of all such written delegation of Powers and authorities. Any written instruction or written approval given by the representative of the Engineer–in–Charge to the Contractor within the terms of such delegation shall bind the Contractor and the Employer as through it had been given by the Engineer–in–Charge.
- Failure of the Representative of the Engineer–in–Charge to disapprove any work or materials shall not prejudice the power of the Engineer–in–Charge thereafter to disapprove such work or materials and to order the pulling down, removal or breaking up thereof.
- If the Contractor is dissatisfied with any decision of the Representative of the Engineer–in–Charge he shall be entitled to refer the matter to the Engineer–in–Charge who shall thereupon confirm, reverse or vary such decision.

33. REMOVAL OF WORKMEN:

The Contractor shall employ in and about the execution of the works only such persons as are skilled and experienced in their several trades and the Engineer-in-Charge shall be at liberty to object to and require the Contractor to remove from the works any persons employed by the Contractor in or about the execution of the works who in the opinion of the Engineer-in-Charge misconducts himself or is incompetent or negligent in the proper performance of his duties and such person shall not be again employed upon the works without written permission of the Engineer-in-Charge.

34. WORK DURING NIGHT OR ON SUNDAYS & HOLIDAYS:

Subject to any provisions to the contrary contained in the Contract, none of the permanent works shall be carried out during night or on Sundays or on authorized Holidays without the permission in writing of the Engineer-in-Charge except when the work is unavoidable or absolutely necessary for the safety of life, property of works in which case the Contractor shall immediately advise the Engineer-in-Charge accordingly.

The Contractor would be required to carry out the work even on Sunday or any other holidays, without conferring any right on the Contractor for claiming for extra payment for introducing this holidays working. The decision of the Engineer-in-charge in this regard will be final and binding on the Contractor. Nothing extra will be paid for doing works on Sunday or any other holidays.

35. COMPLETION CERTIFICATE:

As soon as the work is completed, the Contractor shall give notice of such completion to the Engineer-in-Charge and within a reasonable period of receipt of such notice the Engineer-in- Charge shall inspect the work and shall furnish the Contractor with a certificate of completion indicating (a) the date of completion (b) defects to be rectified by the Contractor and/or (c) items for which payment shall be made at reduced rates. When separate periods of completion have been specified for items or groups of items, the Engineer-in-Charge shall issue separate completion certificates for such item or groups of items.

No certificate of completion shall be issued, nor shall the work be considered to be complete till the Contractor shall have removed from the premises on which the work has been executed all scaffolding, sheds and surplus materials, except such as are required for rectification of defects, rubbish and all huts and sanitary arrangements required for his workmen in the site in connection with the execution of the work, as shall have

been erected by the Contractor the workmen and cleaned all dirt from the parts of building(s) in upon or about which the work has been executed or of which he may had possession for the purpose of the execution thereof and cleaned floors, gutters and drains, eased doors and sashes, oiled locks fastening labelled keys clearly and handed them over to the Engineer-in-Charge or his Representative and made the whole premises fit for immediate occupation or use to the satisfaction of the Engineer-in-Charge.

If the Contractor shall fail to comply with any of the requirements of this conditions as aforesaid, on or before the date of completion of the works, the Engineer-in-Charge may at the expense of the Contractor fulfil such requirements and dispose of the scaffoldings, surplus materials and rubbish etc. as he thinks fit and the Contractor shall have no claim in respect of any such scaffolding or surplus materials except for any sum actually realized by the sale thereof less the cost of fulfilling the requirements and any other amount that may be due from the Contractor. If the expense of fulfilling such requirements is more than the amount realized on such disposal as aforesaid, the Contractor shall forthwith on demand pay such excess to the Company.

- If at any time before completion of the entire work, items or groups of items for which periods of completion have been specified, have been completed, the Engineer-in-Charge with the consent of the Contractor takes possession of any part or parts of the same then notwithstanding anything expressed or implied elsewhere in this Contract :

  (a) Within ten/thirty days of the date of completion of such items or groups of items or possession of the relevant part the Engineer-in-Charge shall issue completion certificate for the relevant part as in condition above provided the Contractor fulfils his obligations under that condition for the relevant part.

  (b) The Defects Liability Period in respect of such items and the relevant part shall be deemed to have commenced from the certified date of completion of such items or the relevant part as the case may be.

36. PRICE ESCALATION:

The quoted rate of the Contractor shall remain firm throughout the entire Contract period including extended Contract period if any and No Price Escalation shall be paid due to any reasons whatsoever.

37. DEFECT LIABILITY PERIOD AND DEFECTS AFTER COMPLETION:

Defect liability period shall be one year from the date of virtual completion of work, as certified by the Company. Any defect, shrinkage or other faults, which may appear within the defect liability period, in the opinion of the Engineer, arising from materials or workmanship not in accordance with the contract or from failure to take due precautions, shall upon the directions in writing of the engineer and within such reasonable time as shall be specified therein be amended and made good by the Successful tenderer at his own cost. In case of default, the Company may employ and pay any other person/persons to amend and make good such defect, shrinkage or other faults and all damage, loss and expenses consequent thereon or incidental thereto shall be made good and borne by the Successful tenderer.

Such damage, loss and expense shall be recoverable from the Successful tenderer by the Company or may be deducted by them from any money due or that may become due to the successful tenderer. The Company may also in lieu of such amendments deduct from any money due to the Successful tenderer, a sum to be determined by the Engineer equivalent to the cost of amending such works, and in the event of the amount retained under Clause 17 (the amount held as retention money) being insufficient, recover the balance from the Successful tenderer, together with expenses the Company may have incurred in connection therewith.

The Successful tenderer shall remain liable under the provisions of this clause notwithstanding the signing by the Engineer of any certificate or the passing of any bills.

38. FACILITIES TO OTHER CONTRACTOR:

The Contractor shall, in accordance with the requirements of the Engineer-in-Charge, afford all reasonable facilities to other Contractor engaged contemporaneously on separate contracts in connection with the works.

39. NOTICES TO LOCAL BODIES:

(i) The Contractor shall comply with and give all notice required under any Governmental authority, instrument, rule or order made under any Act of parliament, State laws or any regulation of bye laws of any local authority relating to the works. He shall before making any variation from the Contract drawing necessitated by such compliance give to the Engineer-in-Charge a written notice giving reasons for the proposed variation and obtain the Engineer-in-Charge's instruction therein.

(ii) The Contractor shall pay and indemnify the Company against any liability in respect of any fees or charges payable under any Act of Parliament, State laws or any Government instrument, rule or order and any regulations or bye-laws of any local authority in respect of works.

40. SUB-CONTRACT:

The Contractor shall not sublet any portion of the contract without the prior written approval of the Accepting Authority.

41. LIABILITY FOR DAMAGE, DEFECTS OF IMPERFECTION AND RECTIFICATION THEREOF:

If the Contractor or his workmen or employees shall injure or destroy any part of the building in which they may be working or any building, road, fence etc. contiguous to the premises on which the work or any part of it is being executed, or if any damage shall happen to the work while in progress the Contractor shall upon receipt of a notice in writing in that behalf make the same good at his own expenses. If it shall appear to the Engineer – in – Charge or his Representative at any time during construction or reconstruction or prior to the expiration of the Defects Liability Period, that any work has been executed with unsound, imperfect, or unskilled workmanship or that any materials or articles provided by the Contractor for execution of the work are unsound or of a quality inferior to that contract for, or otherwise not in accordance with the Contract, or that any defect, shrinkage or other faults have appeared in the work arising out of defective or improper materials or workmanship, the Contractor shall, upon receipt of a notice in writing in that behalf from the Engineer – in – Charge forthwith rectify or remove and reconstruct the work so specified in whole or part as the case may be and / or remove the materials or article so specified and provide other proper and suitable materials or articles at his own expense, notwithstanding that the same may have been inadvertently passed, certified and paid for and in the event of his failing to do so within the period to be specified by the Engineer – In – Charge in his notice aforesaid, the Engineer – In – Charge may rectify or remove and re-execute the work and / or remove and replace with other materials or articles / complained of, as the case may be, by other means at the risk of the Contractor.

42. MEASUREMENTS:

In case of dispute between the successful tenderer and the Company as to under which item a particular work is to be measured the decision of the Engineer shall be final and binding on both the parties to the contract. If for any items, the mode of measurements is not specified the decision of the Engineer about the mode of measurement shall be final and binding on both the parties to the contract.

43. PREPARATION OF RUNNING AND FINAL BILLS:

The Engineer or his representative shall take measurements in presence of Successful tenderers representative and record them in the Measurement Book from time to time and shall prepare abstract for running and final bill, including recovery statements. The bill abstract shall be prepared on standard CPWD form on the basis of abstract of quantities prepared by the Engineer in triplicate. The Successful tenderer should sign the bill and Measurement Book with the remark "Measurement and bill accepted", However, in the final bill, the successful tenderer shall have to certify "The bill is accepted in full and final settlement of all claims and demands against this work."

In case a large amount is blocked in the final bill pending technical/audit check, advance up to the extent of 75% of net final bill amount may be paid to the successful tenderer, with the approval of the Engineer at his direction even after the completion date is over.

The recovery from Running Account Bills for the materials issued by the Company shall be made on the basis of the quantity consumed in the work as assessed by the Engineer, giving a due allowance for wastage. The Successful tenderer shall submit once a month a statement showing the materials received, consumed and the balanced carried over the subsequent month so that a watch could be maintained on the material.

Final payment will be made within 03 (three) month on virtual completion of the entire work under the scope of work mentioned in the tender document and on submission of pre-receipted invoice along with all documents pertaining to warranty, test certificate etc. The payment for measurable items will be made on actual measurement basis (measurement will be taken physically by the Engineer of the Company and the authorised representative of the successful tenderer).

44. TERMS OF PAYMENT:

- All payments will be made on actual measurement/ work done basis.
- 60% payment of the ordered value will be made against delivery of materials/ equipment at site within 30 (thirty) days after submission of bills along with delivery challan and full detailed measurements and as certified by the Consultant/ CMD, Kolkata.
- 30% payment of the ordered value will be made against installation of materials/ equipment as per specifications and to the satisfaction of CMD, Kolkata within 30 (thirty) days after submission of bills along with delivery challan and full detailed measurements as certified by the Consultant/ CMD, Kolkata.
- 5% payment of the ordered value will be made against testing and commissioning of entire system as per specifications and to the satisfaction of CMD, Kolkata within 30 (thirty) days after submission of bills along with delivery challan and full detailed measurements as certified by the Consultant/ CMD, Kolkata.
- 5% on completion of total work in all respects and issuance of completion certificate etc.

45. MODE OF PAYMENT:

All payment shall be made through RTGS/NEFT from Creative Museum Designers, Kolkata office only and the Contractor shall submit the following details to the company :

Name of the company :

Name of Bank :

Name of Bank Branch	**:**	
City	**:**	
Account Number	**:**	
Account Type	**:**	
IFSC Code of the Bank Branch	**:**	
MICR Code of the Bank Branch	**:**	

46. RATES AND TAXES/DUTIES:

Quoted price in the bid shall include all taxes & duties, GST, freight F.O.R. site and transit insurance and related incidentals, labour cess etc. in respect of this contract and no additional claim beyond what has been quoted in the Financial Bid shall be accepted. Accepted tender rates shall not be changed due to changes in wages of labour. **Bidder must submit challan copy of GST as a proof of GST payment.**

The rates quoted by the successful tenderer shall be paid at net rates. He should include in his rates allowance for increase or decrease in the price due to market fluctuation.

The aforesaid rates would be subject to the following deductions as and if applicable at the rates in force at the time the bill is raised:

a. TDS under Income Tax Act.
b. Any other state taxes as applicable, Labour cess etc.
c. The raised bill should clearly and separately mention the following tax(es)
   GST

Nota bene: Tenderer should have obtained registration under the GST Act.

47. LABOUR CESS:

Labour Cess as applicable shall be deducted from each and every bill .

48. ROYALTY:

Payment of Royalty will be the responsibility of the Contractor within his quoted price every month the Contractor shall submit Royalty challan issued by the Competent Authority for Stone chips and Sand purchased by the Contractor and used in the job. It is mandatory for the Contractor to submit to the Company Royalty Certificate from the Mining Department before release of final bill payment due to him.

49. INSURANCE FOR DAMAGE TO PERSONS AND PROPERTY:

a. To execute the work, the successful tenderer shall obtain a **Contractors All Risk Policy** on contract value awarded to them.

b. The Successful tenderer shall be responsible for all injury to persons, animals or things and for all damages to property, structural and decorative, whether such injury or damage arise from carelessness or accident or in any way connected wherewith. This clause shall be held to include, interalia any damage

due to causes as aforesaid to buildings (whether immediately adjacent or otherwise) and to roads, streets, footpaths, bridges or ways as well as all damage caused to the buildings and works forming the subject of this contract by the inclemency of weather. The Successful tenderer indemnifies the Company and holds him harmless in respect of all expenses arising from such injury or damage to persons or property aforesaid and also in respect of any claim made in respect of Injury or damages consequent upon such claim.

c. The successful tenderer shall reinstate all damage of every sort mentioned in this clause, so as to deliver up the whole of the contract works complete and perfect in every respect and so as to make good and otherwise satisfy all claims for damage as aforesaid to the property or third parties.

d. The Successful tenderer also indemnifies the Company against all claim which may be made upon the Company during the currency of this contract by any employee or representative of an Employee of the agency or any sub-agency, employed by him, for any injury to or loss of life or such employees, or for compensation payable under any law for the time being in force to any workman or to the representative of any deceased or incapacitated workmen.

e. The Successful tenderer also indemnifies the Company in respect of any costs, charges and/or expenses, including legal costs as between Solicitor and client, occurring out of any award of compensation and/or damages consequent upon such claims.

f. The Company shall be at liberty and is hereby empowered to deduct the amount of any damages, compensation cost, charges and/or expenses arising or ascertaining from or in respect of any such claim and/or damages as aforesaid from any sum, or sums due to, or become due to the Successful tenderer.

50. WATER & ELECTRICITY:

Service water shall be provided by CMD without any cost implication. The drinking water is to be arranged by the tenderer themselves. Power cannot be provided by CMD for construction purpose. However, commissioning power shall be arranged by CMD. Contractor shall arrange for construction power from available resources/ alternate arrangement at site at their own cost.

51. LAND FOR SITE OFFICE, WORKSHOP & LABOUR COLONY:

CMD will provide land/ space for contractor's temporary office/ godown/ store within project premises only, subject to availability. But no land for labour/ worker hutment shall be provided by CMD.

52. ARBITRATION:

In the case of any disputes or differences arising out of or in connection with, or concerning this Agreement, it shall be settled by arbitration. The arbitration shall be conducted by an expert as Arbitrator in the field acceptable to both the parties. In case of disagreement, it shall be through three experts in the field, one to be appointed by each party and the third presiding expert to be jointly appointed by the expert referred to. The arbitration shall be as per the provision of the Arbitration and Conciliation (amendment) Act, 2015 and the decision of the penal so appointed shall be final and binding on both the parties to this Agreement. The place of arbitration shall be normally Kolkata or any other suitable place mutually agreed.

The provisions of the Arbitration and Conciliation Act 2015 or any statutory modification or re- enactment thereof and of the rules made there under for the time being in force shall apply to arbitration proceedings under this clause.

53. JURISDICTION:

In regard to all disputes or claims arising out of the contract of whatever nature, the place of jurisdiction shall be at Kolkata only.

54. OPENING OF WORK:

a. All works under or in course of execution or executed in pursuance of the contract shall at all times be open to the supervision of the Company, Engineer or their representatives.

b. The successful tenderer shall notify the Engineer in writing immediately after the trenches or excavations, as shown in the drawings, are executed or as soon as any ground is cut into which from the unexpected cause, appears to need immediate attention. After notifying the Engineer he shall await instructions which shall be given within seven days of receipt of such notice. If the successful tenderer puts in, any part of the foundations before he has notified the Engineer and received instruction, he shall be liable to reinstate all work that may subsequently at any time, be damaged on account of any defect or insufficient foundations. The Successful tenderer shall at the request of the Engineer, within such time as indicated by the Engineer, shall open up for inspection any other work and should the successful tenderer refuse or neglect to comply with such request, the Company through the Engineer may employ other workmen to open up the same. If the work has been covered up in contravention of Engineer's instruction, or if on being opened up, be found not in accordance with the drawings and specifications or the instructions of the Engineer, the expenses of opening up and covering it up again, whether done by the Successful tenderer or such other workmen shall be borne by or which may become due to the Successful tenderer or from the amount held as retention money. If the work has not been covered up in contravention of such instructions, and be found in accordance with said drawings and specifications or instructions, the expenses aforesaid shall be borne by the Company and shall be added to the contract sum provided always that in the case of foundations or of any other urgent work so opened up and requiring an immediate attention, the Engineer shall within seven days after receipt of written notice from the Successful tenderer that the work has been so opened, make or cause to make the inspection thereof and at the expiration of such time if such inspection shall not so have been made, the Successful tenderer may cover the same and shall not be required to open it up again, except at the expense of the Company.

55. HEIGHTS:

Successful tenderer's rates shall include lifts up to all heights given in drawings or as required during execution.

56. SCAFFOLDING:

The successful tenderer shall use external scaffolding to ensure true line in vertical and horizontal planes. Scaffolding required for execution of this work may vary from single floor height to multi floor heights, which may require multiple staging, scaffolding, centering and shuttering. Since the payments will be made to the successful tenderer at net quoted rates, irrespective of the heights involved the tenders must see and study the drawings carefully before tendering their rates.Contractor's quoted rates for concreting item shall deemed to be inclusive of all cost for RCC, Reinforcement steel, scaffolding, centering& shuttering, labour, supervision etc. as may be required for successful completion of the work.

57. SITE CLEARANCE AND CLEAN UP:

The Successful tenderer shall, from time to time clear away all debris and excess materials accumulated at the site.

After all fixtures, equipment and appliances have been installed and commissioned, they shall clean up the same and remove all plaster, paints, stains, stickers and other foreign matter of discolouration leaving the construction in ready to use condition.

On completion of all works, they shall demolish all temporary storages put up by them, remove all surplus materials and leave the site in a broom clean condition.

58. QUANTITY VARIATION:

All the quantities given in schedule of quantities are tentative only.

The tenderers shall be deemed to have given balanced Rate for each items, irrespective of the quantities given. Also irrespective of variation in quantities to any extent either positive or negative, the tenderer shall be paid at acceptable contract rates only till completion of work. The Company reserves the right to increase or decrease quantities of any or all items to any extent either positive or negative , for successful completion of work.

59. AUTHORITIES, NOTICES AND PATENTS:

The successful tenderer shall confirm to the provision of any Act of the Legislature relating to the works, the Regulations and Bye-Laws of any corporation and of any electric and other Companies and/or authorities with whose systems the structure is proposed to be connected, and shall, before making any variation from the drawings or specifications that may be necessitated by so confirming, give to the engineer written notice, specifying the variation proposed to be made and the reason for making it and apply for instruction thereon. If compliance with this clause involves any extra work not included in this contract, he shall specify these items of work and the allowance or extra payment required on their account. In case he shall not, within seven days, received such instructions, shall proceed with the work, conforming to the provision and/or regulations of bye-laws in question.

The amount claimed as an extra or whether there is an extra or not shall be decided by the Engineer and will be subject to arbitration clause is so required.

The successful tenderer give all notices required by the said regulations or bye-laws to be given to any authority and pay to such authority or to any public office all fees that may be properly chargeable in respect of the works and lodge the receipts with the bill.

The successful tenderer shall indemnify the Company against all claims in respect of patent rights, and shall defend all action arising from such claims and shall himself pay all royalties, license fees, damages, cost and charges of all and every short that may be legally incurred in respect thereof.

60. CERTIFICATES AND PAYMENTS:

a. The Engineer may from time to time intimate in writing to the Successful tenderer that he requires the works to be measured and they shall attend or send qualified agent to assist the Engineer or the Engineer's representative in taking such measurements, and calculations and to furnish all particulars or to give all assistance required by the Engineer. Should they not attend or neglect or omit to send such agent then the measurement taken by the Engineer or approved by him shall be taken to be correct measurements of the work unless objected to within one month of their being recorded in the

measurement book or books. Such measurements shall be taken in accordance with the mode of measurements mentioned in the specifications.

b. The Successful tenderer or his agents may at the time of measurement take such notes of measurements as they may require.

c. The Engineer or his authorised representative will issue on the basis of necessary measurement interim valuation certificates to the Successful tenderer in respect of items of work, rates for which exist in the priced schedule of quantities or have been subsequently agreed upon between the parties, and shall send the measurement books and the valuation certificates to the Company, The Successful tenderer shall be entitled under these certificates of the Engineer to payments, within 15 days from the date of each certificate. unless objected as provided in sub-clauses (a) &(b) at the rate of maximum 90% (ninety percent) of the value of work so executed and the balance being retained towards retention money. The engineer shall issue such certificates within fifteen days of notice from the Successful tenderer provided measurements have been taken and the value of the work done since last payment exceeds the amount stated in the appendix and not more than one certificate is required in a fortnight, provided always that the issue by the Engineer of any certificate during the progress of the work or after their completion shall not have any effect as a certificate of satisfaction or relieve the Successful tenderer from his liability under Clauses 37 and 54. Provided all defects are removed and the retention money is not forfeited or has not become liable to beforfeited under this contract, entire amount under retention money shall be refunded without interest after the completion of defect liability period or the final bill is passed for payment whichever is later.

d. All intermediate payments shall be recorded as payments by way of advance against the final payment only and not as payment for work actually done and completed. The final bill shall be submitted by the Successful tenderer within 3 months of the date fixed for completion of the work. The measurement of the work taken by the Engineer or his representatives after one week's notice to the Successful tenderer shall be final and binding on him unless objected to within one month of their being recorded in the measurement books.

e. The Company may in consultation with the Engineer, but absolutely at his discretion, make an advance payment on account, which will be merged in the next intermediate payment, based on measurements.

f. Advance for materials brought to site: The Successful tenderer shall execute a bond in favour of the Company in the prescribed format attached hereto for each advance or intermediate payment received by him. If the Successful tenderer commits any default in the terms of the said bond and he fails to pay the bond amount, the Company shall have the power to.

   i. Seize and utilise the said materials or any part thereof for the completion of the works.
   ii. Remove and sell by public auction the materials seized or any part thereof, and out of the proceeds of the sale, retain all sums repayable to the Company together with interest thereon at the rate prescribed by Govt. of India from time to time for capital outlays.
   iii. Deduct all or any part of moneys owing from out of the retention money or any other sum or sums due to the Successful tenderer under this agreement.

g. The Successful tenderer agrees that before final payment shall be made on the contract, he will sign and deliver to the Company either in the measurement books or otherwise as required, a valid release and discharge certificate from any and all claims and demands whatever from the company for all matters arising out of or connected with the contract.

61. TIME AND DAMAGES FOR NON-COMPLETION OF WORK IN TIME:

a. All the construction works shall progress strictly as per the enclosed CPM/PERT/BAR CHART. If however, the Successful tenderer desires some minor modification time and before execution of the agreement indicating the reasons for which changes are required. The Company may after scrutiny, agree to the modifications suggested if the reasons Cited by the successful tenderer areconsidered valid. The decision of the consideration of the company in this respect will be final and binding. The modifications, if any, are to be incorporated in the CPM/PERT/BAR CHART and this will form a part of the agreement.

b. The starting time specified for carrying out of the work as entered in the CPM/PERT/BAR CHART shall be reckoned from the date of issue of the Letter of Intent. The date of completion or such date as is duly extended under Clause 62 shall be strictly observed by the Successful tenderer. The work shall, throughout the stipulated period of the contract, be proceeded with all diligence (Time being deemed to be the essence of this Contract) by the successful tenderer strictly according to the CPM/PERT/BAR CHART which is a part of this agreement.

c. At any stage during the execution of the work if the work lags behind the target indicated in the CPM/PERT/BAR CHART for reasons directly attributable to the Successful tenderer, he shall be liable to pay as agreed liquidated damages equivalent to half percent of the total cost of work awarded every week for the period the work lags behind the CPM/PERT/BAR CHART subject to a maximum of 10% of thecontract valueawarded or gross value of work done, whichever is greater.

d. In the event of Successful tenderer's inability to complete the SITC of HVAC System work by the scheduled date of completion, the Company shall have the right to terminate the contract as per Clause 65 or allow the successful tenderer to continue and complete the work within specific date. In the latter case, during the period of continuation, the successful tenderer shall pay as agreed liquidated damage equivalent to one per cent of the total cost of work awarded for every week that the work remains unfinished subject to a maximum of 10% of thecontract value awarded or gross value of work done, whichever is greater.

62. EXTENSION OF TIME:

If the successful tenderer shall desire an extension of time for completion of the work on the grounds of his having been unavoidably hindered in its execution and for reasons not attributable to him on the following grounds:

a. by reason of any exceptionally inclement whether like Cyclone, severe flood etc., normal monsoon shall not be considered a valid reason for extension of time,
b. by reason of proceedings taken or threatened by, or legal disputes with adjoining or neighbouring owners,
c. due to delay in the work of other agencies or tradesman engaged or nominated by the Company: if such delay is directly responsible for delay in execution of this work,
d. by reason of any general strike or lockout affecting the building made, strike or any kind of labour trouble in successful tenderer's own organisation shall not be a valid reason for extension.
e. in the event of delay in execution of work wholly attributable to delay in supply of drawings by Architect or the Company in spite of request from the successful tenderer well in advance, he shall apply in writing to the Engineer within seven days of the date of the hindrance on account of which he desires such extensions as aforesaid and the engineer, with the consent of the Company may if the reasonable ground be shown therefore allow such extension of time, if any, be necessary or proper,
f. in case of the total value of the work exceeds thecontract value owing to deviation in quantities or extra items, the successful tenderer will be entitled to ask for extension of time in proportion to the increased value of work.

g. No extension of time shall be given to the successful tenderer for non-supply or delay in supply of of materials / equipment.The successful tenderer hereby agrees that extension of time requested for by him and granted by the Company shall be treated as an extension of time allowed to them without any claim for compensation or damages for any reasons whatsoever including those for which the extension is granted.

If the works be delayed by:

a. Force majeure or
b. Abnormally bad weather, or
c. Serious loss or damage by fire, or
d. Civil commotion, local combination of workmen, strike or lock out affecting any of the trades employed on the work, or
e. Delay on the part other Sub-Contractors of tradesman engaged by Company in executing work not forming part of the contract, or
f. Non-availability of stores, which are the responsibility of Company to supply, or
g. Non-availability or break-down of tools & plants to be supplied or supplied by company, or
h. Any other cause which in the absolute discretion of Engineer-in-charge is found as beyond the Sub-Contractor's control, then upon the happening of any such event causing delay, the Sub-Contractor shall immediately give notice thereof in writing to the Engineer-in-charge but shall nevertheless use constantly his best Endeavour's to prevent or make good the delay and shall do all that may be reasonably required to the satisfaction of the Engineer-in-charge to proceed with the works.

63. SUSPENSION OF WORK BY THE SUCCESSFUL TENDERER:

If the successful tenderer suspends the works without obtaining extension of time or in the opinion of the Engineer neglects or falls to •proceed with due diligence in executing his part of the contract or if he makes default more than once in the manner mentioned in Clause 37 above the Company or the Engineer shall have the power to give notice in writing to the successful tenderer requiring that the work be proceeded with reasonable speed and output must be commensurate with the CPM/PERT/BAR CHART. Such notice shall specify the act of default on the part of the successful tenderer. After such notice has been given the Successful tenderer shall not be at liberty to remove from the site of work or from any ground continuous thereto any plant or materials belonging to him which had been placed thereon for the purpose of the work, and the Company shall have a lien upon all such plants and materials to subsist from the date of such notice being given, until the notice have been complied with. Provided always that such lien shall not under any circumstances subsist after the expiration of thirty-one days from the date of such notice being given, unless the Company has entered upon and taken possession of the works and site and of all such plants and materials until the works have been completed under the power hereinafter conferred upon it. If the Company exercises the above power it may engage any other agency to complete the works or finish the works departmentally and exclude the successful tenderer, his agents and servants from entry upon or access to the same except that the successful tenderer or any one person appointed in writing by him and accepted by the Company may have access at all reasonable' times during the progress of works to inspect, survey and measure the works. Such written appointments marked with the Company consent or a copy thereof shall be delivered to the Engineer before the person so appointed comes to the works. The Company shall take such steps as. in the opinion of the Engineer may be reasonable and necessary for completing the works without undue delay & expense, using that purpose the plants and materials above mentioned, in so far as they are suitable and adopted to such use. Upon the completion of the work the Engineer shall certify the amount of expenses properly incurred, consequent on the Incidental to the default of the successful tenderer as aforesaid, in completing the works by other persons. Should the amount so certified as the expenses properly incurred, including the Company overhead if the works were carried out departmentally, be less than the amount which would have been due to the Successful tenderer upon the completion of the works by him, the difference shall be paid to the Successful tenderer by the Company. Should the amount of the former exceed the later,

the difference shall be paid by the Successful tenderer to the Company. The Company shall not be liable to make any further payment or compensation to the Successful tenderer for or on account of the proper use of the plants for the completion of the works under provisions hereinbefore contained other than such payment as is included in the contract price. After the works have been so completed by persons other than the successful tenderer under the provisions hereinafter contained, the Company shall give notice to the Successful tenderer of such completion and may require him from time to time, before and after such completion, to remove his plants and likewise all such materials as aforesaid as may not have been used in the completion of the works, from the site. If such plants and materials are not removed within such reasonable time, the Company may remove and sell the same, holding the proceeds, less the cost of the removal and sell, to the credit of the successful tenderer. The Company shall not be responsible for any loss sustained by the successful tenderer from the sale of plants in the event of the successful tenderer not removing it after notice, or for any damage thereto or deterioration thereof in any event.

64. DETERMINATION OF CONTRACT BY THE CMD:

If the successful tenderer goes into liquidation, whether voluntary or compulsory or shall make an assignment or a composition for the benefit of the greater part, or shall enter into a Deed of Agreement with its creditors or if the Receiver of the Successful tenderer shall be unable, within fourteen days after notice to him requiring him to do so, to show to the reasonable satisfaction of the Company that he is liable to carry out and fulfil the contract and if so required by the Company to give reasonable security therefore or if the successful tenderer shall suffer execution to be issued or shall suffer any payment under this contract to be attached by or on behalf of any of the creditors or the Successful tenderer or shall assign, charge or encumber this charge or encumber this contract thereunder or shall neglect or shall fail to proceed to perform all or any of the act, matters or things by the contract, to be observed and performed by the successful tenderer for three clear days after written notice shall have been given the successful tenderer in manner, matter hereinafter mentioned, requiring the successful tenderer to observer perform the same or shall use improper material or workmanship in carrying on the works or shall in the opinion of the Engineer not exercised such due progress as stipulated in the enclosed CPM/PERT/BAR CHART forming part of this contract which would enable the works to be completed within the time agreed upon or shall abandon the contract, then, and in any of said case the Company may notwithstanding any previous waiver, determine the contract by a notice In writing in which case the retention money (Including the earnest money and the initial security deposit) and whether paid in one sum or deducted by instalment shall stand forfeited and be absolutely at the disposal of the Company.The Successful tenderer shall have no claim or compensation for any loss sustained by him by reasons of his having purchased or procured any materials or entered into any engagements or made advances on account of or with a view to the execution of the work or the performance of the contract. The successful tenderer shall not be entitled to recover or be paid any sum for any work actually performed under the contract unless and until the Engineer will have certified in writing the performance of such work and the value of work payable in respect thereof and the successful tenderer shall only be entitled to be paid the value so certified, The certificate of the Engineer shall be based on measurements taken by him or under his supervision and with due notice to the Successful tenderer and on rates in the priced schedule or as subsequently communicated by the Engineer with the approval of the Company, under this agreement except for arithmetical errors, shall be final and conclusive. The Successful tenderer must remove his plant, materials, scaffolding etc. from the site within 10 days (ten days) of the receipt of the notice from the Company after which they will vest in the Company who may dispose them off as per Clause 63 by sale or auction on account of and at the risk of the successful tenderer who will have no claim for loss or compensation on this account.

65. TERMINATION OF CONTRACT BY SUCCESSFUL TENDERER:

If payment of the amount payable by the Company under the certificate of interim payment issued by the Engineer in accordance with Clause 60 shall be in arrears and unpaid for sixty days after notice in writing

requiring payment of the amount shall have been given by the Successful tenderer tothe Company in manner hereinafter mentioned or if work be stopped for six months under the order of the Company for any reason not connected with any default on the part of the Successful tenderer or by any injunction or other order of any court of law made for any reasons not connected with any such default on the part of the successful tenderer then and in any of the said cases the successful tenderer shall be at liberty to terminate the contract by notice in writing to the Company and he shall be entitled to recover from the Company payment for all works executed and for useful materials (but not plants) purchased for the purpose of the contract and is brought to the site. In arriving at the amount of such payment, the net rates contained in the successful tenderer's tender shall be followed, or where the same may not apply, rates proportional to the prices therein contained. Rates for materials may be determined by the Engineer on actual vouchers produced by the successful tenderer and/or prevailing market rates at the discretion of the Engineer. The Successful tenderer shall not be entitled to recover or be paid any sum for any work actually performed under the contract, unless and until the Engineer has certified in writing the performance of such work and the value payable in respect thereof and the successful tenderer shall only be entitled, to be paid the value so certified. The certificate of the Engineer shall be based on measurements taken by him or under his supervision after due notice to the successful tenderer and shall be final and conclusive except for arithmetical errors. The successful tenderer must remove his plant, materials, scaffolding etc. from the site within ten days or such time as may be extended by the Company in writing, from the receipt of the notice from the Company after which they will vest in the Company who may dispose them off as per Clause 64 by sale or auction on account of and at the risk of the successful tenderer who will have no claim for loss or compensation on this account.

66. COMPENSATION:

All sums payable by way of compensation or liquidated damage under any of these conditions shall be considered as reasonable compensation to be applied to the use of CMD without reference to the actual loss or damage sustained and whether or not any damage shall have been sustained.

67. DISMISSAL OF WORKMEN ETC.:

The Successful tenderer shall on the request of the Engineer immediately dismiss from the works any person employed thereon who may, in the opinion of the Engineer be unsuitable or incompetent or who may in the opinion of the Company or the Engineer misconduct himself and such person shall not be again employed or allowed on the works without the permission of the Engineer and/or the Company.

68. ASSIGNMENT OR SUBLETTING OR BRIBES:

a. This contract shall not be assigned or sublet without the written approval of the Company. If the Successful tenderer shall assign or sublet this contract, or attempts to do so or become insolvent or commence insolvency proceedings or make any composition with his creditors or attempt to do so, or if any bribe, gratuity, gift, loan, pre-requisite award, reward or advantage pecuniary or otherwise, shall either directly or indirectly be given, promised or offered by the Successful tenderer any of his servants or agents to any officer of the Company or to persons who shall become in any way directly or indirectly interested in the Contract, the Company may thereupon by notice in writing rescind the contract and the retention money of the Successful tenderer shall thereupon stand forfeited and be absolutely at the disposal of the Company, and the same consequences shall ensure as if the contract had been rescinded under Clause 64 thereof and (in addition) the Successful tenderer shall not be entitled to recover or to be paid for any work therefore actually performed under the contract.

b. The whole of the works including the contract shall be executed by the Successful tenderer and he/they shall not directly or indirectly transfer or assign or underlet the contract or any part, share or interest therein nor shall he take a new partner without the written consent of the Company and no subletting shallrelieve the Successful tenderer from the full and entire responsibility of the contract or from active superintendence of the works during the progress.

69. NOTICE:

Notice for the Company, the Engineer or the Successful tenderer may be served personally or sent by registered post addressed to the office of the Company or the last known place of business of the Engineer and the Successful tenderer or in the case of the successful tenderer also be being left on the works. Any notice sent by registered post shall be deemed to be served at the time when in the ordinary course of post it would be delivered.

70. APPOINTMENT OF APPRENTICES AS PER APPRENTICES ACT:

The Successful tenderer shall during the currency of the contract when called upon by the Engineer engage and also ensure engagement by sub-agencies and other employed by the successful tenderer with the works such number of apprentices in categories mentioned below and for such periods as may be required by the Engineer. The Successful tenderer shall tram them as required under the Apprentices Act 1961 and the Rules made thereunder and shall be responsible for all obligations of the Company under the said act including the liability to make payments to apprentices as required under the said Act.

- In respect of Civil Works

Building Construction : One apprentice for every 7 persons engaged in this category

- In respect of Electrical Works

Wireman : One apprentice for every 7 persons engaged in this category

The Successful tenderer shall comply with the provision of Apprentices Act 1961 and Rules and Orders issued hereunder from time to time.

If the Successful tenderer fails to do so, his failure will be deemed to be a breach of contract and the Company reserves the right to cancel the contract. The Successful tenderer also shall be liable to any pecuniary liability arising on account of any violation by him of the provisions of the Act.

71. QUALITY MANAGEMENT SYSTEM:

The contractor shall prepare and submit draft Project quality plan/quality assurance plan, based on relevant I.S. Codes, contract specifications etc. as applicable for successful completion of the work, for the Engineers review,comments(if any) and approval within 21 days on award of the contract. The Engineer shall review Project quality plan/quality assurance plan and provide any comments to the contractor within 14 days after receipt of such draft. Within 7 days after receipt of Engineer's comments the contractor shall implements such comments and resubmit the Project quality plan/quality assurance plan to the Engineer for approval. These procedures shall repeat till approval of the Engineer.

The contractor shall follow and comply with the approved Project quality plan/quality assurance plan and shall not amend it without prior written consent of the Engineer. The Engineer or his representative at any

time during performance of the work, may conduct a compliance audit with respect to the Project quality plan/quality assurance plan. If such audit demonstrates noncompliance with any aspect of the quality assurance plan, the Engineer may notify the contractor of such non compliance and the contractor shall promptly undertake appropriate remedial action, at contractors sole risk, cost and expense.

72. NEGOTIATION:

CMD, Kolkata will not enter into any negotiations even with the Lowest Tenderer.

73. AGREEMENT:

The successful Tenderer has to enter into an Agreement with CMD, Kolkata in Nonjudicial Stamp Paper of Rs. 100/- (Rupees One Hundred Only) before commencement of works.

All documents forming the Contract are to be taken as mutually explanatory of one another. In case the bidder requires any clarifications or further information, may contact

Head of Engineering - Civil,
CREATIVE MUSEUM DESIGNERS
NCSM Campus, 33, Block-GN, Building-II
Bidhan Nagar, Sector –V, Kolkata – 700091
Phone No.: 033 2357 6041
Email: cmd.ncsm.civil@gmail.com

NOTES ON HVAC INSTALLATION WORKS

The Tenderers shall carefully go through the drawings, various clauses of the tender, technical specification, BOQ etc. and shall make his offer comprehensive to fulfil all of them and to complete the work in true sense. Beyond the unit prices, no extra amount will be paid on any ground.

I. **The quantities shown in the SOQR are only probable & indicative and actual quantities of work may vary to any extent**, which the successful Tenderers may please ascertain before procuring material. No change in accepted unit rates will be admissible on variation of quantities of items to any extent on either side.

II. The quoted rates shall be inclusive of all taxes & duties; cost of all materials & accessories for erection, connections, testing, commissioning; required labour including skilled manpower for execution and supervision of the work; tools, tackles, plant & machineries required for the work including their transportation; etc. All contingencies, breakage, wastage, sundries, scaffolding, etc. complete shall also be taken care by the bidders in their quoted rates till satisfactory completion of work and handing over.

III. **The works shall be carried out as per the latest relevant CPWD specifications for electrical works, all relevant IE rules & regulations & BIS recommendations**. The quoted rates shall include for carrying out all works as per relevant standards and specifications whether so is specifically mentioned or not.

IV. All expenses towards mobilization & demobilization of site including workforce, material, clearing of site, etc. shall be deemed to be included in the quoted rates.

V. All material to be used in the work including their makes apart from those mentioned in the **''List of Approved/ Acceptable Makes of Material''** shall be subject to approval & acceptance of the Engineer-in-Charge/ Competent Authority.

VI. **The contractor shall be responsible for protection of the Underground Electrical, Telephone & other cables, water lines and other services while working at the site**. Any damage whatsoever done to such services shall be made good by the contractor at his cost.

VII. The contractor shall take all necessary precautions for the safety including in the electrical safety of all workers while working and their health as special protection & precautions are necessary in such works.

VIII. Only the specified/ acceptable makes of material shall be used in the work. For any kind of deviation from those mentioned in the tender in respect of makes of material and/or catalogue numbers as in the SOQR, a prior approval of the Engineer-in-charge/ Competent Authority must be taken.

IX. Beyond the unit price no extra payment will be made on any account.

SPECIAL CONDITIONS OF THE CONTRACT

1.0 INTRODUCTION:

1.1 These Special Conditions of Contract shall be read in conjunction with the General Conditions of Contract, specifications of works, drawings and any other document forming part of this contract wherever the context so requires.

1.2 Notwithstanding the sub-division of the document into these separate sections and volumes, every part of each shall be deemed to be supplementary of every other part and shall be read with and into the contract so far as it may be practicable to do so.

1.3 The workmanship shall satisfy the relevant Indian Standards, the Technical Specifications contained herein and codes referred to. Where the job specifications stipulate requirements in addition to those jobs contained in the standard codes and specifications, these additional requirements shall also be satisfied. In absence of any standards/ specifications/ codes of practice for detailed specifications covering any part of the work covered in this tender, the instructions/ directions of Engineer-in-charge will be binding on the Contractor.

1.4 Where any portion of the General Conditions of Contract (GCC) is repugnant to or at variance with any provisions of the Special Conditions of Contract, then unless a different intention appears, the provision(s) of the Special Conditions of Contract shall be deemed to override the provision(s) of General Conditions of Contract (GCC) only to the extent that such repugnancies of variations in the Special Conditions of Contract are not possible of being reconciled with the provisions of General Conditions of Contract (GCC).

1.5 Without prejudice to the provisions of the General Conditions of Contract, whenever in the Bidding documents it is mentioned or stated that the Contractor shall perform certain work or provide certain facilities it is understood that the Contractor shall do so at his own cost and the Contract price shall be deemed to have included cost of such performance and/or provision, as the case may be.

1.6 In the absence of any Specifications covering any work(s), the same shall be performed /executed in accordance with standard Engineering Practice as per the instructions/directions of the Engineer-in-Charge, which will be binding on the Contractor

2.0 ACCOMPANIMENT TO TENDER:

The tenderer will attach to the Tender, at the time of submission, a statement containing information on the following points on separate proforma, the list of all the materials to be used as per specifications along with manufacturer's name, catalogue and other technical details.

3.0 INTENT:

It is the intention of the specification and drawings to call for finished work, tested and ready for operation. Whenever the words "Supply" or "Provide" are used, it shall mean delivery of material as specified in an assembled manner, ready for installation. Any apparatus, material or work not shown on drawings but mentioned in the specification or vice versa, or any incidental accessories necessary to make the work complete and perfect in all respects and ready for operation, even if not particularly specified, shall be furnished, delivered and installed by the contractor without additional expenses to CMD. Minor details not usually shown or specified, but necessary for the proper installation and operation, shall be included in the work and in the contract.

4.0 INTERPRETATION OF PROJECT DOCUMENTS:

- The Specification, Drawings, and Bill of quantity shall be interpreted in accordance with good installation practice defined in the appropriate regulations and standards whether specifically referred to or not. If there is any discrepancy or shortfall in the application of the regulations to any aspect of this contract or the contractor considers there is anything detrimental to the standards or inconsistent

with his obligations and guarantees, CMD shall be informed prior to signing the contract and shall thereafter inform the contractor in writing the course to be followed. Where the drawings are to a small scale or are expressed in symbolic terms or are in the form of a diagram, then exact location of items shall not be inferred and in all cases, the work shall be fully integrated with the work of other trades and with the fabric of the building. The contractor shall appraise the duties of all plants and equipments taking account of any additions or variations and shall inform the CMD/Consultant of any matters which may affect the design. In all cases the equipment installed shall be of appropriate rating for the duty it performs.

- The Specifications and Bill of quantity shall be considered as part of this contract and any work or material shown on BOQ and not called for in the specification or vice versa, shall be executed as if specifically called for in both. The Drawings indicate the extent and general arrangement of the HVAC Equipment Layout etc. and are essentially diagrammatic.
- The work shall be installed as indicated on the drawings, however, any minor changes found essential to coordinate the installations of this work with other services shall be made without any additional cost to the CMD. The drawings are for the guidance of the contractor, exact locations, distances and levels will be governed by the building. The contractor shall examine all structural and electrical drawings before starting the work, and report to CMD/Consultant or its representative, any discrepancies which in his opinion appear on them, and get them clarified.

5.0 LOCATION AND ACCESS OF SITE:

The Project Site is located at Govt. Polytechnic Campus, Dumka, 15.0 M Dia. Dome Planetarium, Jharkhand. The Site is well connected by Rail and Road from other parts of India. Nearest Airport is at Deoghar.

6.0 These 'Technical Specification and Special Conditions' shall be read in conjunction with other provision including General Conditions of the Contract and are supplementary to & complementary with each other. However, in the event of any provisions of General Conditions are repugnant to or at variance with any provisions of 'Technical Specification and Special Conditions', then unless a different intention appears between the two, the provision given in 'Technical Specification and Special Conditions' shall be deemed to over-ride that provision of General Conditions and shall to the extent of such repugnancy or variation prevail & govern the Contract.

7.0 TIME SCHEDULE:

4.1 The work shall be executed strictly as per Time Schedule as provided in Clause 20 of General Conditions of Contract (GCC).

4.2 CONTRACTOR shall furnish a daily report on category wise labour deployed along with the progress of work done on previous day in the proforma prescribed by the Engineer-in-Charge.

8.0 SEQUENCE OF WORK:

Contractor shall plan the sequence of all works so as to achieve the desired progress keeping in mind overall safety and quality at all points of time.

If due to a particular design or specification or availability of machines or any other reason, a particular sequence of operation is demanded by the engineer due to which some interruptions are inherent to any one or more types of work or items of execution, then no claim for such interruption shall be entertained and contractor shall have to follow the sequence as instructed by the engineer.

9.0 PREPARATION OF BID:

Bidder is advised to visit and examine the site and its surrounding and shall familiarize himself of the existing facilities and environment and shall collect all other information which he may require for preparing and submitting the bid and entering into the contract. Claims and objection due to ignorance of existing conditions

or inadequacy of information will not be considered after submission of the bid and during implementation.

10.0 SCOPE OF WORK:

- The work to be carried out under this contract comprises of the HVAC work for Design, manufacture, Supply at site, Installation, Testing and Commissioning of HVAC System both low and high side. The work covered under this contract comprises of SITC of the HVAC System commencing from point of electric power supply within the project site as per specifications, relevant ASHRAE standards & Code of practice.
- The contractor shall carry out and complete the said work under this contract in every respect in conformity with ASHRAE Standards and with the directions of and to the satisfaction of the Consultant / CMD. The Contractor shall furnish all labour and install all materials, appliances, equipment (except those items which will be supplied by CMD to the contractor at site), necessary for complete provision and testing of the whole HVAC System.
- Design, Supply, Installation, Testing and Commissioning as specified herein and shown on the drawings. This also includes any material, appliances, equipment not specifically mentioned herein or noted on the drawing as being furnished or installed but which are necessary and customary to make complete installation with all outlets for HVAC systems shown in the schedule or described herein, properly connected and in working order.
- The work shall include all incidental jobs including making good connected with HVAC System installation cutting/drilling holes through walls/floors and grouting for fixing of fixtures, equipment etc. Chiselling in principal structure is not permitted. In general, the work to be performed under this contract shall comprise of the following:-
- HVAC System Comprises of : Air conditioning System consisting of Air Cooled Scroll Chiller Units as specified in the design & drawings, AHUs, Duct work etc. both high side & low side works, electrical panelling etc.
- Any extra item not mentioned in the SOQR shall be calculated on the rate analysis basis approved by CMD.

The Contractor shall carry out and complete the said work in every respect in accordance with this Contract and with the directions of and to the satisfaction of the Employer. The Employer may in his absolute discretion and from time to time issue further drawings and/or written instructions, details, directions and explanations, which are hereafter collectively referred to as ”Employer’s Instructions” in regard to :

a) The variation or modification of the design, quality or quantity of works or the addition or omission or substitution of any work.
b) Any discrepancy in the Drawings or between the Bill of quantities and/or Drawings and/or Specifications.
c) The removal from the site of any materials brought thereon by the Contractor and the substitution of any other material thereof.
d) The removal and/or re-execution of any works executed by the Contractor.
e) The dismissal from the works of any persons employed thereupon.
f) The opening up for inspection of any work covered up.
g) The amending and making good of any defects.

The Contractor shall forthwith comply with and duly execute any work comprised in such Employer’s instructions provided always that verbal instructions, directions and explanations given to the Contractor or his representatives upon the works by the Employer shall, if involving a variation, be confirmed in writing by the Contractor within seven days, and if not dissented from in writing within a further seven days by the Employer, such shall be deemed to be Employer’s instructions within the scope of the Contract.

The capacities of various equipment mentioned in the B.O.Q/ summary of capacity sheet (excel Sheet) are the actual capacity required at the specified duty conditions.

11.0 SITE CLEANING:

1. The Contractor shall clean and keep clean the work site from time to time to the satisfaction of the Engineer- in-Charge for easy access to work site and to ensure safe passage, movement and working.

2. If the work involves dismantling of any existing structure in whole or part, care shall be taken to limit the dismantling up to the exact point and/or lines as directed by the Engineer-in-Charge and any damage caused to the existing structure beyond the said line or point shall be repaired and restored to the original condition at the Contractor's cost and risks to the satisfaction of the Engineer-in-Charge, whose decision shall be final and binding upon the Contractor.

3. Contractor shall be the custodian of the dismantled materials till the Engineer-in-Charge takes charge thereof.

4. Contractor shall dispose off the unserviceable materials, debris etc. out of the project premises.

5. Contractor shall sort out, clear and stack the serviceable materials obtained from the dismantling/ renewal at places as directed by the Engineer-in-Charge.

6. No extra payment shall be paid on this account. The rates quoted in SOQR are deemed to be inclusive of all the costs towards all the above activities as well.

7. The tenderer shall note that no Sub-Contractor shall be engaged by them for the above work.

8.1 If due to a particular design or specification or availability of materials or any other reason, a particular sequence of operation is demanded by the engineer due to which some interruptions are inherent to any one or more types of work or items of execution, then no claim for such interruption shall be entertained and contractor shall have to follow the sequence as instructed by the Engineer-in-Charge.

8.2 Contractor may work beyond normal working hour, and also on Sunday and Holidays (with prior approval from CMD / Consultant) as desired by CMD to maintain progress of work as per schedule without any additional liability to CMD. The Contractor shall give priority or redeploy the work force for a particular work as instructed by CMD.

8.3 All materials shall be stored and stacked properly ensuring that place is properly drained and is free from dirt. It shall be ensured that no damage is caused due to improper stacking.

8.4 CMD / Consultant shall have free access at all times to those parts of Contractor's area of work which are concerned with their works. Also he shall be afforded all reasonable facilities at all stages of preparation, fabrication for satisfying himself that the fabrication is being undertaken in accordance with the provisions of relevant specification.

12.0 ACTUAL ROUTE OF CU PIPING / DRAIN PIPING:

The location of the Chiller Units , AHU, ducting work , Refrigerant piping etc. are indicative only, therefore, the actual route of piping and the location may differ from the plans according to the details of the building construction and the conditions of executions of the installations. The contractor shall supply and install at his expense all secondary materials and special fittings found necessary to overcome the interference and to supply the modifications on the route of ref. piping that are found necessary during the work, to the complete satisfaction of the CMD / Consultant representative.

13.0 INSPECTION AND TESTING:

CMD/ Consultant representative reserves the right to request inspection and testing at manufacturer's works at all reasonable times during manufacture of items for this contract. Tests on site of completed works shall demonstrate, among other things:

- That the equipment installed complies with specification in all particulars and is of the correct rating for the duty and site conditions.
- That all items operate efficiently and quietly to meet the specified requirements.
- That all the features performed at its best and loading / unloading of the system.
- That all the accessories used in low side work are of specified make only. And any deviation in the same needs written approval from our technical consultant.
- The contractor shall provide all necessary instruments and labor for testing, shall make adequate records of test procedures and readings, shall repeat any tests requested by the CMD and shall provide test certificates signed by a properly authorized person. Such test certificates shall cover all works. If tests fail to demonstrate the satisfactory nature of the installation or any part thereof then no claims for the extra cost of modifications, replacements or retesting will be considered. CMD/ Consultant's decision as to what constitutes a satisfactory test shall be final.
- Before delivery of the equipment to site, the equipment will be inspected at the discretion of the client and tested for various parameters as detailed in this specification by the client's Engineer at the manufacturer's works and then cleared for shipment. This will however, not in anyway absolve the contractor of his responsibility for the continued performance of the system/components after erection & commissioning at the designated site during the period of defects liability.
- Tenderers are advised to confirm whether a fully equipped ARI/AHRI certified test bed for establishing the unit capacity is available in India, to enable testing by client's engineer if such a facility is not available in India, the Factory Acceptance Test will be conducted at the manufacturers works abroad. For this purpose tenderers should quote separately against the item indicated in Part II of the tender for Cost of testing of each unit.
- On-site testing shall be conducted during the summer season /monsoon season to ensure that the machine performance continues to be in keeping with the contracted performance parameters for which the contractor shall make necessary provisions during installation which will enable testing of the machines.
- Chiller units shall be tested at manufacturer's works and at site jointly with the contractor and the client's Engineer as required by the various sections of the specifications.

14.0 SECURITY DEPOSIT/ PERFORMANCE BANK GUARANTEE:

Please refer Clause 17 of General Conditions of Contract (GCC)

15.0 QUOTATION:

15.1 Contractor shall indicate his price as per Scope of Work and SOQR given in Tender Document.

15.2 The enclosed bid documents are deemed to be sufficient for the bidder to assess the nature and quantity of work involved and to quote his prices for the above job. No deviations from the bid documents will be admissible.

16.0 PROGRAMME:

A monthly time bar chart for various activities like supply, fabrication, transportation to site, welding, Installation, Fixing & Laying, Testing & Commissioning etc. giving starting and completion dates of all activities, shall be submitted after awarding of the job for approval of CMD.

17.0 RULES & REGULATIONS OF SAFETY, ELECTRICITY BOARDS ETC.:

The Contractor shall at all times comply with all relevant acts, electricity rules, safety regulations etc. as per statutory regulations of Central / State Government & Plant Authorities/ JBVNL.

18.0 EXTRA ITEMS:

Please refer Clause 19 of General Conditions of Contract (GCC).

19.0 Following Points to be considered by the Contractor while quoting his offer

Any additional work, if required, will be undertaken by them after getting instruction in writing from the Engineer-in-Charge. For settlement of their claims on any additional work, the contractor will keep joint record of the measurements of such work duly certified by the Engineer-in-Charge.

20.0 MAINTENANCE & GUARANTEE:

Commencing from the date of issue of final acceptance/completion certificate to the Contractor shall stand guaranted for a period of 12 calendar months, from the date of handing over the total job in all respect to CMD / Consultant. The Contractor shall replace/rectify all parts/components which become defective due to bad fabrication or due to any act of oversight or omission. All such rectification or replacements of defective workmanship shall be done free of cost by the Contractor.

21.0 RESPONSIBILITY OF CONTRACTOR:

21.1 It shall be the responsibility of the Contractor to obtain the approval for any revision and/or modifications decided by the Contractor from CMD / Consultant Engineer-in-Charge before implementation. Also such revisions and/or modifications if accepted/ approved by CMD / Consultant Engineer-in-Charge shall be carried out at no extra cost to CMD / Consultant. Any change required during functional requirements or for efficient running of system, keeping the basic parameters unchanged and which has not been indicated by the Contractor in the data/drawings furnished along with the offer will be carried out by the Contractor at no extra cost to CMD / Consultant.

21.2 All expenses towards mobilization at site and demobilization of work force, Contractor's materials, clearing the site etc. shall be deemed to be included in the prices quoted and no separate payments on account of such expenses shall be entertained.

22.0 SITE ORGANISATION:

The Contractor shall without prejudice to his overall responsibilities and liabilities to provide adequate qualified and skilled personnel on the work. For site organization and augment the same as decided by the Engineer-in-Charge depending on the exigencies of work. In addition to this Contractor shall deploy Safety Supervisors to ensure safe working conditions at site.

23.0 CONSTRUCTION:

23.1 The Contractor shall within the scope of work observe in addition to specifications, all national and local laws, ordinances, rules and regulation and requirements pertaining to the work.

23.2 Various procedures and methods to be adopted by Contractor during the construction as required in the respective specifications shall be submitted to CMD / Consultant in due time and well in advance of the specific work for approval.

23.3 The Contractor shall carry out required supervision as per Quality Assurance Plan and furnish all assistance required by CMD / Consultant in carrying out inspection work. CMD / Consultant will have authorized representatives present who shall have free access to the work at all times. If an CMD / Consultant representative notifies the Contractor's representative of any deficiency in any work or in the supervision thereof, the Contractor shall make every effort to carry out such instructions consistent with best industry practice.

24.0 EMPLOYEES PROVIDENT FUND & EMPLOYEES STATE INSURANCE CORPORATION:

24.1 The Contractor undertakes to discharge his responsibility under the Employees Provident Fund Scheme as an immediate employer, for employees engaged or employed by him for execution of contracted work.

24.2 The Contractor undertakes that all employees, either employed by him, or permitted assigns, would be covered under the above scheme from the date of commencement of work. The Contractor further undertakes to pay employee's contribution as well as employer's contribution at appropriate rate to the office of Regional Provident Fund Commissioner within the stipulated time period for the same.

24.3 The Contractor acknowledges the right of the Company to recover deducts or claims any amount, which the company is required to pay.

24.4 Agency must have individual P.F. & ESIC code, copy of P.F. & ESIC code no allotted to the agency to be furnished by the agency.

24.5 The Contractor shall be liable to pay his contribution and the Employee's contribution to the State Insurance Scheme in respect of all labour employed by him for the execution of the Contract, in accordance with the provision of "The Employee's State Insurance Act, 1948" as amended from time to time. In case the Contractor fails to submit full details of his account of labour employed and the contribution payable, the Engineer-in-Charge shall recover from the running bills of Contractor and amount of contribution as assessed by him. The amount so recovered shall be adjusted against the actual contribution payable for Employees State Insurance.

25.0 MEASUREMENT OF WORK:

Please refer Clause 42 of General Conditions of Contract (GCC).

26.0 BUILDING AND OTHER CONSTRUCTION WORKER'S ACT:

In order to govern welfare and working conditions of labourers engaged in construction activities, the Building and other Construction Workers' (Regulation of Employment and Conditions of Service ''RE & CS'') Act, 1996 came into force. RE & CS Act'1996 is applicable in respect of building and other construction work. The Contractor shall strictly comply with the following provisions pertaining to RE & CS Act'1996.

a. The Contractor must be registered with the concerned authorities under the Building and Other Construction Workers' (RE&CS) Act, 1996 or in case of non-registration; the Contractor should obtain registration within one month of the award of contract.
b. The Contractor shall be responsible to comply with all provisions of the Building and Other Construction Workers' (RE&CS) Act, 1996, the Building and Other construction Workers' Welfare Cess Act, 1996, the Building and other Construction Workers' (RE&CS) Rules, 1998 and the Building and other Construction Workers Welfare Cess Rules, 1998
c. Cess as per the prevailing rate, shall be deducted at source from bills of the Contractor by the Engineer-in-charge of the contract and remitted to the ''Secretary, Building and Other Construction Workers Welfare Board'' of the concerned state. The Contractor shall be responsible to submit final assessment return of the cess amount to the assessing officer after adjusting the cess deducted at source.

27.0 LABOUR RELATIONS:

27.1 In case of labour unrest/ labour dispute arising out of non-implementations of any law the responsibility shall solely lie with the Contractor and he shall remove/ resolve the same satisfactorily at his cost and risk.

27.2 Contractor shall deploy only duly qualified and competent personnel for carrying out the various jobs as assigned by the Engineer

28.0 EMPLOYMENT OF LOCAL LABOUR:

Contractor shall ensure that local labour, skilled and/or unskilled, to the extent available shall be employed for this work. In case of non-availability of suitable labour in any category out of the above persons, labour from outside may be employed.

29.0 Contractor shall not recruit personnel of any category from among those who are already employed by the other agencies working at site but shall make maximum use of local labour available.

i) Contractor's Labourers to leave site on completion of the work.

ii) The labourers of Contractor must leave the location of the Plant/township/project site after the work is tapered off/ completed.

30.0 FINAL INSPECTION:

After completion of all tests as per specification the whole work will be subject to a final inspection to ensure that job has been completed as per requirement. If any defects noticed in the work are attributable to Contractor these shall be attended by the Contractor at his own cost.

31.0 TEMPORARY WORKS:

All Temporary and ancillary works including enabling works connected with the work shall be responsibility of the Contractor and the price quoted by them for construction shall be deemed to have included the cost of such works, which shall be removed by the Contractor at his cost, immediately after completion of his work.

32.0 SAFETY:

The Contractor shall ensure that the safety requirements are met in respect of men, materials, adjoining structures, equipment etc. and shall be totally responsible in case any mishap occurs due to negligence or otherwise. In this connection the contractor shall strictly adhere to the rules norms and regulations as applicable.

33.0 HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT:

During construction the contractor shall strictly follow the safety procedures, precautions & norms as per the safety code. The contractor shall submit safety procedure prior to start of construction activities. The procedure should include safety measures to be taken during construction work, firefighting etc. All workmen, supervisors engaged at site shall be equipped with PPE's (Helmet, Shoes, Safety belts, Goggles, Handgloves, Apron etc.)

All the staff/ workers engaged by the agency should follow COVID appropriate behaviour as per Govt. directive i.e. Wearing Masks, maintaining physical distance & washing hands frequently.

The contractor shall take all possible measures to avoid accidents to the contractor's labourers and shall adopt all safety measures as will be directed by CMD's Engineer. Contractor shall provide adequate FIRST AID facility at site and also arrange for necessary medical facilities for proper treatment of laborers, if required. Contractor shall ensure & arrange at his own cost fire & safety provisions as per prevailing practice.

34.0 PERSONAL SAFETY:

All necessary personal safety equipments as considered adequate by the Engineer shall be available for use

of persons employed at site and maintained in a condition suitable for immediate use and the contractor shall take adequate steps to ensure proper use of PPE's by all the concerned at site.

35.0 TAXES & DUTIES :

Please refer Clause 46 of General Conditions of Contract (GCC).

36.0 MATERIALS AND EQUIPMENT:

All materials and equipment shall conform to the relevant standards and shall be of the approved make and design. The materials and equipment shall conform to relevant Indian Standards. The Contractor shall be responsible for approval of the equipmet, as may be required from supply Authority . The Contractor shall be responsible for the safe custody of all the materials and shall insure them against theft, damage by fire, earthquake etc. A list of items of materials and equipment, together with sample of each shall be submitted to the CMD / Consultant within 10 days of the award of the contract. Any item which is proposed as a substitute, shall be accompanied by all technical detail giving sizes, particulars of materials and the manufacturer's name and shall be submitted along with the tender. At the time of the submission of proposed substitute the Contractor shall state the credit, if any due to the CMD. In the event the substitution is approved, all changes and substitutions shall be requested in writing and approvals obtained in writing from CMD / Consultant. CMD's decision in the matter shall be final.

All materials of the same kind of service shall be identical and made by the same manufacturers. Any deviation to this rule shall be got approved from CMD/ Consultant. Top priority shall be given to the products that have a permanent agent providing spare parts and maintenance facilities in the same city where the project is situated. The make of electrical equipments, components, accessories, etc. has been mentioned in order of priorities. The tenderer has to quote for the first priority as mentioned above after ascertaining that the first preference materials are available. If at a later stage during executing the work, material of the first preference make are not available, the contractor has to get approval from the CMD/ Consultant to use other make of material prior to procurement. Any rate difference for the first preference make and the one approved will be passed on to the CMD.

37.0 MANUFACTURERS:

Where manufacturers have furnished specific instructions relating to the materials used in this job, covering points not specifically mentioned in these documents, these instructions shall be followed in all cases. Where manufacturer's names and/or catalogue numbers are given, this is an indication of the quality, standards and performance required. When interfacing occurs, equipment shall be mutually compatible in all respects.

38.0 TEST CERTIFICATES:

The contractor shall submit test certificates for all the installed equipments at site including cable etc.

39.0 INSTRUCTION MANUAL:

The contractor shall prepare and produce instruction, Installation, operation and maintenance manuals in English for the use, operation and maintenance of the complete equipment and installations, and submit 3 sets to CMD, at the time of handing over.

40.0 SAMPLES AND CATALOGUES:

Before ordering the material necessary for these installations, the contractor shall submit to CMD for approval, a sample of every kind of material such as cables, conductors, conduits, switches, socket outlets, circuit breakers, lighting fixtures, boxes etc. along with the catalogues.

For big items such as swithboards, the submission of catalogues shall be enough. Prior to ordering any electrical equipment/material/system, the contractor shall submit to CMD / Consultant, the catalogues, along with the samples(for small items), at least from three different approved vendors/ manufacturers. After the selection of manufacturer by CMD, the contractor shall arrange inspection and testing at the manufacturer's factory or assembly shop for final approval. No material shall be procured prior to the approval of the CMD.

41.0 CONSULTANT'S DRAWINGS:

Drawings have been prepared by the Consultants showing the areas to be air-conditioned and ventilated and the spaces allotted for equipment. Tenderers shall ensure that the equipments of air-conditioning and ventilation installations offered by them fit in the spaces allotted for the purpose.

The tender drawings indicate only the general scheme of requirement and the extent of work covered in this contract. The equipment and their associated works such as ducting, piping etc. may be re-arranged in the space allotted subject to the approval of Client/Consultants. It is the Contractor's responsibility to ensure that his work co-ordinates with the work of other agencies.

The Contractor shall prepare detailed working drawings in co-ordination with other architectural and services drawing and get these working drawings approved by the Client/Consultants. The approval of such drawings by the Client/Consultants shall be from the point of view of assisting the Contractor in co-ordination of services with other agencies and shall not absolve the Contractor from his absolute and indivisible responsibility on performance of his installations.

42.0 VENDOR'S SHOP DRAWINGS:

The contractor shall prepare and submit to CMD / Consultant, for his approval, Six sets of vendor detailed drawings of HVAC Chiller Equipments, Copper piping, Detail Ducting Drawing with Grill / Diffuser Sizing and equipment to be fabricated by the contractor, or other vendor within 10 days of signing of the contract. Before starting the work, the contractor shall submit to CMD/ Consultant for his approval in the prescribed manner, the shop/execution drawings for the entire installation, specially the main connections and junctions, the route of conduits and cables, no. and size of wires drawn through the conduits, location of all the outlet points, and switch boards and distribution boards and any other information required by CMD. CMD reserves the right to alter or modify these drawings if they are found to be insufficient or not complying with the established technical standards or if they do not offer the most satisfactory performance or accessibility for maintenance.

43.0 AS BUILT DRAWINGS & DOCUMENTATION:

At the completion of work and before issuance of certificate of virtual completion the contractor shall submit to CMD, three sets of layout drawing drawn at appropriate scale indicating the complete wiring system "as installed" duly approved by Consultant / CMD. These drawings must provide (in plan, folded elevation and section)

I. Detail Heat Load calculation sheet with all assumptions.
II. Location of Unit and piping.
III. Location of all piping routes including Branch / Y joints.

IV. Route and particulars of all control / power cables.
V. Ducting layout plan for all the floors along with CFM distribution details.
VI. Treated fresh air system.
VII. Ventilation System.
VIII. GA Drawing of all major HVAC Equipment

44.0 GUARANTEE & FREE SERVICE:

The system shall be guaranteed for performance for **12 months** from the date of satisfactory acceptance and handing over to client in all respects. The guarantee shall be for entire performance of the supplied system and covering intended functionalities desired for intended purpose of the design. The certificate of completion shall be issued after the necessary tests in all respects have been carried out to the satisfaction of CMD / Consultant and the required drawings/ manuals / As Built Drawings are submitted. At the close of the work and before issuance of final certificate of **virtual completion** by CMD, the contractor shall furnish written guarantee indemnifying CMD against defective materials and workmanship for a period of **10 (ten) calendar months after completion and handing over of site**. The contractor shall hold himself fully responsible for reinstallation or replacement, free of cost to CMD, in respect to the following:

- Any defective work or material supplied by the contractor.
- Any material or equipment supplied by CMD which is damaged or destroyed as a result of defective workmanship by the contractor.
- Any material or equipment damaged or destroyed as a result of defective workmanship by the contractor.
- Contractor shall give 12 free services (one at each month) for easy and smooth operation of the HVAC System during the defect liability period. The contractor shall make good at his own cost and to the satisfaction of CMD, all defects or other faults arising in the opinion of CMD / Consultant out of bad workmanship or faulty materials not in accordance with the drawings, ASHRAE Standard under which it may appear within twelve months after completion of the work. In case any defects arise during the guarantee Period, the same shall be attended to within one working day from the time the defect was reported by CMD, Kolkata and rectified immediately to the satisfaction of CMD, Kolkata failing which the same could be rectified through other agencies at the Tenderer's Cost and Risk.

During guarantee minimum uptime of 95% shall be ensured failing which guarantee period shall deem to be proportionately extended.

45.0 SAFETY OF MATERIALS:

The contractor shall provide proper and adequate, storage facilities to protect all the materials and equipment including those issued by CMD against damage from any cause whatsoever.

46.0 COMPLETION CERTIFICATE:

On completion of the HVAC SITC (or an extension to an installation) a certificate shall be furnished by the contractor,countersigned by the licensed supervisor, under whose direct supervision the installation was carried out. This certificate shall be in the prescribed form as required by the Local Supply Authority. The contractor shall be responsible for getting the electrical installation inspected and approved by the local concerned authorities.

47.0 SITE ENGINEER AND TRAINING:

The contractor shall employ a competent fully licensed qualified, full time Mechanical HVAC engineer to direct the work of HVAC installation in accordance with the drawings and specifications. The engineer shall be available all times at site to receive instructions from CMD / Consultant, in the day to day activities throughout the duration of contract. The engineer shall correlate the progress of the work in conjunction with all the relevant requirements of the supply authority. The engineer coordinates with other services contractor and CMD for any coordination site issues. Contractor shall give training to technical staff of client for Operating, Control and Basic maintenance for easy operation.

48.0 RESTATING & FINISHING OF CIVIL DAMAGES:

For erection/ installation of equipment etc., if any civil structure/ other agency's work is required to be broken, the same shall be done, restated and finished as original by the tenderer without any extra cost.

49.0 COMPLETION PERIOD:

Time allowed for carrying out the work, as mentioned in the GCC, shall be strictly observed by the Contractor. The work shall throughout the stipulated period of the contract be executed with all the diligence and if the contractor fails to complete the work within the specified period, he shall be liable to pay liquidated damages as defined in the contract.

The contractor shall submit a BAR CHART for completion of the work within 15 (fifteen) days on issuance of Letter of Intent (LOI). Such chart shall include all activities like the date of supply of material at site, item wise completion of work etc., and obtain the approval of the client.

CMD may provide storage space within the project premises or in the building if available. However the responsibility and safety of the materials stored will be with the contractor. No accommodation for contractor's staff, worker, labour etc. will be provided by CMD.

50.0 OTHER ISSUES:

The Contractor shall carry out all the work strictly in accordance with the approved drawing, detailed specifications and instructions of the client's engineer. If in the opinion of the client's engineer/consultant, nominal changes have to be made to suit the site condition and with the prior approval in writing of the Employer, the Contractor shall carry out the same without any extracharge.
The tenderer must obtain for himself on his own responsibility and at his own expense, all the information which may be necessary for the purpose of making a tender and for entering into a contract and must examine thedrawings, inspect the site of the work, and acquaint himself with all local conditions, means of access to the work, nature of the work and all matters appertaining thereto. The Employer's decision in such cases shall be final and shall not be open toarbitration.

A Schedule of Probable Quantities in respect of each work and specifications accompany these Special Conditions. The Schedule of Probable Quantities is liable to alteration by omissions, deductions or additions at the discretion of the Employer. Each tender should contain not only the rates but also the value of each item of work entered in a separate column and all the items should be summed up in order to show the aggregate value of the entire tender.

The rates quoted in the tender shall include all charges for scaffoldings, watching and lighting by night as well as day including Sundays and holidays, protection of all other erections, matters or things and the Contractor shall take down and remove any or all such centering, scaffolding etc. as occasion shall require or when ordered so as to do, and fully reinstate and make good all matters and things disturbed during the execution of work and to the satisfaction of the client.

The contractor shall not be entitled to any compensation for any loss suffered by him on account of delays in

commencing or executing the work, whatever the cause of delays may be, including delays arising out of modifications to the work entrusted to him or in any sub-contract connected therewith or delays in awarding contracts for other trades of the project or in commencement or completion of such works. The Employer does not accept liability for any sum besides the tender amount, subject to such variations as are provided forherein.

The successful tenderer shall carry out all items of work necessary for completion of the job even though such items are not included in the quantities and rates. Schedule of instruction in respect of such additional items and their quantities will be issued in writing by the client.
The successful tenderer must co-operate with the other contractors appointed by the client so that the work shall proceed smoothly with the least possible delay.

51.0 FIRM PRICES:

The quoted price shall remain firmed and fixed and valid until completion of the contract and shall not be subjected to escalation for any reason whatsoever.
The quoted prices and unit rates shall include for the following conforming to and meeting the intents of the specifications and drawings.

a. All equipment and accessories and materials which shall be new and of specified maker quality, or if not specified, then of the best quality conforming to IS and ISI stamped unless otherwise permitted by the Employer.
b. Transport from the place or places of manufactures to the places of installation, loadingand unloading, store and safe custody.
c. Any and all taxes and duties applicable at the time of award of contract by way of Letter of Intent / Work order.
d. Comprehensive Insurance against loss of materials during transit, erection and testing till the equipment/installation is commissioned and handed over.
e. Workmen's compensation for personnel deployed by the tenderer during erection and commissioning.
f. Third party liability arising out of action or lack of action of the tenderer or his representatives.
g. Special tools required for erection, operation and maintenance of the equipment,scaffolding and Ladders as required.
h. Erection, testing and commissioning based on the site conditions & facilities specifiedunder "Tenderer Basis".
i. Obtaining approvals from all statutory bodies and authorities wherever applicable beforeand/or after execution of the work.
j. Making 'As-built' drawings and clearance of site as specified.
k. All other items and services as pertinent to and meeting the intents of the tender documents including drawings.

The prices shall be firm till the entire installation is handed over and shall be free from any fluctuation in the cost of raw materials and labour. Rates expressed in words shall prevail over rates expressed in figures.

The quoted rates shall be self sustaining and shall remain valid for any increase or decrease in quantity. Items with quantity given as Rate Only shall also be quoted by the Vendor. Vendor shall supply the item at the quoted rate if required by Client.

52.0 LAND/ SPACE:

CMD will provide land/space subject to availability for contractor's office/go down only within project premises. But no land/space for labour/ worker hutment shall be provided by CMD.

53.0 VARIATIONS TO BE APPROVED BY EMPLOYER:

The Contractor shall submit a statement of variations giving a quantity and rates duly supported by analysis of rates, vouchers etc. The rates on scrutiny and final acceptance by the Employer shall form a supplementary tender. The Employer shall not be liable for payment of such variations until these statements are sanctioned by him.

54.0 CONTRACTOR TO PROVIDE EVERYTHING NECESSARY AT HIS COST:

The Contractor shall provide at his cost, everything necessary for the proper execution of the works according tothe intent and meaning of the Drawings, Bill of quantities and Specifications taken together whether the same may or may not be particularly shown or described therein provided that the same can reasonably be inferred there from, and if the Contractor finds any discrepancy in the Drawings or among the Drawings, Bill of quantities and Specifications, he shall immediately and in writing refer the same to the Employer who shall decide which is to be followed.

55.0 AUTHORITIES, NOTICES AND PATENTS:

The Contractor shall conform to the provisions of any Act of the Legislature relating to the works, and to the regulations and bye-laws of any authority, and of electric supply and other companies and/or authorities with whose systems, the installation is proposed to be connected and shall, before making any variations from the Drawings or Specifications that may be necessitated by so conforming, give to the Employer, written notice, specifying the variation proposed to be made and the reason for making it and apply for instructions thereon. In case the Contractor shall not receive such instructions within ten days, he shall proceed with the work conforming to the provisions, regulations or bye-laws, in question, and any variation so necessitated shall be dealt with the client as required.

The Contractor shall bring to the attention of the Employer, all notices required by the said Acts, regulations or bye-laws to be given to any authority and pay to such authority, or to any public office, all fees that may be properly chargeable in respect of the works, and lodge the receipts with the Employer.

The Contractor shall indemnify the Employer against all claims in respect of rights, and shall defend all actions arising from claims, and shall himself pay all royalties, license fees, damages, cost and charges of all and every sort that may be legally incurred in respect thereof.

56.0 SETTING OUT OF WORKS:

The Contractor shall set out the works and shall be reasonable for the true and perfect setting out of the same and for the correctness of the positions, levels, dimensions, and alignment of all parts thereof. If at any time any error in this respect shall appear during the progress of the works within a period of one year from the completion of the works, the Contractor shall, if so required, at his own expense, rectify such error to the satisfaction of the Employer.

57.0 CONTRACTOR'S SUPERINTENDENCE AND REPRESENTATIVE ON THE WORKS:

The Contractor shall give all necessary personal superintendence during the execution of the works, and as long thereafter as the Employer may consider necessary until the expiration of the "Defects Liability Period" stated in the Appendix hereto. The Contractor shall also during the whole time the works are in progress, employ a competent representative who shall be constantly in attendance at the works while the men are at work. Any directions, explanations, instructions or notices given by the Employer to such representative shall be held to be given to the Contractor.

58.0 ASSIGNMENTS AND SUB-LETTING:

The whole of the works included in the Contract shall be executed by the Contractor and the Contractor shall not directly or indirectly transfer, assign or sub-let the Contract or any part share thereof or any interest therein without the prior written consent of the Employer, and no undertaking shall relieve the Contractor from the full and entire responsibility of the Contract or from active superintendence of the works during their progress.
No alteration, omission or variation shall vitiate this Contract but in case the Employer thinks proper at any time during the progress of the works to make any alterations in or additions to or omissions from the works or any alteration in the kind or quality of the materials to be used therein and shall give notice thereof in writing under his hand to the Contractor, the Contractor shall alter, add to or omit from, as the case may be, in accordance with such notice but the Contractor shall not do any work extra to or make any alterations or additions to or omissions from the works or any deviation from any of the provisions of the Contract, Stipulation, Specifications or Contract Drawings without the previous consent in writing of the Employer and the value of such extras, alterations, additions or omissions shall in all cases be determined by the Employer, with the prior approval in writing of the Employer in accordance with the provisions of Clause 17 hereof, and the same shall be added to or deducted from the Contract Amount, as the case may be, accordingly.

59.0 BILL OF QUANTITIES:

The Bill of Quantities, unless otherwise stated, shall be deemed to have been prepared in accordance with the Standard Method of Measurement.

Any error in description or in quantity or in omission of items from the Bill of quantities shall not vitiate this contract but shall be rectified and the value thereof shall be ascertained, shall be added to, or deducted from, the Contract Amount (as the case may be) provided that no rectification of errors, if any, shall be allowed in the Contractor's Schedule of Rates.

60.0 SUFFICIENCY OF BILL OF QUANTITIES:

The Contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency ofhis tender for the works and of the prices stated in the Bill of quantities and/or the Schedule of Rates and Prices which rates and prices shall cover all his obligations under the Contract, and all matters and things necessary for the proper completion of theworks.

61.0 QUANTITY VARIATION:

Quantity as shown in SOQR is tentative only and may vary up to any extent either positive (+) or negative (-) and for which bidders quoted rate will remain firm.

62.0 CO-ORDINATION WITH OTHER AGENCIES:

The contractor shall be responsible for proper coordination with other agencies operating at the site so that the work may be carried out concurrently without any hindrance with others. The Engineeer- in – charge shall desolve disputes, if any, in this regard, and his decision shall be final & binding.

63.0 UNFIXED MATERIALS WHEN TAKEN INTO ACCOUNT TO BE THE PROPERTY OF THE EMPLOYER:

Where in any Certificate (of which the Contractor has received payment) the Employer has included the value of any unfixed materials intended for and/or placed on or adjacent to the works, such materials shall become the property of the Employer and they shall not be removed except for use upon the works, without the written authority of the Employer. The Contractor shall be liable for any loss of or damage to such materials.

64.0 REMOVAL OF IMPROPER WORK:

The Employer shall, during the progress of the works, have power to order in writing from time to time the removal from the works within such reasonable time or times, as may be specified in the order, of any materials which in the opinion of the Employer are not in accordance with the Specifications or the instructions of the Employer, the substitution of proper materials, and the removal and proper re-execution of any work executed with materials or workmanship not in accordance with the Drawings and Specifications or instruction, and the Contractor shall forthwith carry out such order at his own cost. In case of default on the part of the Contractor to carry out such order, the Employer shall have the power to employ and pay the other persons to carry out the same, and all expenses consequent thereon, or incidental thereto shall be borne by the Contractor, or may be deducted by the Employer from any moneys due, or that may become due, to the Contractor.

65.0 LABOUR LICENSE:

Contractor will have to obtain labour license for the laborers engaged / to be engaged for their entrusted job from the appropriate authority. Necessary Form V will be issued from CMD office upon receipt of written request from the contractor. Contractor will have to submit the labour license to CMD.

Contrator will have to maintain all records & registers as per requirement of 'ContarctLabour Act, 1970' and furnish the documents as required by Labour Enforcement Officer (LEO)/ Assistant Labour Commissioner (ALC) during their inspection. Contractor should also furnish the details to CMD's representative periodically.

Further Contractor will have to provide necessary facilities at site as per 'Contract Labour Act, 1970'.

66.0 HANDING OVER REQUIREMENTS:

The System shall be handed over after satisfactory testing along with following documents.

1. Detailed equipment data in the approved proforma
2. Manufacture's maintenance and operating instructions
3. Set of as built drawings, layouts, piping, ducting, cable routing, cable schedules etc
4. Approved test readings of all equipment and installations
5. Inspection certificates
6. Certificates of approval from statutory or Local Authorities for the operation and maintenance of the installations, wherever such approval or certification is required. (This shall include Application filed along with enclosures and receipts of fees paid anddeposits made).
7. List of recommended spares
8. Certificate from the contractor that he has cleared the site of all debris and litter caused by him with out violating the EHS norms during the construction. However, contractor has also to periodically clear the site from all the debris which is generated during execution of work.
9. Undertaking from the contractor that all the materials supplied by him at site are fully tax paid and shall produce all documentation for satisfaction of CMD / Consultant or taxation authorities.

Submission of the above documentation shall form a precondition for final acceptance of the plant and installation and final payments.

67.0 STATUTORY APPROVALS & INSPECTION:

The contractor shall be fully responsible for meeting all the statutory obligations and local inspectorates wherever applicable to the works carried out by them. The contractor should prepare all working drawings and obtain approval of competent authorities (Elecric & Emergency Service, Guwahati, Assam) and also have the equipment and installation inspected and got approved by them. All the original receipts of official

fees paid and deposits made against the demand in writing from the appropriate authority shall be submitted to CMD.

68.0 CARE OF WORKS:

From the commencement to the completion of the works, the Contractor shall take full responsibility for the care thereof and of all Temporary works and in the case any damage, loss or injury shall happen to the works or to any part thereof or to any Temporary works from any cause whatsoever, shall at his own cost, repair and make good the same, so that at completion, the Permanent works shall be in good order and condition and in conformity in every respect with the requirements, of the contract and the Employer's/ Consultant's instructions.

69.0 NUISANCE:

(i) The Contractor shall not at any time, do, cause or permit any nuisance on the site or do anything which shall cause unnecessary disturbance or inconvenience to Employers, tenants, or occupants of other properties near the site of work and to the public generally.

(ii) The Contractor shall indemnify the Employer in respect of all claims, demands, proceedings, damages, costs, charges and expenses whatsoever arising out of or in relation to any such nuisance in so far as the Contractor is responsible thereof.

70.0 SCHEDULE OF TECHNICAL DEVIATIONS:

We confirm that all technical terms and conditions and specifications of this tender except for deviations listed below are acceptable to us.

Sr. No.	Section No.	Clause No.	Deviation proposed
1	2	3	4

SEAL OF COMPANY

SIGNATURE
NAME
DESIGNATION
DATE

DETAILED SCOPE OF WORK

1. Successful bidder should study and understand the site to be air conditioned and the systems / equipment to be installed. Agency has to study the hanging position of the ducts at certain places.
2. Successful bidder shall make detailed Engineering of the HVAC system envisaged by the CMD / Consultant.
3. Successful bidder shall prepare necessary shop floor drawings and should get the approval of consultant before submitting to CMD.
4. Successful bidder is responsible for manufacture/procurement, assembly, shop testing of all the equipment at his own cost.
5. Successful bidder supply of material at site, unloading at site, storage at site, transfer of material from store to work place, Erection and installation of the system.
6. Successful bidder is responsible for Testing, commissioning and handing over of all the equipment pertaining to air-conditioning & ventilation system.
7. Successful bidder has to arrange materials required for hanging the ducts at his own cost. In certain places agency has to make arrangements for installing the AHUs, ducts as per site condition.
8. Successful bidder has to study the site carefully and chose size of the AHUs to provide conditioned air in the hall without hindering the movement of audience.
9. Successful bidder shall also prepare and submit as-built drawings of entire work executed after completion of work.
10. Successful bidder shall prepare and submit operation and maintenance manual of the equipment.
11. Successful bidder shall prepare and submit technical data manual of all the equipment.
12. Successful bidder is responsible for clearing the site from time to time.
13. Successful bidder has to take up the core cutting of the floor and minor civil works where grouting, drilling of holes etc. are to carried out in the wall.
    a) Agency has to submit a bar chart/ PERT chart before taking up the work. Agency has to complete the work within 6 months from issuing LOI. Agency has to provide the foundation drawings of chiller, pipe, pumps, AHUs. Agency has to work in tandem with other agencies for the successful completion of the project. If required, the work may be required to be carried out during night.
14. Agency has to provide comprehensive annual maintenance of the equipment for four years after defect liability period. Agency has to keep the required spares for trouble free running of the system.
15. Agency has to arrange for core cutting of the floors and necessary re build there after.
16. Mostly, the agency has to carryout their work during day and night times without affecting the booking in the auditoria.
17. Agency has to submit the necessary Units foundation drawing within one fortnight from the issuing the LOI.
18. Agency has to complete the installation of Ducts, Copper pipes within two months from the issual of the LOI.
19. Agency may submit bar chart programme separately showing completion of work within stipulated completion time.

Exclusions

1) Incoming power supply to main electrical panel of HVAC
2) Power & water for testing & commissioning
3) Power & water for trial run of the system.
4) False ceiling work

TECHNICAL SPECIFICATION

The following terms have been used in the tender specifications, drawings etc.

ISI	Bureau of Indian Standards.
ASHRAE	American Society of Heating Refrigerating & Air-conditioning Engineers.
ISHRAE	Indian Society of Heating Refrigerating & Air-conditioning Engineers.
ASME	American Society of Mechanical Engineers.
ASA	American Standard Association.
B.S.	British Standards.
CMH	Cubic Meter per Hour.
US GPM	US Gallons per minute.
IGPM	Imperial Gallons per Minute.
RPM	Revolutions per Minute.
BTU/Hr.	British Thermal Unit per Hour.
Kcal/Hr.	Kilo Calories per Hour.
HZ	Hertz.
H.P.	Horse Power
Kg/Cm^2	Kilo Gram per Square Centimeter.
SAG	Supply Air Grills.
SAD	Supply Air Diffuser.
SAF	Supply Air Filters.
FD	Fire Damper.
VCD	Volume Control Damper.
RAD	Return Air Damper.
FAD	Fresh Air Damper.

RH	Relative Humidity.
DB	Dry Bulb Temperature.
WB	Wet Bulb Temperature.
MV	Mechanical Ventilation.
DP	Drain Point.

The codes and regulations as detailed below shall be followed in this contract:-

1.	Safety code for air-conditioning (revised) amendment 1 1991)	IS 659 : 1964 (reaffirmed)
2.	Safety code for mechanical Refrigeration 1991)	IS 660 : 1963 (reaffirmed)
3.	Testing of refrigeration compressors	IS 5111 : 1993
4.	Aircooled heat exchangers (amendment 1)	IS 10470 : 1983 (reaffirmed 1991)
5.	Packaged Air-conditioner	IS 8148 : 1976 (reaffirmed 1991)
6.	Hermetic compressors	IS 10617 : Part I, II & III 1983 (reaffirmed 1991)
7.	Suppliers data sheet for clean air equipment (laminar flow)	IS 12357 : 1998
8.	Thermostats for use in refrigeration etc.	IS 11338 : 1965 (reaffirmed 1991)
9.	Code of practice for design and construction of flue chimneys.	IS 11338 : 1965 (reaffirmed 1991)
10.	Metal Duct Work	IS: 665/SMACNA
11.	Steel for general structural purpose	IS 2062 : 1992
12.	Piping Work	Is 1239 Part I & II 1990/ 1992 IS & BS : 3601
13.	Welding	IS 3589
14.	Refrigeration	As per ASHRAE / ISI / ISHRAE
15.	Hot Dip Zinc Coated Steel Tubes	IS 4736 : 1968

16.	Gate Valves for Water lines	IS 778 : 1980
17.	Copper Alloy Gate Globe Check Valve for water lines	IS 778 : 1980
18.	Butterfly Valve	IS 13095 : 1991
19.	Steel Pipe flanges	IS : 6392
20.	Gaskets	IS 638 : 1979 (reaffirmed 1993)
21.	Mild steel tubes & fittings	IS 1239 Part I & II
22.	Colour code for the identification of pipe lines	IS 2379 : 1963
23.	Specific requirements for the direct switching of the individual motors.	IS 4064 (Part II) 1978
24.	PVC insulated (HD) Electric Cables for working voltage up Including 1 100 Volts.	IS : 1554 (Part II)
25.	HRC Cartridge fuse links upto 650 Volts.	IS 2208 : 1976
26.	Starter	IS 9554 (Part I) 1979
27.	Inspection and testing of Installation	IS 732 (Part II) 1979
28.	Three phase induction motors	IS : 325
29.	PVC insulated (heavy duty) cables for working voltage up to 1.1. KV and up to 11 KV Grade respectively.	IS 1554 : 1981 Part I & II
30.	Code of practice for electrical wiring installations.	IS 732 : 1989
31.	Code of practice for earthing	IS : 3043 : 1966
32.	Horizontal centrifugal pumps	IS : 1620
33.	Centrifugal fans (1st. Division)	IS 4894 : 1987 (reaffirmed 1991)
34.	Wrought aluminium & aluminium alloy sheet and strip for general engineering-purposes.	IS : 737
35.	Mild steel tubes, tubular and other wrought steel fittings.	IS : 1239

36.	Burden tube pressure and vacuum gauges.	IS : 3624
37.	Glossary of terms used in refrigeration and air-conditioning.	IS : 3615
38.	Code for practice for standard for selection of standard worm and helical gears.	IS : 7403
39.	Three phase induction motors.	IS : 325
40.	Specification for single phase small A/C & universal motors	IS : 996
41.	Specifications for flame proof motors	IS : 2148
42.	Circuit breaker A.C	IS 2516 : 1980 Part I & II
43.	Contactors for A,C for voltage upto 1100 V.	IS 2959 : 1975
44.	Low voltage switch gear and control gear assemblies.	IS 8623 : 1993 Part I & II
45.	Code of practice for selection of starters for AC induction motors	IS 3914
46.	Specification for cables glands	IS 4821
47.	Code for selection, installation & maintenance of switch gear and control gear.	IS 10118 : 1982 Part I to IV
48.	Conduits for electrical installations	IS 9537 : 1981 Part I to IV
49.	Permissible limits of noise level for rotating electrical machines.	IS 12065 : 1987
50.	Code of practice for installation and maintenance of motors	IS 3106 : 1966
51.	Code of practice for selection of standard worm and helical gear boxes.	IS : 7403
52.	Electrically welded steel pipes for water, gas and sewage.	IS : 3589
53.	Gum metal gate, globe and check valves for general purposes.	IS : 778
54.	Wrought aluminum and aluminum alloy steel and strips for general engineering purposes.	IS : 737

55.	HRC cartridge fuse links upto 650 volts	IS : 2208
56.	PVC insulated (heavy duty) electric cables for working voltage upto & including 1 100 watts.	IS : 1554 (Part I)
57.	Method for testing Panel type air filters for AC purposes	IS 7613 : 1975 (reaffirmed 1991)
58.	Un-bonded glass wool for thermal insulation	IS 3690 : 1874 (1st. Revision)
59.	Expanded polysterene for thermal insulation purposes.	IS 4671 : 1984 (reaffirmed) (1st revision)
60.	Propeller type AC Ventilation fans	IS 2312 : 1967 (reaffirmed 1991)
61.	Electrical axial flow fans	IS 3588 : 1987 (reaffirmed 1991)

SAFTEY CODES

The following IS codes shall he followed:

Safety code for mechanical refrigeration	IS 660
Safety code for air conditioning	IS 659
Safety code for scaffolds & ladders	IS 3696 Part I & II, 1966)
Code of practice for fire precaution in Welding & cutting operations	IS 3016
Code for safety procedures and practices in electrical works	IS 5216
Safety code for constructions involving Use of hot bituminous material	IS 5916 (1970)
Safety requirements for wall openings, railings etc.	IS 4912 (1978)
Code of practice for safety and health	IS 3696 (1966)

SYSTEM DESCRIPTION

This refers to the various discussions on the project and the comments given by the competent authority on the project.

Outside design condition:

DB – 110^0 F WB – 97^0F RH – 63%

Inside design condition (for main Hall):

DB – 72^0 F WB – 61.5^0F RH – 55%

Inside design condition (for Exhibition area):

DB – 75^0 F WB – 64.0^0F RH – 55%

All the inside DB shall have a swing of +/- 2^0 F and RH shall have a swing of +/- 5%. The temperature of the exhibition area is slightly higher than the core area (the main hall) and is designed to reduce thermal shock.

Based on the above the system will comprise of the following:

The exhibition area and the main hall shall be catered by the following scheme:

Centralised chilled water system:

The total cooling requirement works out to be 73.9 Tr. Thus considering a diversity of 15%, 2 number 34 Tr (minimum nominal capacity) air-cooled scroll chiller (each chiller to have minimum 2 independent refrigerant circuitry and 3 no. compressors) along with 2 sets of pumps and chilled water AHUs (2 numbers, both working) for the exhibition area and the main hall.

The fresh air need for all the areas shall be taken directly to the AHU.

The filtration is considered to have efficiency of 90% down to 10 micron. We have considered false ceiling with gypsum board. The same shall be only a part of the exhibition area to facilitate running of supply air duct and part of the return air back to AHU.

The internal load, lighting load and occupancy had been envisaged in the attached summary sheet.

Basis of duct sizing has been indicated in subsequent chapters.

Acoustic insulation at AHU blower outlet has been envisaged to avoid noise transmission through ducting. Length of the acoustic insulation shall be 6 mtr. from the discharge of the plenum chamber including the plenum of the AHU.

Acoustic insulation for the AHU room is considered with 50 mm glass wool suitably fixed on the walls and ceiling of the AHU room.

All air handlers shall be interlocked with fire panel. In the event of fire/smoke the fan shall be tripped automatically through fire/smoke detectors/fire panel. In addition to the above fusible link type fire damper shall be incorporated in the return air path and motorized damper is provided for supply air duct.

Underdeck insulation of the concrete dome shall be carried out with 65 mm rockwool suitably fixed on the ceiling. However, this is excluded from the scope of work of the HVAC vendor and shall be carried out by the client through other agencies.

The entire air-conditioning and ventilation system shall comprise of the following major equipments:

a. Air cooled scroll chillers.

b. Air distribution ducting, grills and diffuser.

c. Water pumps and water distribution system.

POWER SUPPLY:

Stabilised three phase/single phase power supply to be made at points by the client through their own agencies as under:

At AC MCC: 3Ph, 4 wire power would be provided by the client through other agencies.

Single phase power supply to be provided for individual unit for director's room, ticketing and reception.

3 Phase power supply for the office area to be provided at the ODU as per OEM's recommendation for the unit of the office area.

The quantity of such power supply is indicated in the summary sheet.

ASSOCIATED CIVIL / ELECTRICAL AND OTHER WORKS TO BE PROVIDED

TO THE AC CONTRACTOR BY THE CLIENT (THROUGH THEIR OWN AGENCIES)

Provision of pipe and cable shaft.
Provision of floor drains in AHU room.
Provision of clear opening for air intake louvers, fans, dampers etc.
Provision of wiring to single phase outlets.
Provision of false ceiling with openings together with necessary frame for grills & diffusers.
Provision of foundation arrangement for equipments like chiller, pump, cooling tower etc..
Provision of incoming power and water supply.
Provision of storage space during construction.
Provision of power & water for erection, testing & commissioning.

DESIGN PARAMETERS

Given below are some design parameters that should be followed in addition to those given in various sections of technical specifications.

AIR HANDLING UNITS

a)	Maximum Face velocity across cooling coil MPM	:	152.0
b)	Maximum face velocity across prefilters MPM	:	152.0
c)	Maximum water pressure drop across the coil in Mt.	:	4
d)	Maximum water velocity through coil in MPS	:	2
e)	Fan outlet velocity (maxm.) MPS	:	10.0

DUCTING WORK

a)	Method of Duct Design	:	Equal friction method
b)	Maximum air velocity in supply duct MPM		425
c)	Maximum air velocity in return duct MPM	:	240
d)	Friction loss in duct (maxm.) MM Wg in 100 Mt run.	:	6.66
e)	Maximum Velocity at supply air grill outlet MPM	:	122
f)	Maximum Velocity at supply air collar MPM	:	152

NOISE AND VIBRATION CONTROLS

SCOPE

The air conditioning contractor shall take all necessary precautions to have minimum noise generation and its transmission. Minimum vibration as permitted by ISO standard shall be followed. A few points for guidance only are given below:

a) Double fire retardant flexible connections shall be provided at air discharge from outlet of air-handling unit to the duct.

b) Vibration isolation pads of suitable thickness (min 25mm) commensurate to loading for isolation of vibration shall be provided under all pumps, air handling fans etc. in consultation with manufacturer for proper selection of vibration isolators.

c) Vibration isolation springs of suitable size to suit the weight of water chilling machine as recommended by the manufacturer for elimination of vibrations.

d) Flexible conduit connections of minimum diameter of 50mm to motors shall be provided. All loops should be large enough to allow connections to remain flexible.

e) All conduit connection where conduits are 60 mm or larger shall be made of 1.2 meters minimum length conduit installed in the shape of U and grossly slack to provide maximum vibration isolation.

f) Operating clearance of 40 mm shall be kept between the base and the inertia base.

g) All end suction pumps shall be bolted and grouted to the inertia base which in turn shall be supported on suitable vibration isolation rubber pads duly sandwiched with 24G GI sheets. Concrete inertia blocks shall be formed of suitable thickness and of adequate mass.

h) The floor supported piping shall be mounted on pipe supports with 7.5 mm ribbed neoprene pads between the base plate of the pipes and the floors.

i) All items suspended from false ceiling shall be isolated on separate hangers.

j) The expansion-joints or expansion-loops shall be provided to take care of the expansion and contraction in pipes due to temperature rises.

In case of ducts, conduits, pipes & tubes the annular space between construction and penetrating element shall be sealed with sand cement plaster with a separating material like plastic, wood etc which do not react with cement and get corroded.

The supply duct starting from air handling unit & plenum shall be provided with 12 mm thick acoustic lining (48 kg/m3) as indicated in the schedule of quantities. All Fan Coil Units (wherever used) collar shall also be lined with 12mm thick acoustically lined. The duct lining shall be clone with fibre glass of density of 48kg/cubic meter.

All piping connection to pumps and chilling machine shall be through flexible rubber bellows.

The air-conditioning contractor shall take all other precautions or shall make his own arrangements even if not specified in the tenderee documents for eliminating high noise levels & shall minimise vibrations in all mechanical equipments without any additional cost.

All the mechanical equipment shall be located as specified in the drawing.

STANDARD SPECIFICATION ON PIPING WORK

SCOPE:

This section deals with supply, installation, testing & commissioning of chilled water / drain water pipes, pipe fittings and valves etc. as detailed below in specifications. All pipes, fittings and valves etc. shall conform to relevant Indian standards.

WATER PIPING:

The pipes, fittings and valves shall be of approved make indicated in the tenderee document & shall be designed for minimum 10 Kg/cm^2 test pressure.

Chilled water pipes shall be M.S. E.R.W Black pipes & shall conform to IS:1239 (Part 1)

- 1991 & IS:3589 - 1991 with latest amendments. The wall thickness of M.S. E.R.W black pipes shall be as per IS: 1239 (Part 1).

Condensate drain piping shall conform to the above specification.

Drain water (other than the condensate drain pipes) / make up water pipes shall be "B" Class GI Pipe & shall Conform to IS: 4736.

The pipes shall be sized for individual liquid flow & shall ensure smooth noiseless & balanced circulation of fluid. All steel supports shall be thoroughly cleaned and primer coated before installation.

PIPE FITTINGS

The fittings for pipes for screwed piping shall be malleable iron and for piping with welded joints shall be of weldable quality. Also the fittings shall be suitable for same pressure ratings as for the piping system.

All bends up to sizes 150 mm dia. shall be made of heavy duty wrought steel of appropriate class.

All bends in sizes 200 mm and above shall be fabricated from the same dia and thickness of pipe in at least four sections and having a center in radius of at least 1.5 times diameter of pipes. Fittings such as tees, reducers etc. shall be fabricated from the same pipe and its length shall be at least twice the diameter of the pipe.

The dead ends shall be formed with flanged joints & shall have 6 mm thick blank between flange pair for 150 mm and over wherever future expansion is to be done otherwise 8 mm thick blank end to be welded to pipes up to 350 mm dia. & above 350 mm dia. pipes dished ends shall be used.

FLANGES

All flanges shall be of mild steel as per IS: 6392 / 1971 (with latest amendments) & shall be slip on type welded to the pipes. Flanged thickness shall be to suit Class II pressure. 3 mm thick gasket shall be used in between the flanges.

Flanged pair shall be used on all such equipment that are required to be isolated or removed for service for example chilled water pumps, chilling unit, AHU etc.

VALVES (BUTTERFLY VALVES)

Butterfly valves shall be of PN 16 rating as per IS 13095 preferably with fixed linear design to suit duty and flanges as per IS 6392 Table "E". Valves of sizes 32 mm and above diameter shall be made of cast iron close end body, cast iron epoxy coated disc, nitrile Seat and SS 410 Stem with teflon bush. Valves up to 150 mm NB shall be with detachable hand lever operation whereas valves above 150 mm NB shall have worm gear operation. These valves shall be installed in chilled water lines, make up / drain water piping lines. All valves shall be supplied with factory test reports and the manufacturer must have test facilities at their works.

BALANCING VALVES

The balancing control and shut off valves with built in pressure drop measuring facility shall be provided in return water lines for air-handling units, chillers as given in the tenderee drawings/S.O.Q.R.

The valves of sizes 32 mm to 65 mm dia. shall be of gun metal / cast iron construction with screwed ends angular design digital hand wheel with locking facility. Whereas valves of sizes 75mm and above shall be of cast iron construction with internal parts of SS 410 and EPDM / nitrile seat with flanged ends. The test cocks should be long enough to protrude out of valve insulation.

The valves shall be designed for PN 16 and tested for the seat at 1.1 times the design pressure and 1.5 times the design pressure for the shell. All valves shall be supplied with test certificates and the manufacturer must have test facilities at their works.

NON-RETURN VALVE

The check valves shall be used for horizontal / vertical run of pipes & shall conform to PN 16 rating .The valve design shall confirm to API 594 and tested as per ANSI SERIES.

The valves shall have cast iron body, and SS 410 plates, SS 410 Shaft & Nitrile Seat. All valves shall be supplied with factory test reports and the manufacturer must have test facilities at their works.

Y-STRAINER& POT STRAINER

The Y-strainer shall be fabricated out of MS 'C' class pipe two size higher than that of strainer pipe size. Flanges as per BS 10 shall be provided at inlet & outlet of connections. The body shall be pressure tested at 10 Kg/cm2 and shall be hot dip galvanized. Permanent magnet shall be provided in the body of the strainer to arrest MS particles. Filter element shall be of nonmagnetic 20 gauge SS sheet with 3 mm perforation. Strainer shall be provided at inlet of each chilled water pumps.

The Y-Strainer & Pot Strainer confirming to SSPL 107 & SSPL 106 shall have cast iron body and factory tested at works at 16 Kg/cm2 pressure. The screen shall be made out of 3 mm perforated stainless steel sheet. It should be easily removable when required to be cleaned. Isolating butterfly valves at either end of the pot strainer shall be provided.

Pot Strainer body shall be fabricated out of MS plate as per IS 2062. Thickness of sheet shall be as per size of the strainer chamfered pipes with flanges shall be provided at inlet / outlet connections of the strainer. The tangential entry of water shall create a centrifugal action and due to velocity shall separate sediments and deposit on the inner surface of filter element and at bottom of the Strainer. Butterfly valves shall be provided at inlet/ outlet connections as shown in drawing and included in BOQ. The strainer body shall have two separate chambers properly sealed to avoid mixing of filtered and unfiltered water. A powerful magnet shall be provided in the body to arrest MS particles. Filter element of Pot Strainer shall be of non magnetic 18 gauge SS sheet properly reinforced to avoid damage of the element. A cone with sufficiently large drain pipe with butterfly valve shall be provided at the bottom chamber to flush-out foreign particles. This arrangement shall avoid frequent opening of Pot Strainer for cleaning of filter element. Gauge connection shall be provided at inlet and out let connection.

A set of MS flanges with tongue and groove arrangement and neoprene rubber gasket shall be provided on the top cover and Pot Strainer flange with sufficient bolts and nuts to make the joint water-tight. Bearing loaded lope cover lifting and swinging arrangement shall be provided. The pot strainer body shall be properly de-rusted and epoxy coated from inside and outside. Manufacturers Test Certificate shall be provided with each Pot Strainer.

Specifications of various sizes of Pot Strainer. Filter Element and Thickness of MS sheet shall be as under:

Pipe Size	**Pot Dia**	**Pot HT**	**Element Dia.**	**Element HT**	**MS Plate Thickness**
(mm)	**(mm)**	**(mm)**	**(mm)**	**(mm)**	**(mm)**
50	300	400	200	240	6
80	350	450	250	250	6
100	450	500	300	280	6
125	500	600	330	340	8
150	540	700	360	390	8
200	610	815	400	470	8
250	800	955	550	510	8
300	1000	1105	750	580	8
350	1190	1300	895	678	12
400	1350	1500	1020	785	12
450	1518	1700	1060	890	12
500	1690	1800	1100	900	12
600	2000	2200	1500	1160	12
900	2400	2600	1680	1440	12

SUPPORTS FOR PIPES

All supports for pipes from ceiling shall be pre fabricated type epoxy painted MS member with GI down rod having adequate strength. All piping supports at terrace shall be with brick saddles duly finished with sand cement plaster. Otherwise the supports shall be fabricated out of G.I. / epoxy painted M.S. members having adequate strength. However successful tenderer shall submit proper drawings for supporting arrangement for approval prior to installation.

LAYOUT AND SIZING OF PIPE LINES

The sizes and layout given in the drawings / bill of quantities are for guidance purpose only. The A/C Contractor shall prepare and submit detailed drawings after the award of contract to the Engineer in Charge for his approval. No work at site shall be started before final approval of drawings is given. The drawings shall indicate sizes of pipes, quantity of water flow in each length of pipe. All details of fittings, location of all valves, air vents, pipe supports etc. shall be clearly indicated in the drawings.

INSTALLATION OF CHILLED / DRAIN / MAKE UP WATER PIPING

All pipes shall be securely supported or suspended on stands, hangers, clamps etc. as required. The Air-conditioning contractor shall design all brackets, saddles, anchors, clamps etc. & shall be responsible for structural adequacy. All pipe supports shall be of steel, coated with two coats of anti-corrosive paint and finally finished with paint.

The pipe support spacing shall be as follows:

Dia of Pipe	Maximum Spacing between supports
Up to 25mm	1.5 mt
30 mm to 50 mm	2.0 mt
65 mm to 80 mm	2.5 mt
100 mm & above	3.0 mt

The vertical risers shall run parallel to walls and should be straight to wall duly checked with plumb line. In case pipes with/without insulation while passing through the wall / slab, shall be provided with sleeve 50mm higher in size than the pipe with/without insulation.

Wherever insulated pipes are running, it should be supported in such a way that no undue pressure is exerted on the insulated pipe.

TESTING OF PIPE SYSTEM

a) All tools, tackles, labours etc. shall be arranged by A/C Contractor.

b) All pipes shall be tested hydraulically at 3 times the maximum operating pressure for a period of 24 hours. The test pressure should not be less than 10 Kg/sq.cm at any times. All leaks occurring during testing shall be rectified to the satisfaction of the Engineer in Charge. After repairs of leak it shall be tested again at the same pressure.

c) In case piping is tested in parts, these sections shall be securely sealed and capped during testing.

d) The successful tenderee shall ensure that there should be minimum vibration / noise in the chilled water/condenser water circuit due to water turbulence.

AIR-VENTS

Air vents for purging of air trapped in piping system shall be provided at the highest point. Globe valves of the size as indicated below shall be provided &. no additional price shall be paid.

Pipe Size	Valve Size
Upto 100mm	25mm dia
From 100mm to 300mm	40mm dia

PRESSURE GAUGES /THERMOMETERS

Burden type pressure gauges of 100 mm dia of suitable range shall be provided at the following locations:

a) Chiller / Cooling coils of AHU - Inlets and outlets.

b) All pumps - Suction & discharge

The water pressure gauge shall be made of stainless steel grade SS304. The dial plate shall be powder coated with white colour base & the calibration shall be done in black colour. All the pressure gauges shall be complete with ball valves & SS Siphon and confirming to IS:3624.

INDUSTRIAL TYPE THERMOMETER

Direct reading V form type thermometer alcohol filled of suitable range / length shall be provided at the following locations:

a) Chiller / Cooling coil - Inlets and outlets in separate wells of Brass / Gun metal.

The V form thermometer shall be made of aluminium die casting with golden colour anodizing. The thermometer shall have a V groove in the body to protect the refill from the damages during the installation. The refill shall be filled with blue colour mercury. The thermometer shall be complete with brass well & the calibration of temperature shall be in Celsius & Fahrenheit

STANDARD SPECIFICATION OF G.I. DUCT WORK

SCOPE

The scope of work covers supply and installation of

i) Sheet metal ducting.
ii) Air intake and exhaust louvers.
iii) Grills and Diffusers.
iv) Volume control dampers.

For Grills & diffusers the tendereeer shall submit catalogues since the units are standard.

MATERIAL

The material for various applications of air ducting shall be as follows:

Application	Material
Ducting for Air-conditioning	C.R. sheets continuous galvanized with minimum zinc coating 120 g/sq. m both side inclusive as per IS:277 - 1977.
Gasket	Foamed rubber 3.2 mm thk.
Bonding	Mastic Sealant.

All galvanized plain sheets shall be free from wrinkle. The zinc shall be clean, even and free from galvanized spots. Material shall be of approved make.

All ducts for air-conditioning & ventilation shall be rectangular in cross section as outlined in the drawing and in some part the same may be round as per B.O.Q and shall be fabricated as per SMACNA. Grit angles and companion flanges shall be mitered and welded at corners and riveted to duct sheet at 75 mm centres.

Standard elbows with an R/D ratio not less than 1.25 shall be used as far as possible. Where space restrictions do not permit use of standard radius, elbow with lesser R/D ratio and square elbow with equally spaced double thickness vanes may be used.

Ducting shall be supported as per SMACNA and all supporting members shall be of pre-fabricated with structural steel duly painted. The down rods shall be galvanized. Successful tenderee shall submit the support details for approval to the engineer in-charge prior to fabrication and erection.

Air turning devices shall be provided at least for first four outlet collars after even elbow. turning vanes shall be fabricated from min.20G G.I. sheet and equally spaced on side runner to be riveted/bolted to duct sheet.

Splitter dampers shall be installed in branches wherever split takes place. Splitter dampers shall consist of double thickness aerofoil blades hinged at downstream edge.

Splitter damper shall consist of double thickness airfoil blades hinged at the down stream edge. The operation rod shall terminate outside of the duct and insulation and an airtight hub and locking set screw shall be provided. Damper blade thickness shall be as that of the duct in which it is installed but not less than 1.5 mm (16G). Entire splitter damper shall be enclosed in a sheet metal ducting with flanges at both ends aligning with main run of ducting. The enclosure shall be made of sheet one size larger than the corresponding duct.

The duct work shall be fabricated out of galvanized sheet, class VIII conforming to IS 277-1962 (revised). The fabrication of duct shall strictly conform to ISS 655-1963. The thickness of the sheet shall be as follows.

Maximum side mm	Thickness of sheet mm	Type of transverse joint connections	Bracing (if any)
1	2	3	4
Up to 300	0.63	S drive, pocket or None bar slips, on 2.5 m centres S drive, pocket or bar slips. On 2.5m	None
301 to 600	0.63	Centres S drive, 25 mm pocket or 25 mm	25 x 25 x 3 mm angle

601 to 750		bar slips on 2.5 m centres drive, 25 mm bar slips on 2.5 centres	1.2m from joint
751 to 1000	0.80	40 x 40 mm angle connection or 40 mm pocket or 40 mm.	40 x 40 x 3 mm angle 1.2m
1001 to 1500	0.80	Bar slip, with 35 x 3 mm bar reinforcing on 2.5m centres	From joint.
1501 to 2250	1.00	40 x 40 mm angle connections or 40 mm pocket or 40 mm bar slips, 1m maximum centres with 35 x 3 mm bar reinforcing.	40 x 40 3 mm angle 60 cm from joint.
2251 and above	1.25	50 x 50 mm angle connections or 40 mm pocket or 40 mm bar slips.	40 x 40 x 3 mm angle
		1m maximum centres with 35 x 3 mm bar reinforcing.	40 x 40 3 mm angle 50 cm from joint.

Ducts 2250 mm and larger require special field study for hanging and supporting methods.

The following points should be also taken into account while fabrication of ducts.

All ducts shall be supported from the ceiling/slab by means of MS rods of dia. 9 mm with MS angle at the bottom. The ducts may be suspended from the ceiling with the help of dash fasteners. Provision of necessary supports with materials shall be arranged by the Contractor. The rubber gasket shall be installed between duct flanges in all connections and joints. The duct work can be modified in consultation with the Consultant to suit actual site conditions in the building. All flanges and supports should be primer coated on all surface before erection and painted with aluminium paint thereafter.

Note

In case angle iron supports are not feasible to be installed for supporting of the ducts, where limitation of suitable height of the false ceiling is not available then the Contractor shall support the ducts with MS flats of at least double the thickness of the angle iron supports as specified in ISI standards. Also slip joints may be provided instead of flange type joints. No additional charges on these accounts shall be payable to the Contractor.

AIR INTAKE & EXHAUST

Unless shown/mentioned otherwise, louvers shall be made of 3 mm thick. 100 mm extruded aluminium sections fixed in an extruded aluminium frame. Louvers shall be fixed at 45° to vertical and provide 60% minimum net opening 15 mm x 10 mm galvanized bird screen shall form part of the intake/exhaust louver. The entire assembly shall be fitted into the wall clear opening and the edges sealed with poly sulphite. All frame and clamps used shall be hot dip galvanized or extruded aluminium.

GRILLS/D1FFUSERS

Supply air grills shall be double deflection type with the horizontal face bars and vertical rear bars placed in a rigid marginal frame. All grills shall be provided with integral opposed blade, grill face key operated dampers. The operation of the damper can also be through alternative suitable measure.

Return air grilles shall have fixed face bars. Bars shall be set at 40° deflection of vision-proof installation the grilles shall be complete with rigid marginal frames and shall be matching with supply grilles.

Diffusers shall be round/rectangular face with horizontal air diffusion pattern. All diffusers shall be provided with face operated volume control dampers.

Linear diffusers/grilles shall be die formed with single/double directional air flow.

All sheet metal ducting complete with supports, turning vanes, canvas connections, erected in positions shall be measured externally and paid per unit rate area. All dampers shall be excluded in the duct area.

Intake and exhaust louvers with bird screen, louver & frame, erection and sealing shall be measured on the basis of cross sectional area and paid per unit area.

Side-wall grilles shall be measured on the core area excluding the margins and shall include necessary dampers. Minimum payable unit is 0.1 sq. m.

All the dampers with sheet steel enclosure, frame, fusible links, access doors etc. shall be measured as one unit.

LOUVRE DAMPERS

Louver Damper shall be multi blade type with opposed blades or parallel blades of air foil construction rotating in permanently lubricated ball/roller bearings. Blades shall be 1200 mm wide (max.). The housing shall be made of one size thicker sheet than the corresponding duct with flanges at both ends.

STANDARD SPECIFICATION OF DOUBLE & SINGLE SKINNED AIR HANDLING UNITS

SCOPE

This section deals with supply, installation, testing and commissioning of floor mounted & ceiling suspended type air handling units of various capacities and sizes as enumerated under schedule of quantities and conforming to the following specifications.

TYPE

The floor mounted & ceiling suspended type air handling units shall be of double skin construction as specified in the Bill of Quantities, draw through type comprising of various sections such as pre filter section, cooling coil section, fan section etc.

CAPACITY

The air handling unit capacities, static pressure, cooling coil row deep etc. shall be according to bill of quantities. All filters shall conform to the specification of cleanliness and face area to be derived from the air flow rate and the maximum permissible velocity at the filter face. The coil face area also to be decided on the above basis.

DOUBLE SKINNED CASING

The casing shall be self supporting type, factory fabricated & assembled made of extruded anodized aluminum hollow sections to make a rigid frame structure. The frame shall be assembled using pressure die cast aluminum joints. The self supporting unit shall consist of sandwiched panel made out of 0.6mm thick pre-plasticide / pre-coated GI sheet outside & 0.6mm Gl sheet inside duly factory fabricated & insulated with 25 mm thick PU foam injection of density approx. 40 Kg/m^3 in between. The insulated panels shall be bolted to mainframe with neoprene rubber gaskets held captive in the framed extrusion to make it leak proof. Suitable airtight access doors / panels with pressure die cast aluminium hinges & nylon handles and locks

shall be provided for access to various sections for maintenance. The entire housing shall be mounted on extruded aluminum channel framework having pressure die cast aluminum jointers or the framework shall be joined together with corner plates. Condensate Drain Pan preferably shall be constructed of 22 gauge polished stainless steel sheet with all corners welded with uniform slope from all sides leading to drain pan ensuring no stagnation of condensate water. The drain pan shall be preferably sandwiched insulated with 10 mm thick nitrile foam.

MOTOR & DRIVE FOR AIR HANDLING UNITS

The fan motors shall be 415 ± 10% volts. 50 ± 5 % HZ, 3 phase TEFC SQ. Cage induction motor. The motor shall be specially designed for quiet operation & motor speed shall not exceed 1440 RPM. Drive to fan shall be provided through 'V belt & pulley. Belts shall be of the fire resistant type only.

FAN OF AIRHANDLING UNITS

The casing shall have heavy gauge Gl construction backward curved DIDW fan statically & dynamically balanced mounted on EN8 solid shaft or C 40 carbon steel. The supply air DIDW fan shall be backward curved. The fan impeller shall be supported to housing with angle iron frame & pillow block heavy duty ball bearing. The fan shall be selected for a fan outlet velocity below 10 meter / sec. The fan housing with TEFC Sq. Cage motor shall be mounted on a common adjustable base frame on vibration isolators. The fan motor shall be installed inside the housing of air handling unit to keep low noise level. The fan & motor assembly shall be installed on aluminium extruded section only.

COOLING COILS

The cooling coil shall be made of aluminium fins and copper tubes of min. dia. 12.5mm or 16mm OD. The minimum no. of fins / inch for cooling coils shall be 12. The bonding of aluminum fins with copper tube should be done hydraulically. The tube thickness shall be min. 26 G & fin thickness shall be min. 37 G. The cooling / heating coil should be tested for leaks at a hydraulic pressure of at least 16 Kg / cm^2 for a minimum period of 3 hours or with 21 Kg / cm^2 air pressure while submerged in water at works. The air velocity across face of coil should be limited to 152 MPM. In case of chilled water coils the design should be such to limit water velocity to maximum of 120 MPM.

FILTERS

Each unit shall be provided with a factory assembled filter section containing washable synthetic type air filters having extruded aluminum frame with filtration efficiency 90% down to 10 micron particle size. Filters shall fit so as to prevent by pass. Holding frames shall be provided for installing a number of filters cells in banks. These cells shall be held within the frames by sliding the cells between guiding channels. Face velocity across filters shall not exceed 152 MPM.

STANDARD SPECIFICATION OF AIR-COOLED SCROLL CHILLER

SCOPE

This section deals with supply, installation, testing and commissioning of air-cooled chiller with hermetic scroll compressors meeting the requirement of Schedule of Quantity and the intents of the specification.

Equipment documentation with manufacturer catalogues shall be submitted along with the performance data by the tenderee at the time of submission of the tenderee. All performance data shall be in terms of computer print outs for the specified power supply, chiller fouling, part load performance figures shall be clearly specified.

GENERAL DESCRIPTION

Factory assembled single piece air-cooled liquid chiller as specified in the B.O.Q. Contained within the unit shall be all factory wiring, piping, controls, refrigerant charge (R-407C/EQUIV. GREEN ref), multiple refrigeration circuits set, scroll compressors, electronic expansion valves and equipment required prior to field start-up.

Chillers shall employ multi compressors and may be direct expansion or flooded type. Chiller rating shall be as indicated in S.O.Q.R. with the use of R407C/Equiv. green refrigerant. Each chiller shall house multiple compressors (preferably two to three no.).

Compressors shall be hermetic type, tested and validated for trouble free long life. Separate independent refrigeration circuit shall be incorporated along with isolation of power so that one compressor and refrigerant circuit can be undertaken for maintenance keeping the others into operation. In case of compressor motor burnt out in one circuit, the other circuit in the same housing shall be in operation. The chiller shall be factory performance tested.

PERFORMANCES

Cooling capacity: ……..kW
Unit power input (compressor): ……kW
Full load energy efficiency (EER kW/kW): …….
Evaporator entering/leaving water temperature: …7.2/12.8°C
Fluid…….. Clear water
Ambient air in temperature:…43.3 °C
Sound power: …….dB(A)

Nominal Energy Efficiency Ratio (EER):

PRODUCT FEATURES

Unit frame:

Frame shall be made of steel section and protected by two layers of protection (primer and final coating of paint) with an average thickness of 200 microns. The control box plates shall be steel with a paint finish as per manufacture's standard.

Compressors:

Unit shall have hermetic scroll compressors. Each compressor shall be equipped with a discharge shut-off valve. Capacity control shall be achieved by means of switching on/off one compressor as per system demand governed by chilled water outlet temperature.

Motor shall be cooled by suction gas and protected by internal winding temperature sensors. Lube oil system shall include external filter capable of filtration to 5 microns. The oil separator, separated from the compressor, shall not require oil pump.

Evaporator:

Evaporator shall be tested in accordance with applicable code for a refrigerant-side operating pressure of 2100 kPa and for a maximum water-side pressure of 1000 kPa.

The evaporator shall be mechanically cleanable, shell-and-tube type with removable heads. Tubes shall be internally and externally grooved, seamless-copper, and shall be rolled into tube sheets. Shell shall be insulated with 25 mm closed-cell foam with a maximum K factor of 0.28 (min.) or equivalent material to avoid condensation at 35^0C and 80% RH simultaneous. Evaporator thermal insulation shall be factory fitted with aluminium cladding/alternative method as approved by the manufacturer to provide mechanical protection.

The evaporator shall have a drain and vent in each head.

The evaporator shall incorporate an active refrigerant level control system to ensure optimum heat transfer performance under all load conditions.

Chiller shall have preferably one water inlet & outlet connection with victaulic couplings to avoid vibrations transmission and accept small misalignment. This coupling is included in the B.O.Q as a separate item for pricing purpose.

Evaporator shall be fitted with electronic auto setting water flow switch. Paddle switches or differential pressure switches shall not be acceptable.

Condenser: As per chiller manufacturer's standard.

Refrigeration circuits:

Refrigerant circuit components shall include, compressor, high side pressure relief devices, compressor discharge, suction and liquid line shutoff valves, filter driers, moisture indicating sight glasses, long stroke electronic expansion device, and complete operating charge of both refrigerant R407C/equiv. green refrigerant and compressor oil. To facilitate service and maintenance and avoid refrigerant charge transfers, it must be possible to isolate the following components and systems independently:

filter driers, expansion devices and compressor (with compressor suction service valve)

Controls:

Unit controls shall include as a minimum: microprocessor with non-volatile memory, the LOCAL/OFF/REMOTE/CCN selector and a touch-screen display.

Pressure sensors shall be installed to measure suction, discharge, and oil pressure.

Thermistors shall be installed to measure cooler/condenser entering and leaving temperatures.

Unit shall be capable of performing the following functions:

Capacity control based on leaving chilled fluid temperature with return fluid temperature sensing.

Enable reset of leaving chilled water temperature according to the return water temperature.

Provide a dual set point for the leaving chilled water temperature activated by a remote contact closure signal or by the built in time clock.

Allow to enable unit start-up control, demand limit and set-point changes.

Diagnostics:

Display module shall be capable of displaying set points, system status including temperatures, pressures, current for each compressor, run time and percent loading.

The control system shall allow a quick test of all machine elements to verify the correct operation of every switch, circuit breaker, contactor etc. before the chiller is started.

Safeties:

Unit shall be equipped with all necessary components, and in conjunction with the control system shall provide the unit with protection against the following:

- Loss of refrigerant charge.
- Reverse rotation.
- Low chilled water temperature.
- Current imbalance.
- Compressor thermal overload.
- Automatic compressor unloading in case of excessive air temperature.
- High pressure.
- Electrical overload.
- Loss of phase/phase reversal.

Fan motors shall be individually protected by a circuit breaker. Control shall provide separate general alert (minor incident) and alarm (circuit down) remote indication.

Electrical Characteristics:

Unit shall operate on 3-phase power supply without neutral.
Control voltage shall be supplied by a factory-installed transformer.
Unit shall be supplied with factory-installed electrical disconnect/isolator switch integrating main fuses.
Unit shall have a factory installed starter to limit electrical inrush current.

Testing:

The chiller shall be site tested for establishing the capacity and power consumption. Refrigeration capacity shall be computed from measurement of water flow and entering & leaving water temperatures on chiller side. Flow measurement shall be through flow meters. Computed results shall tally with the specified capacities & power consumption figures furnished with the tenderee offer. Test shall be carried out on:

The compressor-motor side for power consumption and also the capacitiy from the Chiller side.

All meters, gauges thermometers, watt-meters shall be provided by contractor with duly calibrated. All necessary pipe-fittings required for insertion of orifice plate assembly shall be provided by contractor during piping installation.

For multiple unit installation test on one prototype unit shall be adequate.

For payment, entire water chilling package with all accessories, starters, controls, control panel, control wiring, insulation, vibration mounts, refrigerant piping, refrigerant and oil charge, erection, commissioning and testing shall be regarded as one unit.

STANDARD SPECIFICATIONS OF PUMP SETS

SCOPE

This section deals with supply, erection, testing and commissioning of water pump sets conforming to general specification and suitable for the duty selected as indicated in the specification. The type, capacity and size of pumps shall suit the schedule of quantities. The Pumps selected should have high efficiency which should be supported by selection charts and curves.

HORIZONTAL SPLIT CASING / BACK PULL OUT PUMPS

The horizontal split casing pumps design shall be selected for condenser water / chilled water re-circulation duty. The pump casing shall have heavily ribbed construction, suction and discharge branches, drilled to BS 4504 PN-16 or equivalent. The impeller made of cast iron shall be double shrouded, single entry, radial flow type. It shall be hydraulicaily balanced to minimise axial thrust. The stuffing box shall be factory fitted with mechanical seal.

A minimum of the following accessories shall be provided with each pump:-

a) Air vent Cocks.

b) Lubrication fittings and seals.

The construction of Back Pull out Pumps shall be as follows and as per IS 1520 / International standards.

Duty	Chilled water
Casing	Cast Iron
Impeller	Cast Iron
Shaft	Stainless Steel
Bearings	Ball Bearing
Base Plate	MS
Speed (Synchronous) for split case	1500 RPM
Speed (Synchronous) for monoblock/ Back Pull-out	2800 RPM
Motor	TEFC
Mechanical seal	Factory fitted

The impellers of pumps shall be statically and dynamically balanced.

The capacity of motor shall be at least 15% in excess of BHP requirement of pump & shall be as per Standard Specifications, Detailed calculation for selection of pumps shall be submitted by the tendereeer.

The installation of pumps shall be carried out by the contractor as per manufacturer recommendations. The pumps shall be mounted on concrete foundations with vibration isolators sandwitched between foundation and floor. As far as possible, the pump sets shall be factory aligned and if necessary site alignments shall be done by experienced and trained person. The pumps shall be installed in a manner that would allow maintenance without causing damage to the insulation.

STANDARD SPECIFICATIONS OF CONTROL SYSTEM

SCOPE

This section deals with supply, installation, testing and commissioning of necessary controls (automatic) and instruments conforming to these specifications and shall be in accordance with Schedule of Quantities. The various controls listed below shall be electrically operated and in case of low voltage controls the necessary

step down transformer shall be provided with each control. All automatic controls shall be as detailed in specifications below, however, if the automatic control is not already installed on the machines, it may be installed by the contractor as per Schedule of Quantities.

CONTROLS FOR AIRHANDLING UNITS

Three way modulating valves:

The three way modulating valves shall be provided in chilled water line to the cooling coil of Air-handling unit which is actuated by a proportionating thermostat. In case of TFA, the valve shall be actuated based on a leaving air temperature of 13^0 C. The three-way valve shall be selected for valve actuating value in the range of 30 % to 60 %. These valves shall consist of bronze metal valve body with stainless steel trim with linear flow characteristics. Modulating motor shall be suitable for operation with a signal of 0-10 volt DC/5-20 mA signal. The pressure drop across valve for air-handler unit shall not exceed 5.0 PSI. The valve linkages shall be of the same make as of valves & modulating motor.

The starters for the AHU shall have potential free contacts to integrate with the fire alarm panel so that the AHU trips whenever there is a fire alarm generated.

THERMOSTATS

Proportionating Thermostat for AHU:

For Air-handling units, three way mixing valves shall be proportionately operated based on return air temperature & is suitable to operate in the range of 14 to 30 °C.

INSTRUMENTS

i) Thermometer: The alcohol filled Y-form thermometer shall have range of 0- 50 °C. for air-conditioning application. These shall be provided at inlet / outlet of chillers & air-handling units.

ii) Pressure gauges: The pressure gauges shall be dial type of 100 mm dia to be installed at inlet / outlet of chillers and air handling units, suction and discharge ends of pump-sets.

STANDARD SPECIFICATION OF THERMAL / ACOUSTIC INSULATION

SCOPE

This section deals with the supply, application, testing of insulation both thermal and acoustic to be applied in duct, pipes as well as underdeck of the exposed roof. All the materials shall conform to relevant National/ International Standard. The material shall also be tested from Govt. Laboratory for thermal conductivity as well as for fire redundancy.

DUCT THERMAL INSULATION (ALUMINIUM FACED)

Thermal insulation material for Duct insulation shall be closed cell Elastomeric Nitrile Rubber of Thermal conductivity of the insulation material not to exceed 0.038 W/m°K or 0.212 BTU / (Hr-ft2 - 0F/inch) at an average temperature of 30°C. Density of the nitrile rubber be 40-60 Kg/m3. The product shall have temperature range of -40 °C to 105°C. The insulation material shall be fire rated for Class 0 as per BS 476 Part 6 : 1989 for fire propagation test and for Class 1 as per BS 476 Part 7, 1987 for surface spread of flame test. Water vapour permeability shall not be less than 0.024 per inch (2.48 x 10"14 Kg/m.s.Pa i.e. u>7000: Water vapour diffusion resistance).

Thickness of the insulation shall be as specified for the individual application. Each lot of insulation material delivered at site shall be accompanied with manufacturer's test certificate for thermal conductivity values,

density, water vapour permeability and fire properties. Samples of insulation material from each lot delivered at site may be selected by Owner's site representative and got tested for thermal conductivity and density at Contractor's cost. Adhesive used for sealing the insulation shall be non-flammable, vapour proof adhesive strictly as per manufacturer's recommendations.

Ducting insulation thickness shall be as per table below.

Ducting position	Thk
SA duct in RA path	13mm
Ducted return air system	SAduct: 19mm Raduct: 13mm
Both SA& RA exposed	Both 25mm

DUCT INSULATION

External thermal insulation shall be provided as follows:

The thickness of nitrile rubber shall be as shown on drawing. Following procedure shall be adhered to:

Duct surfaces shall be cleaned to remove all grease, oil, dirt, etc. prior to carrying out insulation work. Measurement of surface dimensions shall be taken properly to cut closed cell elastomeric rubber sheets to size with sufficient allowance in dimension. Cutting of nitrile rubber sheets shall be done with adjustable blade to make 90° cut in thickness of nitrile rubber sheet. Hacksaw or blades are not acceptable tools for cutting the insulation.

Material shall be fitted under compression and no stretching of material shall be permitted. A film of adhesive shall be applied on the back of the insulating material sheet and then on to the metal surface. When adhesive is tack dry, insulating material sheet shall be placed in position and pressed firmly to achieve a good bond. All longitudinal and transverse joints shall be sealed by providing 6 mm thick 50 mm wide nitrile rubber tape. The adhesive shall be strictly as recommended by the manufacturer.

ACOUSTIC LINING OF DUCT

12 mm thk. fire retardant grade fibre glass rigid board having density not less than 48 kg/m^3 and thermal conductivity 0.027 W/MK at mean temperature of 10°C shall be used for acoustic lining for duct. The insulation material shall be covered with perforated aluminium sheet as per detailed working drawing and the Bill of Quantity.

APPLICATION

Clean the inner duet surface and apply thin layer of adhesive on the surface of insulation and duct surface.

Fix the glass wool cloth on the adhesive surface.

Apply 30 SWG perforated aluminium sheet (20-25%). Fasten the aluminium sheet with GI/brass screws. All the edges shall be folded with the aluminum sheet so that fibre glass does not spread out during operation of the fan.

ACOUSTIC LINING OF AHU ROOM

50 mm thk. fire retardant grade fibre glass rigid board having density not less than 48 kg/m^3 and thermal conductivity 0.027 W/MK at mean temperature of 10°C shall be used for acoustic lining for AHU room. The insulation material shall be covered with tissue paper and perforated aluminium sheet as per detailed working drawing and the Bill of Quantity.

APPLICATION

Clean the inner wall surfaces and apply thin layer of adhesive on the surface of insulation and wall/roof surface.

Fix the glass wool cloth on the adhesive surface and GI frame work fixed on the wall/ roof.

Apply 26 SWG perforated aluminium sheet (20-25%). Fasten the aluminium sheet with GI/brass screws. All the edges shall be folded with the aluminum sheet so that fibre glass do not spread out during operation of the fan.

Underdeck Insulation:

Providing and fixing thermal insulation of ceiling (under deck insulation) with Resin Bonded Rockwool conforming to IS: 8183 and density 48 kg/ m^3, 65 mm thick, wrapped in 200 G Virgin Polythene bags fixed to ceiling with metallic cleats (50x50x3 mm) @ 60 cm and wire mesh of 12.5mm x 24gauge wire mesh, for top most ceiling of building.

Resin bonded rockwool slabs of density 48kg/m3 and thickness 65 mm is suitable for roof underdeck insulation. rockwool slab shall be 'non-combustible' when type tested as per BS 476 part 4,5,6,7. Rockloyd shall have thermal conductivity value 0.029 W/mK at 10° C. mean temp. and conforms to IS : 8183 , BS :3958 Pt.5. Rockwool shall be green product of low embodied energy and it shall be manufactured using slag of steel industry waste and igneous/basalt rocks as mining waste and shall not use CFC or HCFC gases in its manufacturing.

APPLICATION

1. Clean the surface thoroughly with wire brush to free it from dust and chippings.

2. Providing and fixing M.S. cleats of size 50mm x 50mm x 3mm to the ceiling @ 500mm c/c with help of dash fasteners. GI z channels to be fixed on the wall with the help of these clits.

3. Providing & fixing 65 mm thick Rockloyd Rockwool slab of 48kg/m3 density encased in 200g polythene sheet.

4. All joints to be sealed with adhesive tape and held tightly in position with the help of cris-cross GI lacing wire and further installing the same in 24 G x 3/4" hexagonal wire netting.

5. The joints of the wire netting shall be butted and stitched with GI lacing wire.

6. Final finish as per specs or engineer in charge

CHILLED WATER & CONDENSATE DRAIN PIPING THERMAL INSULATION

The material shall be thermocole pipe section of requisite thickness as specified in the B.O.Q. The thickness shall be 25 mm for drain piping and 50 mm for the chilled water circulation pipes.

APPLICATION

For over-ground laying following steps to be followed:

i) Clean the surface thoroughly with wire brush and make it free from dirt, oil. Grease and other foreign material.

ii) Apply one coat of bitumen based adhesive and allow it for drying for 15-20 minutes. Once the adhesive is dry but sticky to touch, apply the pipe section.

iii) Press the insulation section tightly over the entire' surface to make stronger bond between the pipe and insulation.

iv) Apply sealant in the jointing section. Apply vapour barrier on the outer surface of the insulation material.

v) Wrap the surface with chicken wire mesh and finish the surface by sand cement plaster having a mixing ratio of sand to cement as 4:1 (min).

For underground piping insulation follow the above steps from (i) to (iv) including one additional step:

Apply tarfelt/fiberglass tissue with semi hot bitumen 85/25 or 95/10 grade. Overlap joints (75 mm) with semi hot bitumen uniformly. Apply a coat of hot bitumen @ 1.8 kg/m^2 (approx.) over tarfelting.

For condensate drain piping above procedure shall be followed.

For valves, fittings etc. in the chilled water line, same thickness as specified earlier for pipe run shall be followed.

STANDARD SPECIFICATION OF FIRE DAMPERS

SCOPE

This section deals with supply, erection and commissioning of fire dampers and box type dampers, conforming to general specification and suitable for duty selected, indicated in Schedule of Equipment.

FUSIBLE LINK TYPE COMBINED SMOKE & FIRE DAMPERS

a) All supply air Ducts coming out of AHU room shall be provided with approved make fire and smoke dampers of at least 12 minutes fire rating (at 950 Deg. C) certified by CBRI. Roorkee as per UL555:1973. Fusible link shall melt at a temperature of 60 Deg. C.

b) The fire damper blades & outer frame shall be formed of 1.6 mm thick galvanised 115 steel sheet. The damper blade shall be pivoted on both ends using chrome plated spindles in self lubricating bushes. Stop seals shall be provided on top & bottom of the damper housing made of 16G galvanised steel sheet. For preventing smoke leakage, side seals will be provided.

c) The fire damper shall be mounted in fire rated wall with a duct

sleeve min. 600 MM long. The sleeve shall be factory fitted on fire damper. The joints at sleeve end shall be slip on type. Minimum thickness of GI Sheet shall be 18G.

d) The damper shall be installed in accordance with the installation method recommended by the manufacturer.

e) Hinged access doors of suitable size complete with air tight gaskets shall be provided in all fire dampers & plenums.

STANDARD SPECIFICATION FOR AIR MOVING APARATUS

SCOPE

The scope of work covers supply, erection, testing and commissioning of various Air Moving Apparatus as described hereinafter.

All manufacturer catalogues and performance data physical dimensions & weight shall be submitted and got approved before procurement/supply at site.

Centrifugal fan

Centrifugal fans shall have backward curved preferably with hollow heavy section aerofoil, blades with non-overloading characteristics. Fan assembly include, shaft shall be statically and dynamically balanced with critical speed at least 30% away from the operating range of speeds of the fan. Outlet velocity of fan shall be restricted within 10 m/sec.

Heavy duty self-aligning re-greasable roller bearings capable of absorbing radial and axial thrust loads. All bearings shall be selected for quite operation and long life.

The fan shall be suitable for continuous operation. The casing and impeller shall be of galvanized sheet.

The fans shall be shop performance tested as per AMCA 300-85 and ISO 3741.

Axial flow fans

Axial flow fans shall be tube axial flow type. Fans shall be selected for low noise levels and meet the flow and pressure requirements specified.

Drive for all axial flow fans shall be generally direct drive wherever possible. All motors shall be seized at more than the maximum Brake Power of the fan in its operating range.

Circular duct fans

The fan shall be wall mounted type and shall operate as exhaust fan with ducts to be connected at the inlet. The fan shall be provided with backward curved blades with external rotor motor. The casing of, the fan shall be made of GI conforming to IS: 277. The unit shall have the provision of speed control. Max. noise shall not be more than 40 dB (A) at a distance of 1 m for the fan.

Rectangular duct fans

The unit shall have backward curve impeller with external motor having provision of speed control. The fan shall generate noise not more than 50 dB (A) at a distance of 3m. The unit shall have acoustic and thermal insulation with 50 mm thick, mineral wool with perforated GI sheet on the inner surface. The fan shall be provided with all standard accessories including fire retardant flexible connector.

Rectangular inline fans shall incorporate single inlet single width direct driven centrifugal fan with (IP-55) TEFC motor. The fan assembly shall be encased in a housing of min. 22G G.I. with inspection cover & proper gasket assembly. Flanges shall be provided on both sides of inline fan to facilitate easy connection. Flexible anti-vibration joints shall be provided to arrest vibration being communicated to other equipments/component.

All the fans shall be supplied fully wired and ready to fit in sealed installation unit.

All fans shall be tested to establish the following ratings/technical parameters:

Air quantity	CMH/CFM
Static Pressure	mmWC/inofWC
Fan speed	RPM
Outlet Velocity	m/s / FPM
Full load current	Amps.

Equipment with low noise power levels would have added weight age in the assessment of equipment.

Vibration isolators, flexible connectors etc. shall form part of the equipment and shall not be paid separately.

STANDARD SPECIFICATION OF ELECTRICAL MOTORS AND STARTERS

SCOPE

This section deals with supply, installation, testing and commissioning of all types of motors used for pumps, air-handling units, compressors, etc. The motor installation, wiring & its control shall be carried out in accordance with the specifications as detailed below.

MOTORS

The make of motors shall be as specified in List of Approved Make.

a) The motor shall be of the following design and should run at all loads without any appreciable noise or hum. Totally enclosed fan cooled Sq. Cage. (Protection IP – 55)

b) The winding of motors shall be class 'F' insulation (with temperature rise limited to Class "B") and suitable for local conditions. The insulation of motors shall conform to 1S:325/1978.

c) All motors shall comply with IS:325, IEC-34.1 or BS – 2313, IEC-72.1 for foot mounted motors.

d) The rating of the motor shall be as indicated in the Schedule of Quantities / as required. The motors shall be selected on the basis of ambient temperatures and allowable maximum temperature rise.

e) Motor above 1HP shall be three phase unless otherwise specified.

f) All motors shall be rated for continuous duty as per IS:325. Motor shall be suitable for operation on 415 volts ± 10% volts, 50 ± 5% Hz AC supply (or 230 ± 10% volts, 50 ± 5% Hz for single phase AC supply):

g) Motors shall be provided with cable box to receive Aluminum conductors, PVC insulated, PVC sheathed and armoured cables.

h) A11 motors shall be provided with combination of 'Ball and Roller Bearing, Suitable grease nipples for re-greasing the bearing shall be provided.

i) Motors above 0.25 HP shall be provided with overload protection. Motors above 100 HP shall be provided with thermal protection and thermistor detector in the stator winding.

j) The starting current and the type of starter to be used shall be as follows (unless otherwise specified)

	Type of motor	Starting Current	Starting method
a)	Sq. Cage motor up to 7.5 hp	600% of full load current	D.O.L
b)	Above 7.5 hp up to 60 hp	250% of full load current	Open transition Star / Delta
c)	75 HP & above	200% of full load Current	Closed transition Star/ Delta

COMPRESSOR MOTOR SHALL BE REFRIGERANT COOLED AS PER MANUFACTURERS STANDARD SPECIFICATION:

MOTOR STARTERS

k) All starters shall confirm to IS: 13947. The starter shall be enclosed in sheet metal enclosure, which would be dust and vermin proof.

a) All starters should have suitable range of voltage and frequency.

b) All starters shall have integral stop/start push button of international colour code.

c) Contactor shall have number of poles as required for appropriate duty. Contacts should be made of solid silver faced & shall be suitable for at least 40 contacts per hour.

d) In the event of power, failure, the starter should automatically disconnect.

e) All starters shall be provided with thermal over load relay.

f) All star delta starters shall have adjustable timers.

g) Terminal blocks with integral insulating barrier shall be provided for each starter.

h) All starters shall be provided as specified in Schedule of Quantities. All starters shall be compatible to the drive and driven equipment.

l) Extra contact for interlocking purpose shall be provided in the starter.

INSTALLATION OF MOTORS

a) The motor and drive machine shall be fixed on slide rails to facilitate belt and other adjustments.

b) Vibration isolation arrangement shall be provided.

c) The installation of motor shall be carried out as per IS:900.

d) The motor with driving equipment shall be mounted on foundation and connected to each other with flexible coupling with guard for chilled water pumps.

e) All motor shall be wired as per specifications. Earthing of motor frame shall be done with GI strips as specified in 'Bill of Quantities'.

f) All motors shall be tested at manufacturer's works as per I.S. standard and test certificates shall be furnished.

g) All motors after installation shall be tested at site for vibrations, heating and electrical insulation resistance by AC contractor.

STANDARD SPECIFICATION OF MOTOR CONTROLCENTRE & CABLE

MOTOR CONTROL CENTRE

CONSTRUCTIONAL FEATURE

Single front non-draw out design, free standing, compartmentalized, floor-mounting type.

Panel with sheet steel (CRCA) i.e. 1.6 mm thick, except front door. The same may be 2 mm thk. sheet steel.

Dust and vermin proof design. The degree of Protection Class for enclosure shall be minimum IP-54 as per IS: 12063-1987 with 50 KA fault level.

Safety insulating barriers shall be provided in each module to prevent accidental contact with live parts.

Cutouts in the modular door shall have neoprene gaskets ensuring to prevent dust ingress.

Neoprene gaskets shall be used for cable alley door fixing.

All panels of MCC shall be provided with door interlocks. All terminations shall be shrouded in an approved manner. The entire enclosure shall meet with IS:2147/1962. Feeder connections shall be made out of solid insulated copper/aluminium wires or strips with bimetallic clamps wherever required. Internal wiring, bus bar markings etc. shall conform to IS:375/1963. Internal wiring shall have terminal ferrules. Main switch should be at an easily accessible height and the highest switch operating handle should not be over 1.75m from floor level. Cable glands need not form part of the switch board as the cost of glands will form part of the cable termination.

Bus bars shall be three phase and neutral and of copper or aluminium or aluminium alloy as specified and shown on drawings and rated for a temperature rise of 30°C over the ambient temperature specified. Neutral bars may be of one half-the size of the phase bars. The main horizontal bus bars shall be of uniform cross section and rated in accordance with the incoming switch.

The vertical bus bars for the feeder columns may be rated at 75% of aggregate feeder capacity and shall be uniform in size. Bus bars and interconnections shall be taped with PVC colour coded tape to prevent bar-to-bar accidental shorts. Each bus bar shall be directly and easily accessible on removal of the front cover. Bus bars shall be totally enclosed, shrouded and supported on non-hygroscopic insulated blocks to withstand thermal and dynamic overloads during system short circuits. An earth bus of size 50% of the phase bar subject to a minimum of 15 x 3 Cu or 25 x 3 Al shall be provided. Individual switch components shall be connected with the earth bus through copper or aluminium or galvanized steel strip. All wire connections to bars shall be through lugs, bolts and nuts and spring washers.

Isolators shall be fixed on wall on self-supported angle iron frame work as required and mounted as near to the motor as possible. Where several motors are installed, isolators if required shall be provided at a central location on a common frame work.

Panels shall be installed on a base channel frame and on a concrete pad to be provided by others. All panels shall be meggar-tested and shall not be commissioned till the values are more than 2.5 megaohms phase to phase and 1.5 megohms phase to neutral. All meters on the panel shall be calibrated before commissioning.

The general arrangement and fabrication drawings shall be got approved before taking up for fabrication.

All ammeter/voltmeter shall be 96 mmX96 mm.

All starters shall be selected in line with Type II coordination chart for breaker, contactor and over load relay etc. for fuse less system.

CABLES

All cabling work from MCC to various drives as well as to various local control centers shall be carried out by the successful tendereeer.

LT power cables within the enclosed premises shall be PVC insulated, unarmoured PVC sheathed conforming to IS:1554-1988. Cables in terrace and other open areas shall be PVC insulated armoured and PVC sheathed type.

All LT aluminium power cables of size 10 sq. mm and below shall be with solid conductor and above 10 sq. mm shall be with stranded copper case.

Control cables shall be of circular stranded copper conductor, PVC insulated round wire armoured, PVC overall sheathed and shall conform to IS: 1554, 1988.

Cables shall be selected considering a-de-rating factor of 0.7. There shall be no joining in the run of a cable.

Tenderee shall furnish cable list indicating the cable designation type, size, route and length.

Cables shall be laid in the routes marked in the drawings. Where the route is not marked, the contractor shall mark it out on the drawings and also on the site and obtain the approval of the Architect/Consultant before laying. Procurement of cables shall be on the basis of actual site measurements and the quantities shown in the schedule of work shall be regarded as a guide only.

Cables, running indoors shall be laid on walls, ceiling, inside shafts or trenches. Single cables laid shall be fixed directly to walls or ceiling and supported at not more than 500 mm. Where number of cables is running, necessary perforated cable trays shall be provided. Perforated cable trays shall be of Aluminium/mild steel. Perforated trays shall not be directly suspended but supported on mild steel frame-work as shown on drgs. or as approved. Cables laid in built-up trenches shall be on steel supports. Plastic identification tags shall be provided at every 20m. Cables shall be bent to a radius not less than 12 (twelve) times the overall diameter of the cable or in accordance with the manufacturer's recommendations whichever is higher.

In the case of cables buried directly in ground, the cable route shall be parallel or perpendicular to roadways, walls etc. Cables shall be laid in an excavated, graded trench, over a sand or soft earth cushion to provide protection against abrasion. Cables shall be protected with brick or cement tiles. Width of excavated trenches shall be as required. Backfill over buried cables shall be with a minimum earth cover of 600 mm. The cables shall be provided with cables markers at every 30 meters and at all loop points.

MV cables shall be tested upon installation with a 500V Meggar and the following readings established:

1) Continuity on all phases.
2) Insulation Resistance
m) between conductors
n) all conductors and ground.

All test readings shall be recorded and shall form part of the completion documentation.

PAINTING WORK

SCOPE

This section deals with painting of various equipment / material supplied under this contract. It gives basic guidance for painting as specified below:-

a) Application: The original colour of all equipments like water chilling machines, air-handling units etc. which if get damaged during transportation or during installation shall be painted in original shade with the two coat of paint to give a final finish.

b) All chilled water pipes shall be painted as per standard code of practice and arrows shall be marked to indicate direction of flow of water.

COLOUR SCHEME FOR THE EQUIPMENTS / MATERIALS

i)	Chilling M/C Standard.	As Per Manufacturer's
ii)	Pump-sets	Battle ship grey
iii)	Chilled water pipes	Light blue
iv)	Direction of flow of water	Black arrows
v)	Electrical panels/ sub-panel/remote control console	Light grey powder coated
vi)	Cable trays	Cadmium Plated
vii)	Supports for ducts	Silver

MODE OF MEASUREMENT

The following measurement code shall apply to the Contract:

SHEET METAL WORK

DUCTING

a) The final finished sheet area in sq. mtr shall be measured only.

b) Vanes, splitters, flanges, access doors etc. shall not be separately measured. These shall be treated as part of duct work.

c) Bends, Elbows, Transformation, pieces etc. shall be measured along the centre line and measured as per duct work.

d) Canvas connections, Duct Supports, Stiffening members, frames etc. shall not be measured separately and shall form part of duct work.

GRILLS / DIFFUSERS / FIRE DAMPERS

All Grills / Diffusers / Fire Damper areas will be measured in terms of effective area (Neck Area). Any Extruded aluminum grill / diffusers having an area less than 0.1 sq.mt shall be accounted as 0.1 sq.mt.

BOX DAMPERS

a) No separate measurement of box dampers shall be done since they form part of duct.

b) Fresh air dampers shall be measured as effective areas only. No separate measurements for bird screen inlet / outlet louvers shall be done.

PIPING WORK

a) The length of piping accessories & fittings shall be measured along its transfer line in meters and no measurements for bends, elbows, tees etc. shall be made. All such fittings / accessories shall be treated as part of the piping work.

b) Flanges shall not be measured, as they form part of piping work.

c) For thermometer wells & pressure gauge sockets no measurement shall be done separately.

d) All kinds of supports, hangers etc shall be part of piping work & no extra measurements shall be done.

e) No additional price for installation of purge valve, drain valve & descaling valves as required at site shall be paid.

INSULATION

Insulation of Duct

This shall be measured on the basis of bare duct surface area i.e. the area of duct insulation & area of duct shall be same.

Insulation of Chilled Water / Drain Water:

Insulation of pipes shall be measured in terms of linear length of pipe for each size.

For insulation of bends, elbows, tees etc. it shall be measured along with the center line of insulation and shall be measured in meters.

Insulation of valves shall form a part of piping insulation work.

Insulation of Chiller / Expansion Tank / Suction Line

The insulation of the above equipments shall be deemed to form part of equipment and no separate measurements for insulation of such items will be accounted for.

Acoustic Lining of Duct & Plenum

This shall be measured on the basis of bare duct surface area i.e. the area of duct lining & area of duct shall be same.

ELECTRICAL CABLING WORK

a) All power cables / controls cables shall be measured on linear basis in meters.

b) No extra price shall be paid on account of end termination of cables which includes thimble, gland etc.

STRUCTURAL SUPPORTS

No extra price shall be paid for the structural supports and the same will be deemed to have been included in the respective works.

PERFORMANCE TESTING, GUARANTEE AND SEASONAL TEST

SCOPE

The performance test shall be carried out for a period of 72 hrs. in presence of owner/consultant satisfactorily. The contractor will be solely responsible for full-proof performance of the entire air conditioning plant offered by him. The performance guarantee is for a period of 12 months from the date of handing over of the plant after successful commissioning and performance testing or for 18 months from the last delivery whichever is later. The performance guarantee will cover the following:

a) To achieve and maintain design conditions within areas to be air-conditioned, all through the year irrespective of variation of outside design condition and internal loads within permissible tolerance as specified in the tenderee documents.

b) To achieve uniform distribution of conditioned air and chilled water.

c) All equipment to give capacities as specified in technical data filled up by contractor and as accepted by consultant.

d) Consumption of utilities like electrical power and water keeping in view the total utilities requirement indicated by contractor in his offer as accepted by owner/ consultant.

Unit capacity (of each chiller) in tones of refrigeration shall be computed from the temperature readings and water flow measurements. Flow measurement shall be preferably through flow meter. Properly sized orifice plates along with the necessary valves shall be provided by the successful tenderee, in chilled water circuit for fixing the flow meter. Or alternately the successful tenderee shall arrange calibrated non-contact type flow meter for measuring the flow for computation purpose during commissioning. Computed results shall tally with the specified capacities and the power consumption (KW input to the drives while working under 100% load) shall tally with the figures furnished by the successful tenderee. Tolerance on unit capacity shall be as per ASHRAE/ARI.

In case unit capacities and design parameters guaranteed by the contractor are not established during the performance guarantee testing, the owner at his discretion may reject or accept the A/C plant after assessing technical suitability. However, purchaser shall levy liquidity damages as per the following formula and such amounts shall be deducted from the contract price. The contractor shall be given 2 months time after commissioning for rectification to achieve the necessary parameters, beyond which this L.D. shall be applicable:-

2.0% of the order value for every one degree excess temperature beyond the specified upper temperature limit

Rs. 25000 for every extra KW drawn above indicated values.

SEASONAL TESTS

The plant shall be offered for 72 hours performance tests immediately after commissioning. These tests shall be final acceptance test cum first seasonal test. The contractor shall carry out 72 hours seasonal test during summer and monsoon. The period of these tests will be fixed mutually by owner/consultant/contractor. The contractor shall be solely responsible for all the required materials, tools and tackles at site. These tests shall be conducted only after the physical completion of work is done, the system is commissioned and ready to use, the primary inspection is done and the 72 hours performance test is done. The seasonal test shall ensure that the equipment perform as per their rating chart, the entire system can meet the system requirement and the inside conditions are achieved.

Preliminary Acceptance Tests

During PAT checking will be made for confirming the installation of various equipments/items pertaining to air-conditioning system with respect to approved drawing and specification. Following parameters shall be checked during PAT:

1. Completeness of installation of the entire system.

2. Checking of rotating parts for free movement (without compressor). In case of non-availability of power supply, check shall be conducted through temporary power supply being arranged by the owner.

3. Checking of alignment of drive package.

4. Checking of direction of rotation of all driven equipment except compressor.

5. Checking of proper tightness of fasteners as well as foundation bolts and nuts.

6. Functional test of all electrical items.

7. Supply cable laying and megger test. In case the same is done during erection, relevant certificate shall be furnished.

8. Insulation/earthing resistance by megger. In case done during erection, relevant certificate shall be furnished.

9. Checking of cable termination.

PAT shall be organized by successful tenderer and arrange to meet the requirements for conducting the PAT.

During commissioning, all the equipments pertaining to the Air-conditioning system will be put into operation. Checking of all parameters will be done with respect to the contract documents and approved drawings. However, capacity test of the chiller will be carried out during FAT but functional checking of various controls will be done during commissioning. Performance of the system including maintenance of design condition will be observed. In addition to the above power consumption and utility consumption will also be recorded. All arrangement of commissioning will be made by the successful tenderer excepting the provision of power and water. In case the capacity test of the equipment had already carried out during inspection, the relevant certificate with inspection result shall be produced.

Final Acceptance Test (FAT)

Final Acceptance Test will mean load trial of the complete system including all the system equipments. The same will demonstrate that the system can perform to give rated output and establish desired/agreed inside

condition as stipulated in the contract. FAT will be done when suitable load will be made available by the user. All arrangement of conducting FAT will be made by the successful tenderer.

Tenderee shall furnish the equipment wise technical data as per the following:

WATER CHILLING UNITS

a) Make –
b) Model –
c) Compressor type –
d) No. of compressors per unit –
e) Refrigerant –
f) Capacity at the specified condition
g) Chilled water out °C -in °C –
Input K\V at
100% load (KW)
67% load (KW)
33% load (KW)

h) Incoming breaker size required – Amp.
I) Physical dimension -
j) Weight Dead –
Operating –
o) Noise (DBA) at a distance of 3M –

Chiller

a) Water passes (No.) –
b) Refrigerant circuits (No.) –
c) Shell dia & shell length –
d) Water side pressure drop (Kpa) -
e) Fouling factor –

Condenser (Water-cooled)

a) Water passes (No.) –
b) Refrigerant circuits (No.) –
c) Shell dia & shell length –
d) Water side pressure drop (Kpa) -
e) Fouling factor –

CHILLED WATER PUMPS (Performance Curve to be given)

a) Pump discharge (CMH) –
b) Head (MWC) –
c) BKW –
Motor rating –
Starter type –
d) Motor enclosure (IP Rating) –
e) Make/Model –

AIR HANDLING UNIT

a) Make/Model/Type –
b) Air quantity (CMH) –
c) Total static (MMWC) –
d) Speed (RPM) –
e) BKW –
f) Motor rating/Make –
g) Starter Type –
Make-
h) Motor enclosure (IP) -
i) Fan outlet velocity (M/S) -
j) Fan make and model -
k) Coil Row/Deep -
1) Coil Face Area (M^y) –
Tube dia & tube thickness (MM) –
No. of tubes –
No. of Fins/inch –
Fin material/thickness –

m) Air entering temperature °C , Air leaving temperature °C
n) Water quantity (m^3/hr) –
0) Water temperature In °C –
Out °C –
p) Pressure drop (mmWC) –
q) Pre-filter material –
r) Make/size –
s) Filter Face area (SQ.M) –
Air velocity (M/S) –
t) Pressure drop
Clean condition (mmWC) –
Dirty condition (mmWC) –
u) Filtering efficiency –

FANS

a) Make/Model –
b) Type/Discharge-
c) Speed (RPM) –
d) Air Quantity (CMH) –
e) Static Pressure (MMWC) –
f) Power Consumption (KW) –
g) MotorRating
h) Starter type –
i) Motor enclosure (IP) –

ENERGY RECOVERY WHEEL (if applicable)

Make/Model –
Capacity CFM/CMH –
Design outside/ inside condition –
Power required for wheel –
Intake air blower-
Exhaust air blower-
Computerised selection of the ERV/TFA – Enclosed

LIST OF APPROVED MAKES

Sl. No.	Description	Makes
1	Air-cooled Scroll Chiller	Blue Star/Voltas/Carrier
2	Air handling unit	Blue Star / CARYAIRE / ETHOS/Edgetech/Zeco/Citizen
3	AHU Blower	Comefri / Krugger / Nicotra /Lau
4	Air Filters (Pre Filters)	FMI / SPECTRUM / AIRTECH /AHU manufacturer's std.
5	Pumps	Kirloskar/KSB/ BEACON/Grundfoss/Zylem
6	Secondary Pumps	Kirloskar/KSB/ BEACON/Grundfoss/Zylem
7	Three phase motors	Crompton/ABB/ Siemens
8	Inline Fans	Kruger / Nicotra/Systemair
9	MS/GI piping	Jindal/Tata
10	Water duty valves excluding balancing valve	Audco / Intervaive / Leader / Levcon / Advance / Rapid Cool / Flowcon / Crawley & Ray
11	Balancing valve	Advance / Flowcon/Belimo /Johnson controls /Siemens
12	Strainers cum flow straightners	ANERGY
13	Gl Sheet	SAIL/TATA
14	Pressure gauges	Feibig/ H Guru
15	Automatic Air Vent valves	ANERGY
16	"V" type thermometer	EMERALD / FIEBIG
17	Thermocole (Pipe Insulation)	Beardsell/ Calcutta Packaging / Thermowell/Astha
18	Propeller /Axial Flow Fans	FLAKT / NICOTRA/Systemair
19	Fibre glass rigid board	UP Twiga / Kimmco
20	Grilles/Diif./Fire dampers	Systemair / Dynacraft / Caryaire/Premier Industries
21	Volume Control Damper (G.I.)	RAVISTAR / DYNACRAFT/Premier Industries/Systemair
22	AHU Control valves	Honeywell / Johnson / Belemo/Siemens
23	Sensors / controllers	Honeywell / Johnson / Siemens
24	Energy Recovery Ventilators	Dessicant Rotor International
25	MCB/ACB	L&T/GE/Siemens/ Schneider
26	Valve Actuator	Jhonson/Honeywell/Siemens/Belemo
27	Power & Control cable	CCI/Gloster / Finolex
28	Voltmeter/Ammeter	A.E./IMP
29	Switches	L&T/Siernens/ABB/GE/ Schneider
30	HRC fuse & fittings	L&T/Siemens/GE

31	Current 129ransformer	A.E./Kappa
32	Contactors	L&T/Siemens/ GE/ Schneider
33	Overload Relays	L& T /Siemens/Gt/Schneider
34	Indicating lights	Vaishnu / EMCO
35	Panels (electrical)	System Syndicate/System control and Automation Pvt.Ltd/EAP / Synergy Enterprise
36	Flex. Bellow	CORI
37	Water tank for Expansion tank	Patton/Syntex
38	3 Star rated Split Ac (Hi-Wall)	Blue Star/Carrier/Hitachi/Daikin
39	Nitrile Rubber	Armacell/ K-Flex/ Vedio Flex
40	Rockwool	Lloyd insulation/equivalent

The Tenderer shall indicate the specific make of material (any one of the make listed in "list of approved make") proposed to be used by them for the said work against each item failing which the client reserves the right to choose any one make out of the makes of materials. In case the make of any item is not listed in the "List of approved make", the tendered shall propose the make of the said item which they intend to use in the project.

Signature and Seal of the tenderer

Schedule of Quantities & Rates (SOQR)

All equipment and accessories shall be offered inline with the technical specifications

SECTION A (For SITC of HVAC System)

Sl. no.	Description of item	Unit	Qty	Rate (Rs.)	Amount (Rs.)
1a	Air cooled scroll chiller of 34 Tr. (minimum) nominal capacity to be offered with the technical specifications cofiguration, shell and tube evaporator, control panel, refrigeration accessories, first charge of refrigerant and oil, mounting arrangement etc., control panel with necessary wiring complete in all respect to commission. The unit shall have mutiple compressors (preferably 2-3 nos) with multiple refrigerant circuitry (2 to 3 no circuits per chiller).The entering and exiting chilled water temperature shall be 55/45 Deg F and the ambient air temperature shall be 43.3 Deg C. The fouling factor for cooler shall be 0.0001 FPS unit. The chillers shall be two working.	no.	3	₹ 9,20,000.00	₹ 27,60,000.00
1b	80 mm dia flexible pipe connectors	no.	6	₹ 2,600.00	₹ 15,600.00
1c	80 mm butterfly valve with additional set of flanges for isolating the equipment for service.	no.	6	₹ 3,100.00	₹ 18,600.00
1d	Water flow switch with interconnecting cable between the flow switch and the control panel	no.	3	₹ 2,200.00	₹ 6,600.00
1e	Dial type (4" dial) pressure gauge (0-150 psi) with necessary fittings and isolation valve	no.	6	₹ 950.00	₹ 5,700.00
1f	80 mm dia Glove valve	no.	3	₹ 9,800.00	₹ 29,400.00
1g	Stem type thermometer with thermowell (0 to 120 DegF)	no.	6	₹ 850.00	₹ 5,100.00
2	Supply, installation, testing and commissioning of monoblock pumpsets comprising of the pumps motors and other accessories.				
2a	Chilled water pump sets having head of 24 mwc at a discharge rate of 90 usgpm (2 working) including motor, base frame and coupling etc. to complete the installation. Monoblock Pump.	no.	3	₹ 1,04,000.00	₹ 3,12,000.00
2b	80mm dia Butterfly valve with additional set of flanges for isolating the equipment for service.	Sets	6	₹ 3,100.00	₹ 18,600.00
2c	80mm dia Check valve	no.	3	₹ 4,800.00	₹ 14,400.00
2d	80mm dia Y-Strainer with SS screen	no.	3	₹ 5,000.00	₹ 15,000.00
2e	80mm dia Glove valve	no.	3	₹ 9,800.00	₹ 29,400.00
2f	80mm dia flexible pipe connector	no.	3	₹ 2,600.00	₹ 7,800.00

2g	Dial type (4" dial) pressure gauge (0-150 psi) with necessary fittings and isolation valve	Sets	6	₹ 950.00	₹ 5,700.00
3	Supply, installation,testing and commissioning of double skin air handling unit with blower, motor, drive set, cooling coil, filters, vibration isolators and other accessories as required to complete the installation.				
3a	36 Tr (14000 CFM) 50 mm SPWG floor mounted with 6 row cooling coil (2W)	no.	2	₹ 2,42,000.00	₹ 4,84,000.00
3b	80 mm nb Butterfly Valve with additional set of flanges for isolating the equipment for service.	no.	10	₹ 3,100.00	₹ 31,000.00
3c	Arrangement of temperature and pressure gauges with fittings and valves (set shall mean both inlet and outlet of AHU together)	sets	2	₹ 3,600.00	₹ 7,200.00
3d	Starter for AHU with suitable step down transformer for power supply to the actuator of fire damper and the tree-way modulating valve.	no.	2	₹ 17,000.00	₹ 34,000.00
3e	65 mm nb 3 way motorised valve with actuator, proportionate thermostat and sensing arrangement complete.	no.	2	₹ 58,000.00	₹ 1,16,000.00
4	SITC of 3star rated split unit (Hi-Wall Type) . The units shall be complete with compressor, condenser, evaporator, expansion device, refrigerant piping and other accessories to complete the installation. The nominal capacity shall be as under:				
a	2.5 Tr	sets	5	₹ 65,000.00	₹ 3,25,000.00
b	1.5 Tr	sets	4	₹ 40,000.00	₹ 1,60,000.00
5	PVC tank of specified make having capacity as given below including cutouts and flanges for necessary pipe connection and other connections to be used as expansion tank including insulation. The price shall include for insulation with 50 mm thick TF quality thermocole slab applied on bitumin, covered with vapour barrier, chicken wiremesh and finished with 12 mm thk sand cement plaster. Make up and quick fill connection with ball float and necessary valves shall be included in the price of the tank.				
5a	500 litres capacity	no.	1	₹ 11,000.00	₹ 11,000.00

6	Supply,installation,testing and commissioning of floor mounted compartmentalised dust and vermin proof MCC for the air conditioning system with all the starters for the pumps, power feeder for the AHUs, power feeder for the chilling unit, common annunciation from the chilling unit. This should feed the following:	no.	1	₹ 2,70,000.00	₹ 2,70,000.00
	The power feeder for the chiller 3 no (2W)				
	Starter for chilled water pump 3 no (2W)				
	Power Feeder for AHU 2 No (2W)				
	On-OFF switch and On indication for AHUs				
7	Supply,installation,testing and commissioning of 1100 V, aluminium armoured, PVC insulated cables including earthing and cable trays for dressing wherever necessary.				
7a	31/2X50 Sq. mm	Mtr.	5	₹ 620.00	₹ 3,100.00
7b	3 1/2 CX35 Sq.mm	Mtr.	120	₹ 500.00	₹ 60,000.00
7c	3CX10 Sq. mm	Mtr.	2	₹ 275.00	₹ 550.00
7d	3CX6 Sq. mm	Mtr.	30	₹ 240.00	₹ 7,200.00
7e	3CX4 Sq. mm	Mtr.	120	₹ 215.00	₹ 25,800.00
	Supply, installation, testing and commissioning of 1100 V, copper armoured, PVC insulated cables including earthing and cable trays for dressing wherever necessary.				
7f	2CX1.5 Sq. mm copper armoured cable	Mtr.	50	₹ 200.00	₹ 10,000.00
7g	3CX1.5 Sq. mm copper armoured cable	Mtr.	20	₹ 210.00	₹ 4,200.00
7h	3CX2.5 Sq. mm copper armoured cable	Mtr.	20	₹ 240.00	₹ 4,800.00
7i	2CX 1.0 Unarmoured copper cable	Mtr	10	₹ 140.00	₹ 1,400.00
7j	3CX 1.0 Unarmoured copper cable	Mtr	10	₹ 170.00	₹ 1,700.00
7k	4CX 1.0 Unarmoured copper cable	Mtr	10	₹ 200.00	₹ 2,000.00
8	Supply,installation,testing and commissioning of GSS ducting with turning vanes, GI down rods and support angles as per IS 655.				
8a	20 SWG	Sq. Mtr.	95	₹ 1,130.00	₹ 1,07,350.00
8b	22SWG	Sq. Mtr.	110	₹ 1,000.00	₹ 1,10,000.00
8c	24 SWG	Sq. Mtr.	290	₹ 850.00	₹ 2,46,500.00
9	Supply,installation,testing and commissioning of duct thermal insulation				
9a	with 13 mm thick aluminium foil faced nitrile rubber as per specification.	Sq. Mtr.	20	₹ 590.00	₹ 11,800.00

9b	with 25 mm thick aluminium foil faced nitrile rubber as per specification.	Sq. Mtr.	5	₹ 900.00	₹ 4,500.00
9c	with 19 mm thick aluminium foil faced nitrile rubber as per specification.	Sq. Mtr.	450	₹ 800.00	₹ 3,60,000.00
10	Supply, installation, testing and commissioning of duct accoustic insulation with 12 mm thick fibreglass rigid board having density of 48 kg/cu.m finished with tissue paper and 30 SWG aluminium perforated sheet.	Sq. Mtr.	150	₹ 650.00	₹ 97,500.00
11	Supply, installation, testing and commissioning of grills, diffusers and dampers as per specification and approved drawings				
11a	Extruded aluminium powder coated diffuser with MS black painted VCD	Sq.mtr	2	₹ 13,000.00	₹ 26,000.00
11b	Extruded aluminium powder coated rectangular grills having flanges all around with MS black painted VCD	Sq.mtr	2.5	₹ 9,800.00	₹ 24,500.00
11c	Extruded aluminium powder coated rectangular grills having flanges all around	Sq.mtr	15	₹ 6,700.00	₹ 1,00,500.00
11d	Extruded aluminium powder coated continous linear grill	Sq.mtr	1	₹ 7,000.00	₹ 7,000.00
11e	MS black painted collar damper	Sq.mtr	3	₹ 3,900.00	₹ 11,700.00
11f	Extruded aluminium powder coated diffuser	Sq.mtr	4	₹ 9,500.00	₹ 38,000.00
11g	Extruded aluminium Fresh air damper with bird screen and cowl	Sq. Mtr.	1	₹ 11,500.00	₹ 11,500.00
11h	Extruded aluminium Fresh air louver with bird scree	Sq.Mtr.	1	₹ 11,500.00	₹ 11,500.00
12	Volume control damper for the supply air duct made of GI sheet as per requirement	Sq.Mtr.	3.5	₹ 7,800.00	₹ 27,300.00
13	Supply, installation, testing and commissioning of fire damper of suitable gauge as per approved drawing with fusible link and limit switch to be integrated with the fire safety system and to switch off the AHU. These are to be installed at return air path.	Sq.Mtr.	4.5	₹ 10,300.00	₹ 46,350.00
13a	Supply, installation, testing and commissioning of combined smoke and fire damper of suitable gauge as per approved drawing with actuator and linkage to be integrated with the fire safety system and to switch off the AHU. These dampers are to be installed at supply air duct.	Sq.Mtr.	3	₹ 22,500.00	₹ 67,500.00

14	Supply, installation, testing and commissioning of chilled water pipeline of M.S ERW class "C" pipes insulated with 2" thick thermocole pipe section (TF quality) wrapped with vapour barrier, chicken wire mesh and 0.5" thick sand cement plaster including all necessary fittings and accessories. The piping works shall include drain valve, purge valves. Valves for works shall include drain valve, purge valves. Valves for provision of discaling shall be included in the unit rates.				
14a	125 mm NB	Mtr.	2	₹ 2,200.00	₹ 4,400.00
14b	100mm NB	Mtr.	75	₹ 1,850.00	₹ 1,38,750.00
14c	80mm NB	Mtr.	44	₹ 1,410.00	₹ 62,040.00
14d	65 mm NB	Mtr.	2	₹ 1,100.00	₹ 2,200.00
14e	50 mm NB	Mtr.	2	₹ 710.00	₹ 1,420.00
	Supply, installation, testing and commissioning of chilled water pipeline of M.S ERW class "C" pipes insulated with 2" thick thermocole pipe section (TF quality) warraped with vapour barrier, chicken wire mesh and 0.5" thick sand cement plaster including all necessary fittings and accessories. Finally the insulated pipes shall be covered with tarfelting and this shall be applied for underground piping between bothe the building.				
14f	100 mm NB	Mtr.	2	₹ 2,000.00	₹ 4,000.00
15	Supply, installation, testing and commissioning of M.S ERW class "B" pipes insulated with 1" thick thermocole pipe section (ND quality) warraped with vapour barrier, chicken wire mesh and 0.5" thick sand cement plaster for chilled water drain including all necessary fittings and accessories.				
15a	50 mm NB	Mtr.	20	₹ 900.00	₹ 18,000.00
15b	40 mm NB	Mtr.	10	₹ 1,100.00	₹ 11,000.00
16	Supply, installation, testing and commissioning of accoustic insulation of AHU room with 50 mm thick fibreglass rigid board (densith 48 Kg/cu.M) on GI frame work covered with tissue paper and finally finished with 26 SWG aluminium perforated sheet.	Sq. Mtr.	155	₹ 1,205.00	₹ 1,86,775.00

17	Propeller type exhaust fans for toilets to be wall mounted single phase power connection as per following capacities:				
17a	200 cfm	no	2	₹ 5,000.00	₹ 10,000.00
17b	400 cfm	no	2	₹ 6,500.00	₹ 13,000.00
18	3 bend acoustic louver made of wooden frame with 25 mm fibreglass rigid board covered with 30 gauge perforated aluminium sheet. This shall be installed adjacent to return air fire damper.	Sq.Mtr.	10	₹ 1,200.00	₹ 12,000.00
19	Underdeck insulation with 65 mm thick rockwool covered with polythene sheet properly fastened with ss screws and fixed within GI Z channel fixed on the ceiling. The underside of the insulation shall have GI wire lace and finally covered with chicken wire mesh.	Sq. Mtr.	1400	₹ 1,000.00	₹ 14,00,000.00
20	GI Flexible duct of following diameter for server & projector connection				
20a	200 mm dia	Mtr	20	₹ 2,200.00	₹ 44,000.00
20b	250 mm dia	Mtr	5	₹ 2,500.00	₹ 12,500.00
TOTAL AMOUNT (A) EXCLUDING GST					**₹ 80,32,435.00**

SECTION B (For Comprehensive Annual Maintenance Contract)

Sl. no.	Description of item	Unit	Qty	Rate (Rs.)	Amount (Rs.)
21	AMC for all the equipment and accessories executed in the project on a comprehensive (all inclusive) basis including all consumables as required for consecutive 3 years.				
21a	1st year after defect liability period	Per year	1	₹ 2,75,000.00	₹ 2,75,000.00
21b	2nd year after defect liability period	Per year	1	₹ 3,00,000.00	₹ 3,00,000.00
21c	3rd year after defect liability period	Per year	1	₹ 3,25,000.00	₹ 3,25,000.00
TOTAL AMOUNT (B) EXCLUDING GST					**₹ 9,00,000.00**

''ANNEXURE – E''

SUMMARY OF PRICE

Sl. No.	Description	Amount/ Remarks
A	Total Estimated Cost for the Work as per SOQR (Section - A)	**Rs. 80,32,435.00**
B	Total Estimated Cost for the AMC as per SOQR (Section - B)	**Rs. 9,00,000.00**
	Total Cost for Section – A + Section - B	**Rs. 89,32,435.00**
C	Percentage above / below / at par on total estimated cost as stated in Sl. A & B above, applicable uniformly on all items of SOQR	In figure (+) / (-) / at par ……..% In word…….Percent
Total Value = (A+B)*(100± C)/100 =		**Rupees in figures:** **Rupees in words:**

Note:

1. The bidders shall quote percentage above / below / at par under Sl. No. C as above, maximum upto two decimal places.

2. If the percentage is not quoted in Sl. No. C above or 'NIL' is not indicated, it shall be considered 'NIL' for price evaluation / award.

3. Bidders to strike out (+) or (-) above, as applicable.

4. Upon evaluation of price as per above criteria the job will be offered to the lowest bidder as per following sequence.

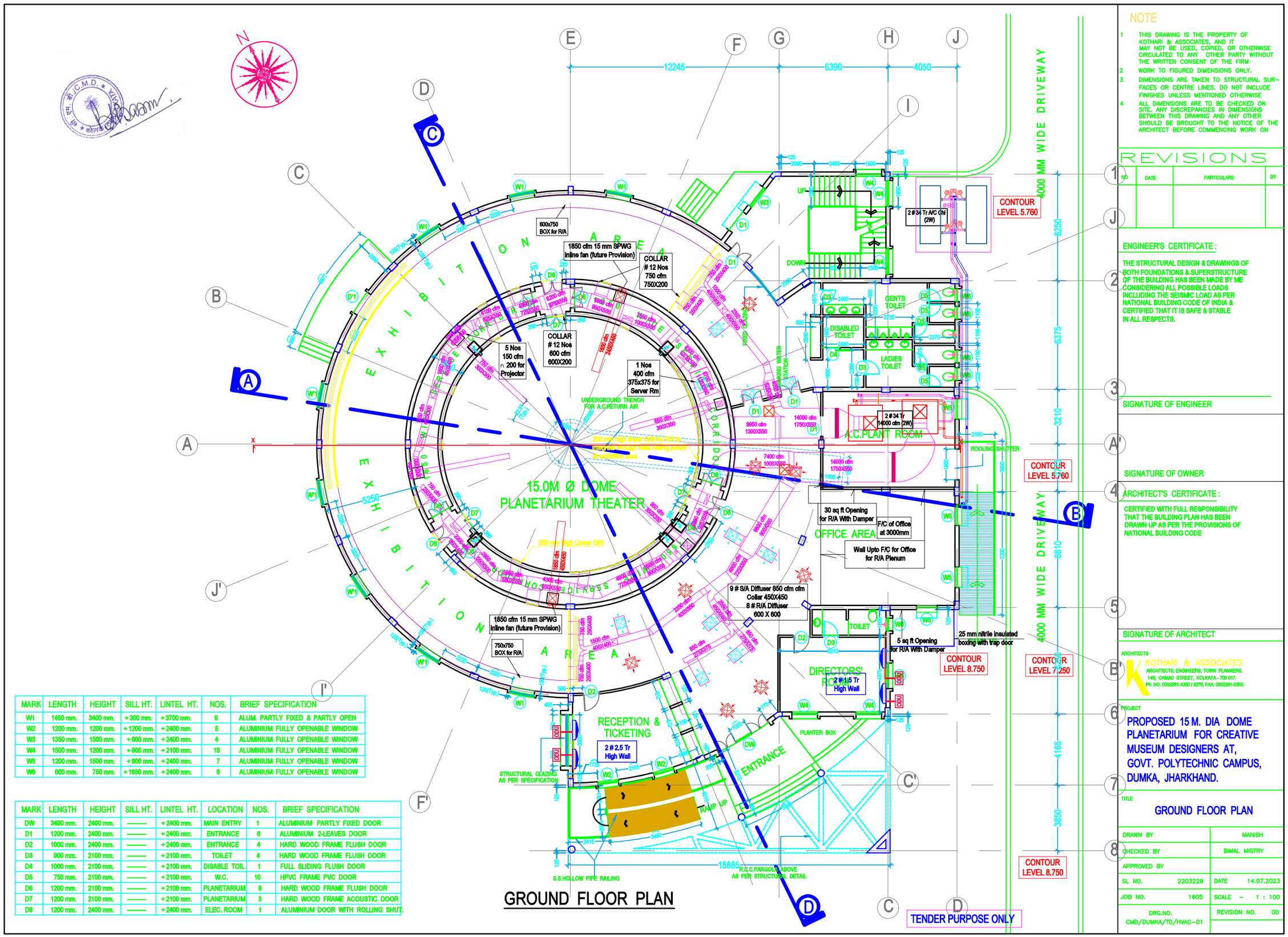
i. Initially order will be placed on the successful bidder for Section – A i.e. for SITC of HVAC System

ii. Order for Section – B i.e. for Comprehensive Annual Maintenance Contract (AMC) job will be issued after completion of Defect Liability Period (DLP).

(Signed & Stamped by the Bidder)

Bar Chart For HVAC Installation Works of 15m Dia. Dome Planetarium Project at Dumka, Jharkhand.

Sl. No	Activity	Period (In Weeks) from date of issuance of L.O.I.																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Mobilization																								
2	Fabrication & installation of GSS Duct																								
3	Fabrication , supply ,Transporation of Air Cooled Scroll Chiller																								
4	Supply and Installation of AHU Room																								
5	Supply and Installation of chilled water pipe line with insulated work																								
6	Laying of accoustic at AHU hall.																								
7	Electrical work																								
8	Misc. Work related to testing and commissioning																								
9	Testing and Commissioning																								
10	Hand over with trail run.																								



GROUND FLOOR PLAN

MARK	LENGTH	HEIGHT	SILL HT.	LINTEL HT.	NOS.	BRIEF SPECIFICATION
W1	1450 mm.	3400 mm.	+300 mm.	+3700 mm.	9	ALUM. PARTLY FIXED & PARTLY OPEN
W2	1200 mm.	1200 mm.	+1200 mm.	+2400 mm.	5	ALUMINIUM FULLY OPENABLE WINDOW
W3	1350 mm.	1500 mm.	+900 mm.	+2400 mm.	4	ALUMINIUM FULLY OPENABLE WINDOW
W4	1500 mm.	1200 mm.	+900 mm.	+2100 mm.	18	ALUMINIUM FULLY OPENABLE WINDOW
W5	1200 mm.	1500 mm.	+900 mm.	+2400 mm.	7	ALUMINIUM FULLY OPENABLE WINDOW
W6	600 mm.	750 mm.	+1650 mm.	+2400 mm.	8	ALUMINIUM FULLY OPENABLE WINDOW

MARK	LENGTH	HEIGHT	SILL HT.	LINTEL HT.	LOCATION	NOS.	BRIEF SPECIFICATION
DW	3400 mm.	2400 mm.	——	+2400 mm.	MAIN ENTRY	1	ALUMINIUM PARTLY FIXED DOOR
D1	1200 mm.	2400 mm.	——	+2400 mm.	ENTRANCE	6	ALUMINIUM 2-LEAVES DOOR
D2	1000 mm.	2400 mm.	——	+2400 mm.	ENTRANCE	4	HARD WOOD FRAME FLUSH DOOR
D3	900 mm.	2100 mm.	——	+2100 mm.	TOILET	4	HARD WOOD FRAME FLUSH DOOR
D4	1000 mm.	2100 mm.	——	+2100 mm.	DISABLE TOIL	1	FULL SLIDING FLUSH DOOR
D5	750 mm.	2100 mm.	——	+2100 mm.	W.C.	10	HPVC FRAME PVC DOOR
D6	1200 mm.	2100 mm.	——	+2100 mm.	PLANETARIUM	9	HARD WOOD FRAME FLUSH DOOR
D7	1200 mm.	2100 mm.	——	+2100 mm.	PLANETARIUM	3	HARD WOOD FRAME ACOUSTIC DOOR
D8	1200 mm.	2400 mm.	——	+2400 mm.	ELEC. ROOM	1	ALUMINIUM DOOR WITH ROLLING SHUT.

NOTE

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REVISIONS

NO	DATE	PARTICULARS	BY

ENGINEER'S CERTIFICATE :

THE STRUCTURAL DESIGN & DRAWINGS OF BOTH FOUNDATIONS & SUPERSTRUCTURE OF THE BUILDING HAS BEEN MADE BY ME CONSIDERING ALL POSSIBLE LOADS INCLUDING THE SEISMIC LOAD AS PER NATIONAL BUILDING CODE OF INDIA & CERTIFIED THAT IT IS SAFE & STABLE IN ALL RESPECTS.

SIGNATURE OF ENGINEER

SIGNATURE OF OWNER

ARCHITECT'S CERTIFICATE :

CERTIFIED WITH FULL RESPONSIBILITY THAT THE BUILDING PLAN HAS BEEN DRAWN UP AS PER THE PROVISIONS OF NATIONAL BUILDING CODE

SIGNATURE OF ARCHITECT

ARCHITECTS
KOTHARI & ASSOCIATES
ARCHITECTS, ENGINEERS, TOWN PLANNERS.
148, CAMAC STREET, KOLKATA - 700 017.
Ph. NO. 0332281-4350 / 4276, FAX: 0332281-5300.

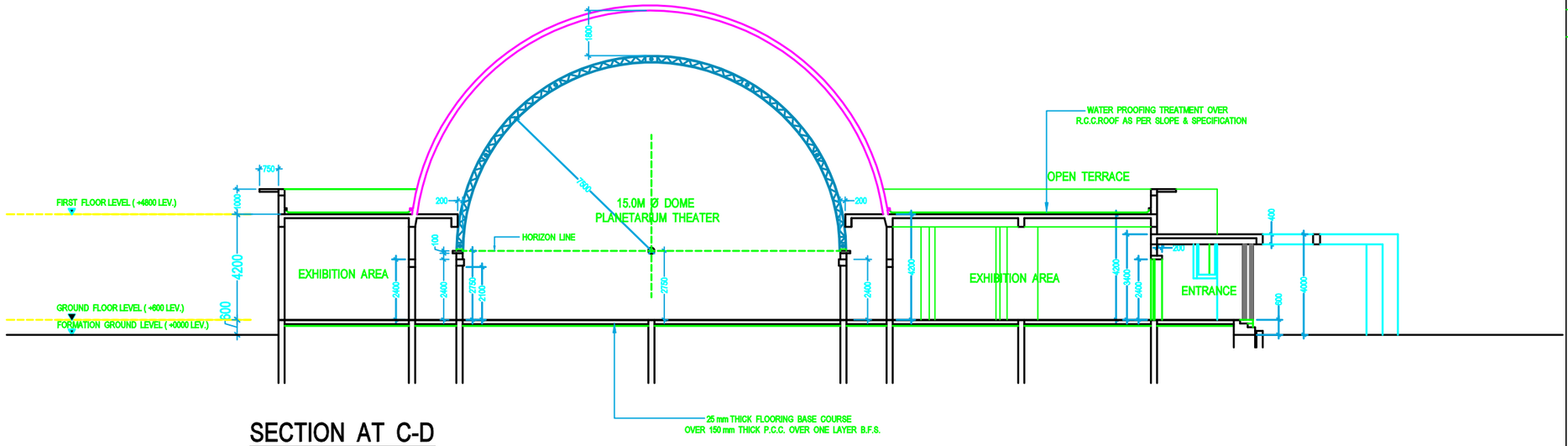
PROJECT

PROPOSED 15 M. DIA DOME PLANETARIUM FOR CREATIVE MUSEUM DESIGNERS AT, GOVT. POLYTECHNIC CAMPUS, DUMKA, JHARKHAND.

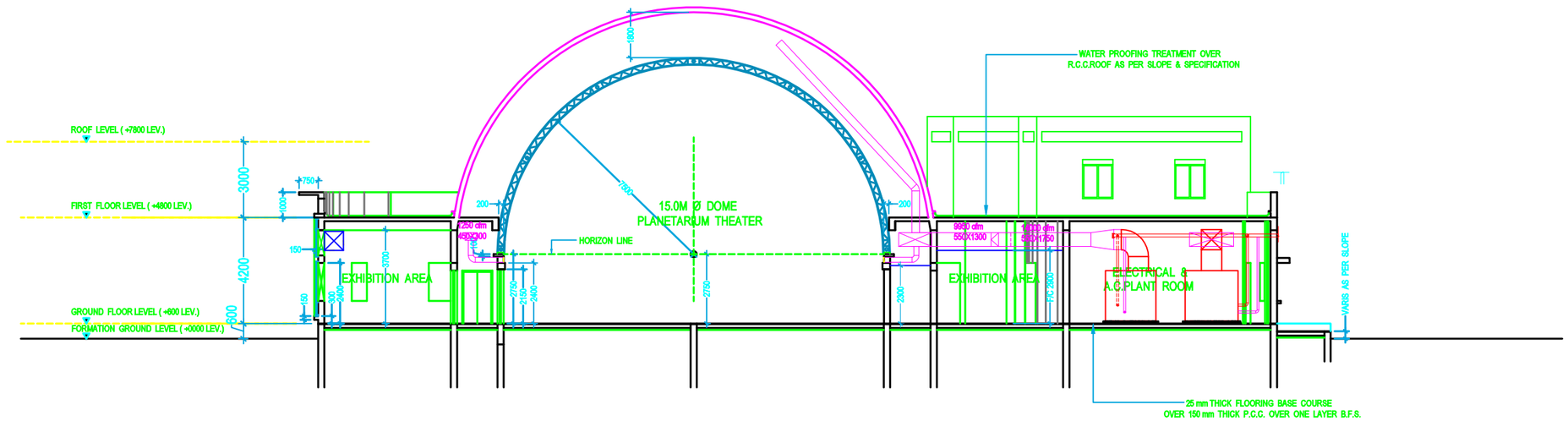
TITLE

GROUND FLOOR PLAN

DRAWN BY	MANISH
CHECKED BY	BIMAL MISTRY
APPROVED BY	
SL NO. 2203229	DATE 14.07.2023
JOB NO. 1605	SCALE – 1 : 100
DRG.NO. CMD/DUMKA/TD/HVAC–01	REVISION NO. 00



SECTION AT C-D



SECTION AT A-B

SECTION AT X-X

TENDER PURPOSE ONLY

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ARCHITECTS, ENGINEERS, TOWN PLANNERS.
14B, CAMAC STREET, KOLKATA - 700 017.
Ph. NO. 0332281-4350 / 4276, FAX: 0332281-5300.

PROJECT

PROPOSED 15 M. DIA DOME PLANETARIUM FOR CREATIVE MUSEUM DESIGNERS AT, GOVT. POLYTECHNIC CAMPUS, DUMKA, JHARKHAND.

TITLE

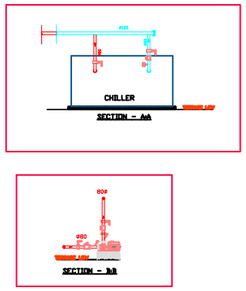
SECTIONS

DRAWN BY	MANISH
CHECKED BY	BIMAL MISTRY
APPROVED BY	
SL NO. 2203233	DATE 14.07.2023
JOB NO. 1605	SCALE – 1 : 100
DRG.NO. CMD/DUMKA/TD/HVAC–02	REVISION NO. 00

NOTES FOR HVAC:

1.All supply air duct inside return air path to be insulated with 13 mm thk. nitrile rubber as specified.

2.All supply air duct inside service corridor to be insulated with 19 mm thk. nitrile rubber as specified.



Equipment Layout at terrace of Service Building

HVAC LEGENDS

SYMBOL:	DESCRIPTION:
	SA Diffuser
	R/A Diffuser
	S/A Duct
	AHU
	Linear Grill
	Volume Control Damper
	Fire Damper
	Drain Line
	Tap Door
	Properller Fan
	High Wall
	BUTTERFLY VALVE
	BALANCING VALVE
	NON RETURN VALVE
	Y-STRAINER
	PRESSURE GAUGE
	TEMPERATURE INDICATOR
	FLOW SWITCH

TENDER PURPOSE ONLY

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ARCHITECTS, ENGINEERS, TOWN PLANNERS.
14B, CAMAC STREET, KOLKATA - 700 017.
Ph. NO. 0332281-4360 / 4276, FAX: 0332281-5300.

PROJECT
PROPOSED 15 M. DIA DOME PLANETARIUM FOR CREATIVE MUSEUM DESIGNERS AT,
GOVT. POLYTECHNIC CAMPUS,
DUMKA, JHARKHAND.

TITLE
NOTES FOR HVAC

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APPROVED BY	
SL NO. 2203233	DATE 14.07.2023
JOB NO. 1605	SCALE – 1 : 100
DRG.NO. CMD/DUMKA/TD/HVAC–03	REVISION NO. 00