



PRASAR BHARATI  
(INDIA'S PUBLIC SERVICE BROADCASTER)  
O/o ADDITIONAL DIRECTOR GENERAL (E) (WZ)  
ALL INDIA RADIO & DOORDARSHAN  
P.B. ROAD, WORLI, MUMBAI-30.



NO.ADG (E)(WZ)/AIR-P/Repl. Of AC Plant/ 2024-25

Dated. 23/04/2024

**Subject:** - Invitation of Budgetary Quote for the Supply, Installation, Testing and Commissioning of **4 x 5.5 TR air cooled packaged type AC Plant** at following stations.

S.NO.	STATION	EXISTING AC PLANT (To be replaced)	NEW AC PLANT
1	Surat (Guj.)	4 x 5.5 TR air cooled AC Plant	4 x 5.5 TR air cooled packaged type AC Plant
2	Himmatnagar (Guj.)	4 x 5 TR air cooled AC Plant	4 x 5.5 TR air cooled packaged type AC Plant
3	Rajgarh (M.P.)	6 x 3 TR air cooled AC Plant	4 x 5.5 TR air cooled packaged type AC Plant

1. The budgetary quotation form of the upcoming tender is enclosed herewith to offer comments, (if any) by prospective bidders/firms with budgetary quote.
2. Bidders/firms may please submit the above detail/ their quote on or before due date by e-mail to [sgvaidya@prasarbharati.gov.in](mailto:sgvaidya@prasarbharati.gov.in) and [mohanmahadeomose@prasarbharati.gov.in](mailto:mohanmahadeomose@prasarbharati.gov.in) or at following address.

**Sh. Suhas Vaidya**

Assistant Engineer

O/o Additional Director General (E-WZ)

Akashvani & Doordarshan, 2<sup>nd</sup> floor, A.O.A building,  
Doordarshan Complex, Worli, Mumbai – 400030

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[mohanmahadeomose@prasarbharati.gov.in](mailto:mohanmahadeomose@prasarbharati.gov.in)

**Last date of receipt of budgetary quotation in this office: 03-05-2024 up to 12:00Hrs.**

**Enclosed:**

1. Budgetary Quotation form of the upcoming tender is enclosed herewith.

(Suhas Vaidya)  
Assistant Engineer  
For Add. Director General (E),WZ  
MUMBAI



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ALL INDIA RADIO & DOORDARSHAN  
P.B. ROAD, WORLI, MUMBAI-30.



NO.ADG (E)(WZ)/AIR-P/Repl. Of AC Plant/ 2024-25

Dated. 22/04/2024

**Budgetary Quotation Form**

**Subject:** - Invitation of Budgetary Quote for the Supply, Installation, Testing and Commissioning of 4 x 5.5 TR air cooled packaged type AC Plant at following stations.

S.NO.	STATION	EXISTING AC PLANT (To be replaced)	NEW AC PLANT
1	Surat (Guj.)	4 x 5.5 TR air cooled AC Plant	4 x 5.5 TR air cooled packaged type AC Plant
2	Himmatnagar (Guj.)	4 x 5 TR air cooled AC Plant	4 x 5.5 TR air cooled packaged type AC Plant
3	Rajgarh (M.P.)	6 x 3 TR air cooled AC Plant	4 x 5.5 TR air cooled packaged type AC Plant

**Last date of receipt of budgetary quotation in this office: 03-05-2024 up to 12:00Hrs.**

Please read carefully the terms and conditions given the enquiry quotation form.

SR.NO.	PARTICULARS	SURAT (GUJARAT)		HIMMATNAGAR (GUJARAT)		RAJGARH (M.P.)	
		QTY.	RATE	AMOUNT	RATE	AMOUNT	RATE
A.	<b>Supply of Packaged Unit</b>						
1	Supply of Packaged type Air conditioning plants of capacity 4 X 5.5 TR each. Equipment Consisting of the following : Compressor unit, Air cooled condenser, Cooling Coil, Blowers, Refrigerant Piping System.  (Specifications of the item to be procured is attached with this form )	1 set of 4 Units					

<b>B.</b>	<b>Works</b>							
1	<b>Modification in plenum Chamber: Minor Repair works</b> , as required shall be done by the firm. <b>Remarks:</b> Existing Plenum Chambers to be used.	1 Job						
2	Return AIR Chamber - <b>4 Nos.</b> <b>Remarks:</b> Four return air chambers up to the height of false ceiling in plant room shall be provided as per P&D unit drawing.	1 Job						
3	i) Switch board & wiring of equipment	1 Set						
4	ii) Electrical Earthing	2 Nos.						
5	Dismantling of old AC Plants	1 Job						
6	Civil works (As per site requirement)	1 Job						
7	Erection commissioning & testing of the plant at site	1 Job						
8	Remote status indication panel (As per requirement)	1 Set						
9	Electrical Cables - As per requirement	1 Set						
<b>C.</b>	<b>Spares</b>							
1	Belts for Blower, Pressure gauges for refrigerant & oil, Dial type thermometer, Air Filters, Empty gas cylinder with regulating valve adopter & pressure gauge, Liquid strainer, Whirling psychometer, Anemometer, Thermometer, Valve key	1 Set						
<b>D.</b>	<b>Buyback of Old dismantled AC Plants</b>	1 set						
		<b>TOTAL</b>						
		<b>GST</b>						
		<b>GRAND TOTAL</b>						

**Note:**

1. Consignee: Installation officer, Akashvani Surat (Guj.), Himmatnagar (Guj.) and Rajgarh (M.P.)
2. Time of execution as per permission of engineer in charge at Akashvani Surat (Guj.), Himmatnagar (Guj.) and Rajgarh (M.P.)
3. The bidder must be experienced in same kind of scope.
4. Specifications of the item to be procured is attached with this form, filling the budgetary quote specifications should be considered extensively.
5. Supply has to be done as per the terms and conditions in upcoming tender documents.
6. Quantity of Material & Scope may increase or decrease as per actual requirement/constraints at site.
7. Validity: 120days
8. Declaration: We declare that all the conditions as given in the quotation form have been read by us.

Name (in capital) \_\_\_\_\_  
(Seal & Signature of the Bidder)



**Specification for SITC of 4x5.5TR Air-cooled packaged Air Conditioning Plants at Akashvani Surat, Himmatnagar and Rajgarh**

**SECTION- I**

**GENERAL**

**1.1 SCOPE**

1.1.1 This specification for SITC of 4X5.5 TR Air-cooled packaged air-conditioning plants covers supply at site, installation, testing and commissioning of complete equipment at Akashvani Surat, Himmatnagar and Rajgarh. The plants shall work on non-ODS refrigerant. The plants shall deliver the specified tonnage, both in summer and monsoon seasons. The AC plants are to run 20 hours a day, 365 days in a year.

**1.2 GENERAL CONDITIONS OF CONTRACT**

Payment terms, insurance cover, SITC schedule and time of completion, inspection, testing and commissioning of equipment and warranted terms, penalty for delay etc. would be applicable as per AIR terms and conditions on the subject framed by the indenter, namely, ADG(E) (WZ) ALL INDIA RADIO & DOORDARSHAN, 3<sup>rd</sup> Floor, AOA Building, Doordarshan Complex, P. B. Marg, Worli, Mumbai 400 030

**1.3 DESCRIPTIVE TECHNICAL LITERATURE AND DRAWINGS**

**1.3.1 Site visit**

In case, the tenderers desire to have idea regarding the electrical, refrigerant piping for preparation of schematic layout of equipment in plant room, they are **advised to inspect the site** before submitting their tender.

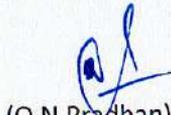
**1.3.2 Tender Documents**

The tenderers shall submit the following in duplicate along with their tender (as a part of **technical bid**). Commercial bid will be in a separate sealed cover.

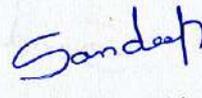
- Descriptive and technical leaflets giving complete mechanical and electrical data about the equipment offered including detailed dimensions of the equipment.
- The schedule of requirements (See **Section-II**), technical particulars (see **Annexure-1**) and technical/performance specifications of the equipment offered in the Proforma as per **Section-II** and **Section-III** of the specifications.
- A tentative piping drawing showing layout for the entire piping with all diameters, lengths, sizes and number of valves etc.
- Tentative** details showing cable sizes and length, equipment capacities, switchgear rating and number, rating and number of control components.
- A schedule giving time period from start to finish of the complete work.
- In order to avoid correspondence and clarifications at a later date, tenderers are requested to indicate clearly all the technical details and information asked for in **Section II & III** of this specification.

  
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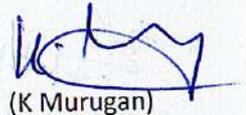
(K N Pandey)  
ADE(SD)



(O N Pradhan)  
DDE(TM)



(Sandeep Singh)  
DE(SD)



(K Murugan)  
DDG(SD)



### 1.3.3 Installation Drawings

In the event of an order being placed, the tenderer shall supply to the indenter 3 copies each of the following for approval within one month from the date of placement of the order.

- Dimensional drawings (including sections) giving complete details for erection of plants including foundation.
- Electrical wiring diagram and control circuits of all electrical equipment showing cable sizes and electrical rating of the related equipment.
- Instruction manuals of various equipment of the A/C plants with details of all adjustment, operation & maintenance/servicing procedures.

**NOTE :** Before taking up the installation work at site, the tenderer shall ensure that the indenter approves the installation drawings.

### 1.3.4 COMPLETION DRAWINGS AND OTHER INFORMATION

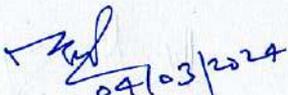
Three sets of complete drawings comprising the following shall be submitted by the tenderer while handing over the installation:

- Electrical drawings for the entire electrical equipment showing cable sizes, equipment capacities, switchgear ratings, control components, control wiring.
- Schematic control drawings giving detailed notes to explain the sequence of operation of the control circuit.
- Piping drawing showing layout for the entire piping with all diameters, lengths, sizes and number of valves etc. shown clearly. Isometric drawing showing each of the equipment/unit shall also be supplied.
- Detailed drawings and specifications in respect of wearing parts and consumable parts.
- Lists of components like thermostats, other control components, relays, timers, contactors etc. giving their type, designation, function etc.
- Schedule of items of which the tenderer is not the manufacturer/the manufacturer's authorized dealer. This should contain the specifications of each item and the agency from which these items are procured.

### 1.4 EXCLUSIONS

The following items of work shall be undertaken by the indenter and need not therefore be included in the tender.

Main power supply connection to be terminated in a cable box at the switchboard of the tenderer. (Zonal office-WZ will ensure the power handling capacity of connected cable)

  
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## 1.5 ERECTION

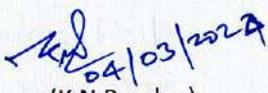
- 1.5.1 This specification provides for dismantling of the existing plants & the complete erection including all the associated civil works like equipment foundation for the air conditioning equipment at site by the tenderer. The tenderer may examine the site before quoting the rates.
- 1.5.2 The entire work shall be carried out as per latest IS codes, regulations etc. and as per terms and conditions contained in this document.
- 1.5.3 The tenderer shall make his own arrangement for storage of all equipment and materials brought to site from time to time and their safe custody at site till the plants are taken over by the indenter/his representative.
- 1.5.4 The tenderer shall make his own arrangements for providing accommodation for his workmen at site. Tents may, however, be pitched in the site compound at place to be decided upon by the indenter or his representative at site.
- 1.5.5 The tenderer shall make own arrangements for procuring necessary labourer, skilled and unskilled. He should conform to all local government laws and regulations covering labour and their employment.
- 1.5.6 The tenderer shall indemnify and hold harmless the purchaser against all claims in respect of injury to any person howsoever arising out of the erection of the equipment in the course of such installation. The tenderer shall discharge all his obligations under the Indian workman's compensation act as far as it affects workmen in his employment.
- 1.5.7 The tenderer and his employees shall comply with the regulations in force for controlled entry into the premises where the air-conditioning equipment is to be installed.

## 1.6 TENDERER'S LIABILITY FOR DAMAGES CAUSED:

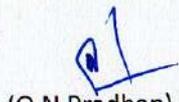
Tenderer shall be liable for damages caused during installation work, if the tenderer or his/her workmen or servants shall break, deface, injure or destroy any part of the building in which they may be working or any building, road, road kerb, fence, enclosure, water pipe, cable, drains, electric or telephone posts or wires, trees, grass or grasslands in the premises on which the work or any part of it is being executed, Tenderer shall also be liable, if any damage shall happen to the work while in progress from any cause whatsoever.

## 1.7 TENDERER'S LIABILITY FOR IMPERFECTIONS IN WORK DURING GUARANTY PERIOD:

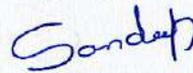
Tenderer shall be liable for imperfections noticed within the guaranty period if any defect or other faults appear in the work arising out of defective or any improper materials or workmanship within 12 months (after completion certificate given by the indenter). The tenderer shall, upon receipt of a written notice, rectify the fault at his/her own expense. In case of default, the indenter may get the same rectified and deduct the expenses from any amount due for payment or from his security deposit.

  
04/03/2024

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DDG(SD)



## 1.8 INSPECTION AND TESTING

The testing of the plant shall be carried out as per Acceptance Test Procedure for Air-cooled AC plants as mentioned at **Annexure-3**.

## 1.9 WARRANTY

- The compressors shall be provided with on site warranty for satisfactory working for a minimum period of five years.
- The remaining air-conditioning equipment shall be warranted for a minimum period of one year.
- For this purpose, the warranty period shall be counted from the date of completion certificate given by the indenter.
- Various defects arising/reported within the warranted period shall be rectified by repairs/replacement at site by the tenderer free of charge. This shall also include free supply of the refrigerant and compressor oil etc., if required, by the tenderer for optimum running of the plant during the warranted period.

## 1.10 QUOTATIONS IN MKS/S.I UNITS

Values for performance figure given in these specifications are in MKS/SI units. Full particulars of all figures of performance of the equipment offered shall be furnished in MKS/SI Unit. The technical data should be furnished in MKS/SI units only. The technical data should be typed or in capitals.

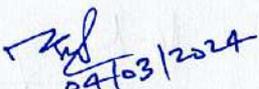
## 1.11 TRAINING

The tenderer shall undertake to extend free training for minimum three days in operation & maintenance of air-conditioning plants offered by them to the technical personals nominated by AKASHVANI SURAT, HIMMATNAGAR AND RAJGARH

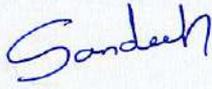
Details of the training offered with period may be indicated.

## 1.12 PAST EXPERIENCE

The tenderer should furnish detailed data regarding his past experience in supply, erection and commissioning of air-conditioning plants of similar or higher capacity and type. Due weightage will be given for the past experience while evaluating tenders. **The criteria for this will be decided by the zonal office-WZ.**

  
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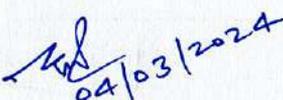
Specification for SITC of 4x5.5TR Air-cooled packaged  
Air conditioning plants at Akashvani Surat, Himmatnagar and Rajgarh

Final Specification No. SSC-6083

Dated:04/03/2024 Page- 5/26

### 1.13 AFTER SALE SERVICE

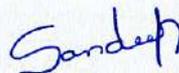
The tenderer shall ensure adequate and prompt after sale service in the form of maintenance/servicing personnel and spares as and when required with a view to minimizing the break down period. The tenderer has also to give a written undertaking from OEM that spare parts required for air-conditioning plants shall be available off - the - shelf for a period of at least 10 years from the date of commissioning of the plants at site. Sufficient advance intimation shall be given to the indenter before phasing out any spare component/part so that indenter is able to stock the same for future use.

  
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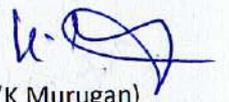
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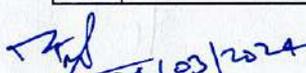
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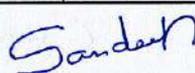
SECTION-II

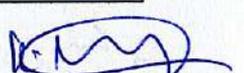
SCHEDULE OF REQUIREMENTS FOR SITC OF 4X5.5 TR AIR-COOLED PACKAGED AIR-CONDITIONING PLANTS FOR STUDIO AT AKASHVANI SURAT, HIMMATNAGAR AND RAJGARH

SN No	Description of the equipment	Quantity	Reference to Para of section-III for Technical specification	Remarks
1.	Supply of Packaged type air conditioning plants Equipment consisting of the following  i. Compressor Unit ii. Air-cooled Condenser iii. Cooling Coil iv. Blowers, v. Refrigerant Piping system	Four sets of plants at each site as per details below	Para-1 and Layout Plan Drawing no. SC-14856	
2.	Return air chambers:	2 Nos.	Para-2 & Suggestive Layout Plan Drg. No. SC-14856	Two numbers of independent AIR Chambers are to be created as per Drg. No. SC-14856.
3.	Modification in Supply & Return Duct	1 Job	Para-3 & Suggestive Layout Plan Drg. NO.14856	Indoor Units of AC Plant shall be installed in place of existing AC Plant. Necessary modification in existing Supply Ducts, if required, shall be carried out to interface the Indoor Units of AC Plant.
4.	i) Switch Board & Wiring of Equipment ii) Electrical Earthing	1 Set 2 Nos	Para-4 & Annexure-4	
5.	Civil works:	As per site requirement	Para-5	Heavy-duty flooring has already been provided by AIR.
6.	Erection, commissioning & testing of the plant at site.	Lump sum	Para 1.3.3 & 1.3.4 of Section-1 & Annexure-3	
7.	Provision of Indicators	Lump sum	7	

  
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Specification for SITC of 4x5.5TR Air-cooled packaged

Final Specification No. SSC-6083

Air conditioning plants at Akashvani Surat, Himmatnagar and Rajgarh

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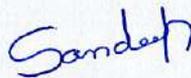
	for Filter Clogging & Condenser Clogging			
8.	Dismantling of old AC Plants	Lump sum	Section-I Para 1.5.1	Dismantled AC Plant shall be handed over to Akashvani Surat/Himmatnagar/Rajgarh Authorities.
9.	<b>Accessories</b>			The price/Charges of each item of spares shall be quoted separately along with make & model no
9.1	Belts for Blower	1 Sets for each plant		
9.2	Pressure Gauges for refrigerant & oil	4 sets of High Pr., Low Pr. & Oil Pr. Gauge.		
9.3	Dial type thermometer	4 Nos. each for suction and discharge side		
9.4	Air-Filters	Four sets (one for each plant)		
9.5	Empty Gas cylinder with regulating valve adopter & pressure gauge.	1 No.		
9.6	Liquid line strainer	2 Nos.		
9.7	Whirling Psycho meter	2 Nos.		
9.8	Anemometer	2 Nos.		
9.9	Thermometer	2 Nos.		
9.10	Valve Key	2 Nos.		

  
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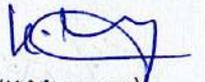
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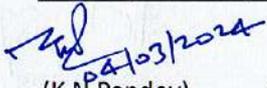
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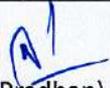


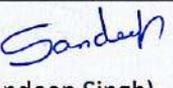
**SECTION -III**

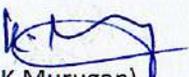
**TECHNICAL SPECIFICATIONS FOR AIR-COOLED PACKAGED AIR-CONDITIONING EQUIPMENT  
OF 4X5.5 TR CAPACITY FOR STUDIO AT AKASHVANI SURAT, HIMMATNAGAR AND RAJGARH**

	PARTICULARS	AIR'S REQUIREMENT	TENDERER'S OFFER
1.	Packaged Air-Conditioner		
1.1	Cabinet		
1.1.1	Modular design	Packaged AC plant should be modular in construction. Complete AC Plant Unit consisting of all the Modular Parts including Cabinet, Blower & Fan Section, Air Filters, Expansion Valves, Refrigerant and Electrical & Control Circuits should be sourced from single OEM.	
1.1.2	Access Doors/panels	Packaged unit shall have hinged quick operating air-tight access doors. Unit access doors shall be double skin type.	
1.1.3	Heat & Sound Insulation	The cabinet of the packaged unit shall be treated for heat and sound insulation and shall be so arranged as to provide easy accessibility to the various components mounted inside.	
1.1.4	Vibration Isolators for the Packaged unit	To be used if necessary, as per manufacturer's recommendation.	
1.1.5	Microprocessor Controlled	Whole packaged unit shall be microprocessor controlled.	
1.1.6	Supply outlet & Return Intake	The supply outlet shall be ductable to existing supply duct. The return air shall be arranged for connections to Air Chamber through flap doors in false ceiling	
1.2	Power Supply		
1.2.1	Operating Power supply	3 Ph, 415 V, +/- 10%, 50+/- 3% Hz	
1.2.2	Starting Current	Not to exceed the limits stipulated by the local electric supply company. Provision of reduced inrush starting current system to be confirmed by the tenderer	
1.2.3	Normal (full load) running	To be indicated by the tenderer	

  
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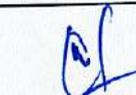
  
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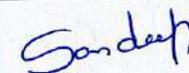


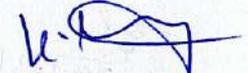
	current		
1.3	Working Noise	Silent and smooth-noise level not to exceed 85 dBA at a distance of 1 m from the machine	
1.4	<b>Compressor</b>		
1.4.1	Type	Hermetically sealed (Scroll)	
1.4.2	Capacity	At least 5.5 Tons ( To be indicated by Tenderer)	
	(a) Under "ASHRAE" Conditions of 4.4° C suction temperatures and 40.5 ° C condensing temperature.	At least 16632 Kcal/hr.	
	(b) Under site conditions.	To be indicated by tenderer	
1.4.3	Design (Mechanical)	Scroll type Compressor Not more than two units to form the total capacity of plant ( if multi-compressor )	
1.4.4	Refrigerant		
	a) Type	Non-ODS refrigerant as per ASHRAE standards 34 Class A-1	
	b) Quantity	For full capacity	
1.4.5	Make of compressor	By standard and reputed manufacturer	
1.4.6	Mounting	The compressor should be suitably mounted on vibration absorbers.	
1.4.7	Protection Circuits	The compressor units shall be rated for continuous working under tropical conditions and shall be provided with suitable starter incorporating overload, under voltage protection and also with single phasing preventers. The compressor shall be provided with thermal protector, preferably winding embeDDGd to ensure automatic switching off the motor when the winding temperature tends to go beyond safety limits.	
1.4.8	Interlocking of Compressor with Blower & Condenser	Provision for interlocking the compressor with blower motor and	

  
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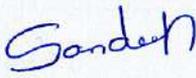
  
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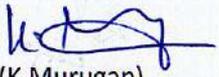


	units	condenser cooling fan motor shall be available.	
1.4.9	First charge of refrigerant and oil	The first charge of refrigerant and oil shall be included in the supply.	
<b>1.5</b>	<b>CONDENSER UNIT</b>		
1.5.1	Heat Rejection Capacity	Shall be adequate to match the compressor	
1.5.2	Type	Outdoor Type	
1.5.3	Type of Cooling	Air-cooled	
1.5.4	Design material of Condenser Coils	Copper Tubes with Aluminum fins	
1.5.5	Outdoor Unit Cabinet	The cabinet of the outdoor unit shall be weatherproof and shall be kept on roof top of existing AC Plant Room /at suitable location. Necessary arrangement for placing the cabinet shall be made alternatively outdoor unit can be installed outside AC Plant Room on a suitable platform (decision regarding location of outdoor unit shall be taken by Zonal Office in consultation with station, however location shall be such as minimum length of refrigerant pipe is required)	
1.5.6	Outdoor Unit Mounting	The outdoor unit shall be mounted on a vibration proof mounting at a suitable place on the roof.	
1.5.7	Securing of Outdoor unit	Provision shall be made for securing the outdoor unit against theft and tampering by unauthorized persons. For this purpose, a cage of suitable size is to be provided that will be fabricated by using steel bars of 10mm diameter spaced 75 mm from center to center and welded to a 50x25x5 mm angle iron frame covered at the top with 22 SWG G. S. Sheet & provided with suitable locking arrangement and coated with rust-proof paint.	

  
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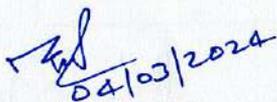
  
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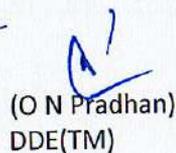
  
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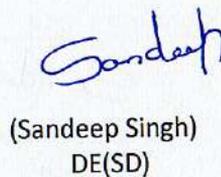


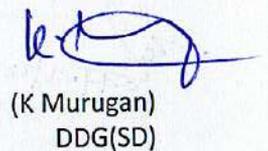
		Similarly refrigerant Pipes from Plant room to Outdoor unit shall be secured by routing them through proper Cable Trays.	
<b>1.6</b>	<b>Evaporator Coil Section</b>		
1.6.1	Capacity of cooling coil	Its capacity shall be adequate so that the evaporation coil shall cool and dehumidify the quantity of air specified. It should match fully with the compressor offered.	
1.6.2	Construction Material	The evaporator coil shall be made of copper tube with aluminium fins.	
<b>1.7</b>	<b>Blower &amp; Fan section</b>		
1.7.1	Type & make of fan	Centrifugal	
1.7.2	Balancing	Static and dynamic (both).	
1.7.3	Direction of discharge	Vertical	
1.7.4	Nominal fan discharge (Speed not to exceed 1000 RPM)	3740 CMH or 2200 CFM	
1.7.5	Static pressure at nominal discharge	36 mm WG	
1.7.6	Fan Speed	Should be around 950 RPM.	
1.7.7	Fan Motor	The fan motor shall be rated for continuous duty and shall conform to the relevant IS specification. Fan Motor should have BEE Star Rating of 5.	
<b>1.8</b>	<b>AIR FILTER</b>		
1.8.1	Type	The filter shall be dry, cleanable type, rejection capacity down to 10 Microns mounted in frame with section.	
1.8.2	Path	Air filter shall be provided in the return air path.	
<b>1.9</b>	<b>Expansion Valve</b>		
	a) Type	Direct Expansion	
	b) Capacity	To match the refrigeration capacity.	

  
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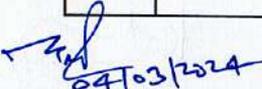
  
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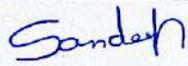
  
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1.10	Thermostat for shutting off the plant.	<ol style="list-style-type: none"><li>1. A separate thermostat to be provided in the return air circuit.</li><li>2. The thermostatic Switch shall be operational between the temperature ranges of 20°C to 30°C for cutting out and bringing in the compressor.</li><li>3. Each plant shall have separate set of thermostats.</li><li>4. Thermostat shall be of adjustable type.</li><li>5. Accuracy shall be within +/- 1 deg.C</li></ol>	
1.11	Refrigerant, electrical & Control Circuits	The air conditioning unit shall be completed with all internal refrigerating piping, electrical wiring and control switches necessary for the control and operation of the equipment within the unit.	
2	Return AIR Chamber		
2.1	Requirement	Indoor Units of the Packaged AC plants shall be installed in the existing AC Plant Room.AC plant room shall be partitioned into two parts as shown in the drawing no. SC-14856. Plant no.1&2 will be installed in Air-chamber no.1 while Plant no.3&4 will be installed in Air-chamber no.2. In both Air-chamber one openings of size 1000x600 will be provided in false ceiling for return air collection required by plant no. 1-2 and plant no. 3-4.	
2.2	Restriction/Precaution	Electric switchgears (LT Panel & UPS) of the complex may also be located in same room where air chambers exist therefore proper care should be taken so that operation and maintenance of	

  
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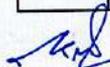
  
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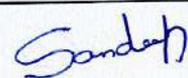


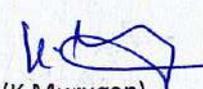
		switchgear and routing of cable and trenches should not be obstructed, during and after the fabrication of chambers.	
2.3	Construction Material	Wall of AC plant room shall be treated for insulation up to real ceiling as per Drg. No. SC- 14856. A partition made of puff insulated double skinned aluminium panel (not less than 19 mm thick) shall be provided in the AC Plant Room. The thickness of outer and inner aluminium sheet of the panel should not be less than 20 SWG and 22 SWG respectively and it should be supported by aluminium-extruded framework. An air tight door made of similar puff insulated double skinned aluminium panel (not less than 19 mm thick) with rubber lining if required shall be provided and shall remain closed with the arrangement of tower/sliding bolt.	
2.4	Size of chambers	The size of the chamber should be appropriate (as shown in the drawing SC-14856), keeping in view of the maintenance aspect of packaged units. Two no. of Return Air Openings (1000x600) with Flap Doors shall also be provided in false ceiling so that free air discharge may be available from above the false ceiling to the return input of plants.	
2.5	Fresh Air Window	<ol style="list-style-type: none"><li>Existing windows(W1 &amp; W2) shall be resized to (900x600)mm using masonry work for use as fresh air window. Window(W3) shall be sealed using masonry work.</li><li>Chicken mesh filter may be provided for fresh air and</li></ol>	

  
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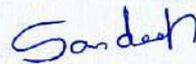
  
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		stale air openings to restrict unwanted entry lizards, mice birds etc. Sun shade also be provided to protect above said openings from outside rainfall and sunlight. 3. Any other opening in the Air-chamber shall be closed using masonry work.	
2.6	Stale Air Window	Existing stale air window shall be used.	
<b>3.</b>	<b>Modification/Connection of Supply &amp; Return Duct</b>		
3.1	Location	Plant-1, Plant-2, Plant-3 and Plant-4 (As shown in the Drawing No. SC-14856) shall be directly connected to the existing supply duct.	
3.2	Coupling to AC Plant	Double folded canvas coupling shall be provided between the supply outlet of plants and duct connecting the plenum chambers, in each plant.	
3.4	Control Dampers	Control damper shall also be provided in supply duct, located below false ceiling level for convenience of operation, and with open and close position of the damper clearly marked.	
3.5	Modification in the existing supply ducts.	Minor modifications are to be carried out to interface the supply ducts with the Indoor unit of AC Plant as per suggested layout plan Drg. No. SC-14856.	
<b>4.</b>	<b>Electrical Switch Gear &amp; Accessories</b>		
4.1	Construction	One cubicle type switchboard with appropriate ratings of an incoming MCCB, bus bar and individual MCCB units for each plant has to be provided in the AC plant room.	
4.2	Wiring of Control circuit of AC Plant	Normally plants shall run on main supply. In case of failure of main supply, only blowers will run on	

  
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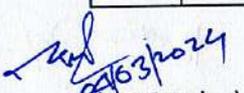
  
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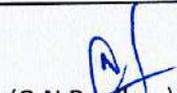
  
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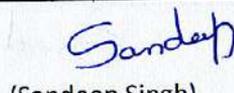
  
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		D/G supply. Necessary arrangement shall be made for the same by the Firm.	
4.3	Bus-bar	The bus bar shall be three phase and neutral copper/aluminium bus bar adequately rated for the load.	
4.4	Electrical Earthing	Earthing shall be provided as per drawing placed at <b>Annexure-4..</b> The earth shall be connected to electrical switch gear.	
4.5	Indicator/Instruments	The switchboard shall be provided with at least the following minimum indicators/instruments etc. i. Voltmeter with selector switch for measuring the voltage of all the 3 phases. ii. Separate ammeter of suitable range for each plant. iii. The switchboard shall be provided with neon lamp/LED type phase indicator in each phase. iv. Indicators shall be provided on the switchboard to indicate the functioning of individual plants.	
4.6	Remote status indication Panel	1. A Panel with status indications of the working of packaged unit shall be wired & installed in control room. 2. The panel shall have indication lamps i.e. Green Lamp/LED for OFF & Red for ON conditions of the equipment. 3. The tenderer shall carry Out SITC of Remote Indication panel Including cabling from A/C plant room to Control Room.	
4.7	Electrical Wiring	The wiring in AC plant room for AC equipment shall be carried out in concealed conduits as per site condition. Necessary conduits	

  
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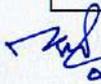
  
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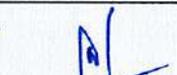
  
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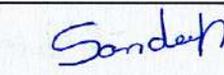


		shall be provided and buried in walls/floor by the tenderer. Alternatively cables may be neatly taken on cable trays above 2300 mm heights.	
4.8	Cables	Copper conductor PVC cables of 1100 V rating shall be used for wiring of various plants.	
4.9	Conformity to IS Standards	The switch board, electrical equipment and wiring shall conform to the relevant IS specification.	
<b>5</b>	<b>Civil Works</b>		
5.1	Foundation blocks & Vibration isolation	The tenderer shall provide the foundation blocks, suitable mounting arrangements with vibration isolation for the Packaged units for effective control of transmission of vibrations & structure borne noise. Various Instruction as per Annexure-2 'Noise & Vibration Control' should be followed.	
5.2	Repair of existing False Ceiling	Repair and replacement of existing false ceiling in plant room that is damaged during the erection of plenum chamber/ plants, shall also be carried out by tenderer.	
5.3	Fresh Air Window	<ol style="list-style-type: none"><li>Existing windows(W1 &amp; W2) shall be resized to (900x600)mm using masonry work for use as fresh air window. Window(W3) shall be sealed using masonry work.</li><li>Chicken mesh filter may be provided for fresh air and stale air openings to restrict unwanted entry lizards, mice birds etc. Sun shade also be provided to protect above said openings from outside rainfall and sunlight.</li></ol>	

  
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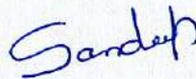
		3. Any other opening in the Air-chamber shall be closed using masonry work.	
5.4	Stale Air Window	Existing stale air window shall be used.	
5.5	Heat Insulation Treatment in AC Plant Room	<p>i. Necessary Heat insulation treatment shall be carried out on the exposed walls of AC Plant room, as indicated in the sketch drawing to form the return Air Chamber.</p> <p>ii. Necessary under-deck heat insulation treatment shall be carried out on the roof of AC Plant Room.</p>	
5.6	Platform for outdoor condenser unit	Location of condenser unit shall be decided in consultation with station authorities. If required a 450 mm high platform shall be constructed for these outdoor units and must be away from the walls.	
5.7	Securing of Outdoor unit & Outdoor Piping	<p>Provision shall be made for securing the outdoor unit against rain, theft and tampering by unauthorized persons if there is not such existing arrangement. A cage is to be provided that will be fabricated by using steel bars of 10mm diameter spaced 75 mm from center to center and welded to a 50x25x5 mm angle iron frame covered at the top with 22 SWG G. S. Sheet &amp; provided with suitable locking arrangement and coated with rust-proof paint.</p> <p>Similarly refrigerant Pipes from Plant room to Outdoor unit shall be secured by routing them through Proper Cable Trays</p>	

  
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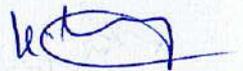
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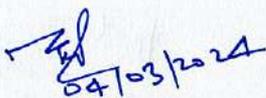
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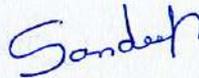
5.8	Miscellaneous	<ol style="list-style-type: none"><li>i. Minor civil works will be carried out as per requirement.</li><li>ii. Any other work not specifically mentioned above but necessary for satisfactory completion of entire job shall be the responsibility of the contractor.</li><li>iii. The holes if any made by the tenderer in the walls for passage of pipes, conduits, trenches, cables etc. shall be repaired &amp; original finish shall be given by the tenderer.</li></ol>
<b>6. Installation of Piping</b>		
6.1	Installation of Piping	<ol style="list-style-type: none"><li>1. All necessary piping shall to be provided to make the AC equipment complete and ready for regular and safe operation. The equipment connection shall be as per recommendation of manufacturer.</li><li>2. All condensate drainage to be pitched in the direction of flow to ensure proper drainage.</li><li>3. Necessary precautions shall be taken to close ends of pipes to prevent debris entering the piping system.</li><li>4. The pipes shall be cut accurately to measurements established at site so as to place them in position without forcing.</li></ol>

  
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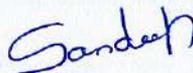
6.2	Piping Support:	<ol style="list-style-type: none"><li>1. Proper supports shall be provided for all piping or tubing, to prevent vibration or excessive deflection of piping or tubing.</li><li>2. Extra supports shall be provided at the bends and at heavy fittings like valves to avoid undue stresses on the pipes.</li><li>3. Independent supports shall be provided for piping so that equipment is not stressed by piping weight.</li></ol>
6.3	Piping Sleeve:	<ol style="list-style-type: none"><li>1. Where pipes pass through walls, steel pipe sleeve of size 50 mm larger than outside diameter of pipe shall be provided.</li><li>2. Where pipes are insulated, sleeve shall be large enough to have ample clearance for insulation also.</li></ol>
7.	<b>Indicators for Filter Clogging &amp; Condenser Clogging</b>	
7.1	Filter Clogging Indicators	Necessary sensors (Differential Pressure or other electronic) with indicators for indicating Clogged Air Filter shall be installed in each Unit either by OEM or by Project Implementing Agency.
7.2	Condenser Clogging Indicators	Necessary sensors (Differential Pressure or other electronic) with indicators for indicating clogged outdoor Condenser Unit shall be installed in each unit either by OEM or by Project Implementing Agency.

  
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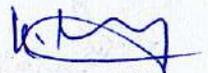
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ANNEXURE – 1

**STATEMENT OF TECHNICAL PARTICULARS FOR 4x5.5 TR AIR-COOLED PACKAGED AC PLANTS**

(To be submitted with the technical bid)The tenderer should submit the following technical data of the equipment offered along with the tender (vide clause 1.3.2 of section I).

Sl. No.	ITEMS	
A	<b>AIR CONDITIONER:</b>	
i)	Packaged air conditioner make	
ii)	Packaged air conditioner type	
iii)	Warranted refrigerating capacity of packaged air conditioner for return Air conditions of 26.7 Deg.C DB and 17.9 Deg.C WB	Kcal/Hr.
iv)	% De-rating of capacity with increase in ambient temp. by a) 5 Deg.C --- b) 10 Deg.C--- %	
B.	<b>COMPRESSOR UNIT:</b>	
i)	Refrigerating capacity under ASHRE conditions & 50 Hz operation	Kcal/Hr. rating
ii)	Number of compressors per packaged AC plant	
iii)	Power consumption KW/TR Full load and part load at 75%, 50% and 25% as per compressor design	
iv)	Operating speed of the compressor	
v)	Refrigerant (name) & Quantity	
C.	<b>BLOWER</b>	
i)	Blower (Fan) speed	R.P.M.
ii)	Static pressure developed	W.G.
iii)	HP of blower motor	
iv)	Speed of blower motor	R.P.M.
D.	<b>COOLING COIL</b>	
i)	Coil face area	Sq. mtr.
ii)	Number of Rows	
iii)	Fins per cm.	
iv)	H.P fanmotor	of
E.	<b>AIR COOLED CONDENSER</b>	
i)	Coil face area	
ii)	Number of Row	
iii)	Fins per cm.	
iv)	H.P of fan motor	
v)	Speed of Condenser Fan	R.P.M.
vi)	Heat rejection capacity	

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ANNEXURE -2

**NOISE AND VIBRATION CONTROL**

The tenderer must take all necessary precautions to have a minimum noise generation and its transmission as deemed necessary. Minimum vibration as permitted by BIS relevant code shall be ensured. A few points for guidance are given below:

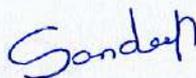
- a. Double fire retardant flexible connection shall be made for air discharge to the duct.
- b. Vibration isolation pads of suitable thickness and loading for elimination of vibration shall be provided for air handlers etc. as per recommendations of the manufacturer.
- c. Flexible conduits of suitable diameter and length are to be provided for making flexible electrical connection to the motors.
- d. The floor supported piping shall be mounted on rubber pads with 7.5 mm ribbed neoprene pads between the base plate and the support.
- e. All suspended ceiling shall be isolated on hangers. The vibration hangers shall have stable steel spring. A neoprene neck shall be provided where the hanger rod is connected to the supporting element to prevent metal to metal contact. The steel spring element shall have static deflection equal to half the static deflection of the isolated equipment and shall be used to support all equipment from the vibration equipment or from the floor or ceiling of the equipment room.
- f. In case of conduits, pipes, tubes, the annular space between construction and penetrating element shall be filled with fibrous material and both sides sealed with hardening ;resident sealant.
- g. All floor mounted vibration isolated equipment shall be supported on steel frames or concrete block.
- h. The air conditioning tenderer shall take all other precautions, provide on his own, if not specified above for reducing noise level to within limits or minimize vibrations in all mechanical equipment without any additional cost.

  
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**Annexure-3**

**ACCEPTANCE TEST PROCEDURE AT SITE AFTER INSTALLATION WITH TEST READINGS**

Tenderer's representative shall witness all type of routine tests. Performance tests of equipment/control installed shall be carried out at site.

On completion of installation, the tenderer shall conduct initial test. Any defects found shall be rectified immediately. The test readings during initial test run shall be recorded.

The initial test which has to be carried out by the tenderer shall be (but not limited to) as follows:-

- Pressure tests for all condenser and refrigerant circuit as recommended by the manufacturer before charging the system.
- To check satisfactory functioning of all electrical motors, switch-gear, control, pressure testing of all condensers and refrigerant system, air-handler's etc.
- To check alignment of motors.
- To operate, check and run compressor, condenser fan, Air-handlers.

**NOTES:**

All necessary test instruments such as thermometers, pressure gauges, anemometer, sound level (decibel) meter, required quantity of gas, oil and lubricants etc. shall be arranged by the tenderer at his own expense along with personnel. However, power for testing and commissioning of the system shall be provided free of cost by the indenter.

In addition to the initial test as explained above, the tenderer shall also give two continuous running tests of the system during peak summer and monsoon each of 24 hour duration or for 3 days each of 10 hour duration when the ambient conditions are close to the design conditions. The **capacity test** shall be conducted in presence of representative of the indenter. Inside and outside conditions shall be recorded on hourly basis during the test.

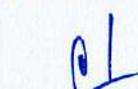
**CAPACITY OF PLANT**

Before capacity tests are conducted, the following aspects shall be checked:

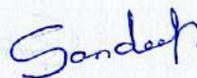
- The tests shall be conducted during the peak season only. In case the outside design conditions are not available, then tests shall be conducted at design conditions closest to outside design conditions.
- All internal loads such as light load, occupancy or equipment load shall be close to design loads. Otherwise, artificial load shall be generated to satisfy internal design loads.

  
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- c. Hourly readings of temperature, relative humidity, electric current, power consumption etc. shall be recorded. The capacity of the system components shall be computed as given in the TEST READING-PROFORMA given below.
- d. Test readings shall be furnished in duplicate prior to handing over the plants.

### 1. OUTSIDE DESIGN CONDITIONS

- a. Season :
- b. Dry bulb temp. Deg.C. :
- c. Wet bulb temp. Deg.C. :

### 2. INSIDE DESIGN CONDITIONS

- a. Dry bulb temp. Deg. c. :
- b. Wet bulb temp. Deg.C. :
- c. Relative Humidity % :

### 3. COMPRESSOR

- a. Suction Temp. Deg.C. :
- b. Suction Pressure Kg./Sq.cm. :
- c. Discharge temp. Deg.C. :
- d. Discharge pressure Kg/Sq.cm. :
- e. Oil Pressure Kg./Sq.cm. :
- f. Capacity of compressor motor(HP):
- g. Starting current(Amps) :
- h. Readings of Voltmeter, Ammeter and Power Factor Meter.

Power computation at various loads of 100% 75%, 50%, 25%

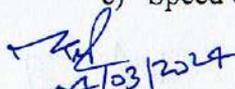
Motor current (Amps) :

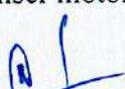
Voltage (Volts) :

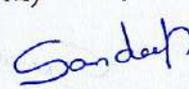
Starting current (Amps.) :

### 4. Condenser Fan motor

- a) Voltage (Volts) :
- b) Starting current (Amp) :
- c) Running Current (Amp) :
- d) Noise generated (dBA ) :
- e) Speed of condenser motor & fan (RPM) :

  
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## **5. AIR HANDLERS**

- a) Coil face area Sq.mt. :
- b) Maximum air quantity CMH :
- c) Actual air quantity CMH :
- d) Air velocity m<sup>3</sup>/hour :
- e) Entering air temp. DB/WB Deg.C :
- f) Leaving air temp. DB/WB Deg.C :
- g) Motor drive for air handlers
  - i) Rated horse power (HP) :
  - ii) Rated voltage/current/volt/ampere :
  - iii) Actual voltage/current/volt/ampere :
  - iv) Starting current (Amps) :

The above data should be recorded for each individual AHU.

## **6. FILTERS**

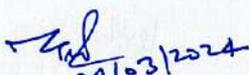
- a) Area of filters m sq. :
- b) Effective area m sq. :
- c) Velocity of air m/hr. :
- d) Quantity of air m<sup>3</sup>/hr. :

### **Notes:**

#### **1. TESTING VARIOUS LOADING CONDITIONS**

The performance tests shall be conducted at various loads of 100%, 75%, 50% and 25% of the capacity of each plant.

#### **2. COMPUTATION OF CAPACITY OF VARIOUS EQUIPMENT.**

  
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a) Compressor

$$\text{B.H.P./Ton} = \frac{\text{Power input in kW}}{0.746 \times \text{Compressor Capacity in ton.}}$$

The capacity of compressor shall be taken from manufacturer's rating chart to be supplied by the tenderer.

b) Cooling coils of Air Handlers

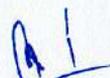
$$\text{Capacity of cooling coil} = \frac{\text{Cfm} \times 60 (h_e - h_l)}{V \times 12000}$$

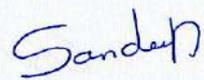
Whereas  $h_e$  = Enthalpy of entering air in btu/lb\*  
 $h_l$  = Enthalpy of leaving air in btu/lb.\*  
 $V_e$  = Specific volume of air entering in Cft/lb of air  
 $V_l$  = Specific volume of leaving air Cft/lb of air.  
 $V$  = Average Specific volume  
=  $(V_e + V_l)/2$

\* Wet bulb temperature of air before and after the cooling coil of the AHU should be measured to know  $h_e$  and  $h_l$  values.

3. All functional tests of motors, other electrical equipment and electrical cables shall be conducted as per Indian Electrical Rules and ISI specifications.
4. The interlocking of various stages and all safety devices shall be checked.
5. HP/LP cut-out, oil failure switches, etc. shall be thoroughly checked and tested at various settings.
6. The in-built capacity control arrangement of each compressor shall be checked at various steps of loading.
7. Functional check & Remote Indication Panel shall be ascertained

  
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REPLACEMENT OF A/C PLANT WITH 4x5.5 TR. AIR COOLED PACKAGED AC PLANT AT SURAT  
 HIMMATNAGAR AND RAJGARH UNDER STUDIO BIND SCHEME  
 SUGGESTIVE LAYOUT OF A/C EQUIPMENTS IN A/C PLANT ROOM

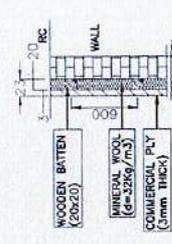
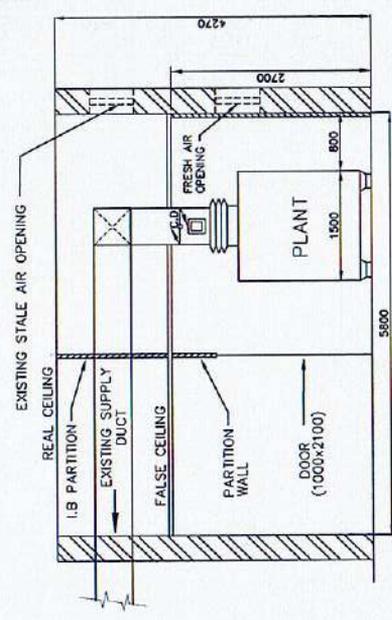
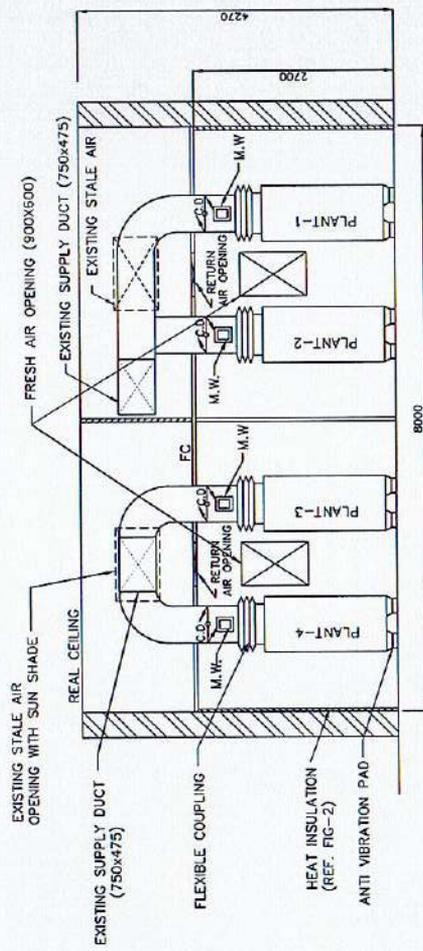


FIG-2  
23mm THICK HEAT INSULATION

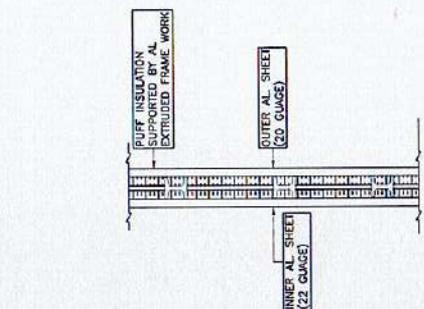
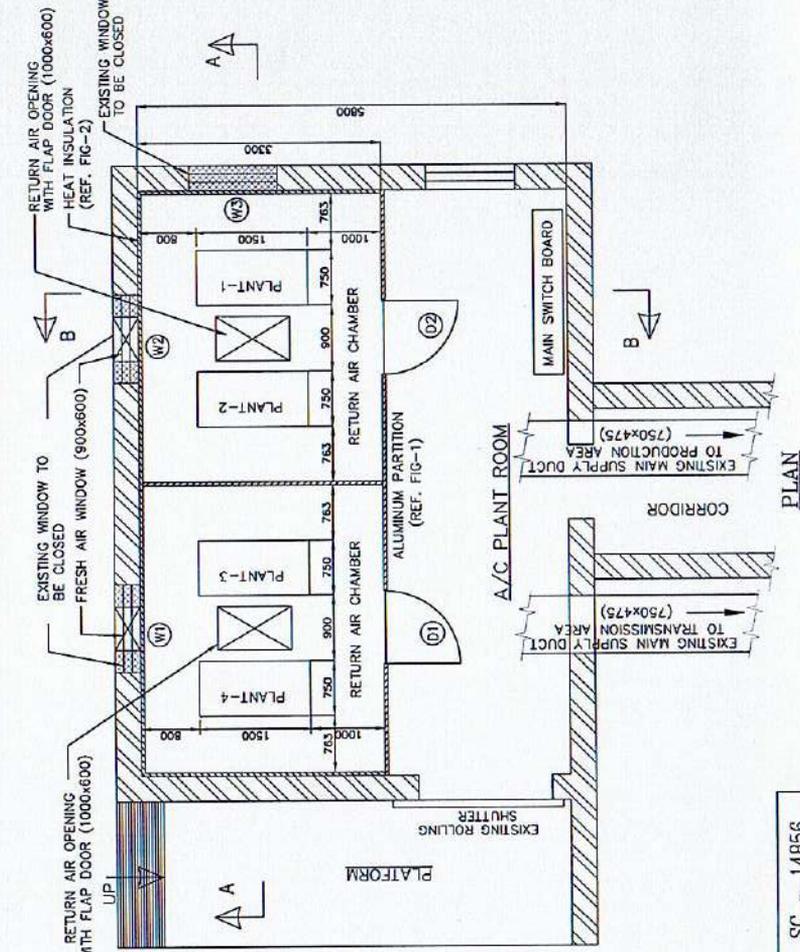


FIG-1  
ALUMINIUM PARTITION (19mm THK. ATLEAST) (FLOOR TO FC)



- NOTES: -
1. ALL DIMENSIONS ARE IN MM
  2. AN AIR CHAMBER SHALL BE CONSTRUCTED OF PUFF INSULATED DOUBLE SKINNED ALUMINIUM PANEL FOR HOUSING AC PLANTS.
  3. ONE SET OF PLANT No. 1 & 2 MEANT FOR PRODUCTION AREA AND ANOTHER SET CONSISTING OF PLANT No.3 & 4 MEANT FOR TRANSMISSION AREA HAVE BEEN SHOWN IN THE DRAWING. IN BOTH THE SET ONE PLANT SHALL BE WORKING AND ANOTHER AS STAND BY.
  4. OPEN AND CONTROL DAMPER OF STAND BY PLANTS OF BOTH THE SET SHALL REMAIN CLOSE.
  5. THE SIZE OF A/C PLANT SHOWN IN THE DRAWING ARE TENTATIVE.
  6. SUNSHADE ON OUT SIDE OF FRESH AIR WINDOW & STALE AIR OPENING SHALL BE PROVIDED TO STOP RAIN WATER.
  7. EXISTING WINDOW (W1 & W2) SHALL BE RESIZE TO USED AS FRESH AIR WINDOW OF SIZE (900x600) AS SHOWN IN THE DRAWING WINDOW (W3) SHALL BE CLOSED WITH MASONRY WORK.
  8. EXISTING LIGHT FITTINGS IN THE ROOM, IF REQUIRED, PROPER ILLUMINATION IN THE ROOM, AS SHOWN IN THE DRAWING.
  9. 23mm THICK HEAT INSULATION WILL BE PROVIDED ON ALL THE THREE WALLS OF A/C PLANT CHAMBER (REF. FIG-2) AS SHOWN IN THE DRAWING.
  10. A/C PLANTS SHALL BE CONNECTED WITH EXISTING SUPPLY DUCTS.
  11. PROVISION OF LIGHT SHALL BE MADE ABOVE FALSE CEILING FOR MAINTENANCE WORK.
  12. OPENING/CLOSING ARRANGEMENT FOR FLAP DOORS OF STALE AIR OPENINGS, FRESH AIR OPENINGS AND RETURN AIR OPENINGS SHALL BE MADE.
  13. THE DOOR (D1 & D2) PROVIDED IN RETURN AIR CHAMBERS SHALL BE MADE AIR TIGHT AND REMAIN CLOSE WITH THE ARRANGEMENT OF TOWER/SLOING BOLT.
  14. CHICKEN MESH AIR FILTER MAY BE PROVIDED IN FRESH AIR & STALE AIR OPENINGS TO RESTRICT ENTRY OF UNWANTED LIZARD, MICE, BIRDS ETC.
  15. MINOR CHANGES IF REQUIRED MAY BE DONE AT SITE.

DRN	DATE	NAME	BIND SCHEME	ALL INDIA RADIO
TRD	Jan-2024	Chetan Patel	LOCAL RADIO STATION (WEST ZONE)	P&O UNIT NEW DELHI, INDIA
CHD			LAYOUT OF A/C EQUIPMENTS IN A/C PLANT ROOM (4x5.5 TR.)	
COMP				
C.D.				
SCALE: - 1:50				
APPROVED: -				
DRG. No. SC - 14856				

- LEGENDS
- R.C. - REAL CEILING
  - F.C. - FALSE CEILING
  - O.D. - ON/OFF DAMPER
  - C.D. - CONTROL DAMPER
  - M.W. - MEASUREMENT WINDOW
  - I.B. - INSULATING BOARD 12 MM THICK