



**INDIAN INSTITUTE OF TECHNOLOGY BOMBAY**  
**MATERIALS MANAGEMENT DIVISION**  
Powai, Mumbai 400076.

Ref No. (PR No.1000040622)

(Rfx No. 6100001767)

**Technical Specifications : Microprocessor based Precision  
in –row Cooling Units with Accessories )**

## A. Introduction:

IIT Bombay desires to augment existing racks and equip it with two more in-row cooling units.. Therefore, IIT Bombay invites bids from the original equipment manufacturer / System Integrator, who can supply, install and integrate two in-row units with the existing set-up. The technical specifications of the requirements are as follows.

## B. Scope of the Work:

1. Detail designing & engineering of additional Inrow units for BYOH Data center at IIT Bombay.
2. SITC of chilled water based IN-ROW unit along with all accessories including piping, drain piping, humidifier piping etc.
3. Providing warranty support for the set up for 3 years after successful installation and commissioning.

## C. Technical Detail of In-Row Units:

Sr.No.	Technical Specifications	Compliance (Yes/No)
1.	<p><b>Cabinet Construction</b></p> <p>The exterior panels shall be 18-gauge steel foam insulation. Insulation shall comply with UL94 HB. Front and rear exterior panels shall be 18-gauge perforated steel with 80% open free area, and equipped with a keyed lock to provide a means of securing access to the internal components of the unit. The frame shall be constructed of 16 gauge formed steel welded for maximum strength. All units shall provide maintenance from the front and rear, allowing units to be placed within a row of racks. All exterior panels and frame shall be powder coated for durability and attractive finish.</p> <p>Units shall include castors and levelling feet to allow ease of installation in the row and provide a means to level the equipment with adjacent IT racks</p>	
2.	<p><b>Variable Speed Evaporator Fan Assembly</b></p> <p>The unit shall be configured for a draw-through air pattern to provide uniform airflow over the entire face of the coil. The unit is equipped with variable speed, electrically commutated, 400 mm backward inclined fans complete with Inlet Volute. Each fan assembly should be designed to provide total CFM with standard filter is min 6000 CFM. Fans shall be variable speed capable of modulating from 30-100%. Each fan assembly shall consist of integral fan finger guards.</p>	
3.	<p><b>Main Disconnect Switch</b></p> <p>Unit shall be provided with Thermal-Magnetic circuit breakers with interrupt capacity ratings per UL/IEC listed. Voltage: 380-415V 50Hz</p>	
4.	<p><b>Automatic Transfer Switch</b></p> <p>The units shall be equipped with an automatic transfer switch (ATS). The ATS shall automatically switch from a main power supply to a secondary power supply in the event of a power outage or power supply failure, without changing equipment operation. The ATS shall monitor the main power supply so that when the power is restored to the primary source it will automatically switch from the secondary source back to the main power source</p>	

5.	<p><b>Main Disconnect Switch</b></p> <p>Unit shall be provided with Thermal-Magnetic circuit breakers with interrupt capacity ratings per UL/IEC listed Voltage: 380-415V 50Hz. Units shall include main disconnect switches located on the E-panel in order to individually disconnect primary/secondary power inputs.</p>	
6.	<p><b>Microprocessor Controller</b></p> <p>The master display shall allow monitoring and configuration of the cooling unit through a touch screen control. Functions include status reporting, set-up, and temperature set points. LEDs report the operational status of the connected air conditioning unit. The microprocessor controller shall allow the user to navigate between menus, select items, and input alphanumeric information. The microprocessor controller shall activate a visible and audible alarm in the occurrence of the events listed in the Technical Specifications Manual. The microprocessor controller shall log and display all available events. Each alarm log shall contain a time/date stamp. Controllers shall display the run time hours for major components.</p> <p>Unit should able to display below details: -</p> <ul style="list-style-type: none"> <li>a. Unit capacity</li> <li>b. Unit airflow</li> <li>c. Unit water flow rate</li> <li>d. Supply air temperature</li> <li>e. Return air temperature &amp; RH</li> <li>f. Rack inlet temperature</li> <li>g. Group capacity</li> <li>h. Water leak detection alarm</li> </ul>	
7.	<p><b>Network Management Card</b></p> <p>The unit shall include a network management card to provide management through a computer network through TCP/IP. Management through the network should include the ability to change set points as well as view and clear alarms. Modbus TCP/IP and RTU: Units shall support Modbus TCP/IP and RTU.</p>	
8.	<p><b>Cooling Coil</b></p> <p>The cooling coil shall use aluminum fin OD copper tube coils. Fin shall be a minimum of 0.0055 in thick. Tube wall shall be a minimum of 0.016 in thick. Coil tube sheets shall be a minimum 18-gauge G90 galvanized steel. The coil shall be rated for a maximum pressure of min 2500</p>	

	<p>kPa. Coil headers are equipped with drip plates in the bottom to route the condensate accumulating on the header tubes to the condensation pan. The coil is configured in a counterflow arrangement to optimize heat transfer efficiency. The coil should be hydrophilic blue fin coating.</p>	
<p>9.</p>	<p><b>2 Way Modulating Valve</b></p> <p>The valve shall be microprocessor controlled to automatically direct the proper amount of chilled water in the cooling coil to maintain desired conditions. A shut-off valve located in the bypass line may be manually adjusted for 2-way flow if so desired. Three-way control valve shall be rated for 300 WOG with brass body and stainless-steel ball. Actuator shall be a direct connected rotary floating point style actuator with potentiometer feedback, and should be capable of being replaced without disconnecting piping from the valve. Ability for manual operation is also provided</p>	
<p>10.</p>	<p><b>Condensate Pan With Condensate Pump</b></p> <p>The unit shall consist of a primary and secondary drain pan. The secondary drain pan shall be piped to the primary pan for removal of condensate. The primary drain pan shall include a condensate pump and dual floats for control and overflow protection.</p> <p>The factory-installed condensate pump is piped internally to the condensate pan. It is capable of pumping min 20 l/h liquid a maximum distance of 20 m, which may include a maximum lift of 3.0 m. Dual floats are included with the unit. One float is used for condensate pump control, the other to generate condensate pan overflow alarms.</p>	
<p>11.</p>	<p><b>Filters</b></p> <p>The standard filters shall be 30% efficient per ASHRAE Standard 52.1, UL Class 2 (MERV 8 per ASHRAE 52.2). Filters shall be EN779 G4 efficient. The 96 mm (3.75 in) deep, pleated filters shall be replaceable from the rear of the unit. The optional filter shall be 85% efficient per ASHRAE Standard 52.1 (MERV 13 per ASHRAE 52.2, EN779 F7).</p>	

<p>12.</p>	<p>Humidifier</p> <p>Humidifiers shall be able to modulate capacity. The humidifier shall be self-contained, steam generating type, factory piped and wired, with disposable cylinder and automatic solid-state control circuit. Humidifier canisters shall be replaceable. The humidifier controller shall communicate directly to the microprocessor controller and provide complete status and control at the operator interface. Humidifiers shall control flush cycling and conductivity via automated controls. Humidifier shall be capable of producing steam as per OEM design</p>	
<p>13.</p>	<p>Electric Reheat</p> <p>Reheat elements shall be low watt density, wired for three-phase, loaded equally on all three phases and shall be electrically and thermally protected by both automatic and manual reset cutouts. Reheat capacity shall be 9 kW. Reheat coils shall be stainless steel, fin tubular construction. Heater casing shall be 20-gauge G90 galvanized steel. Heater shall be provided with self-engaging electrical connectors upon installation. Heaters with manually connected conductors are not acceptable.</p>	
<p>14.</p>	<p>Temperature And Humidity Sensor</p> <p>a. Internal Temperature Sensors: Thermistor temperature sensors shall be mounted behind the front and rear doors to provide control inputs based on supply and return air temperature. Sensor accuracy shall be within <math>\pm 1</math> °C accuracy.</p> <p>b. Internal Humidity Sensors: Humidity sensors shall be mounted behind both the front and rear doors and shall provide control input based on humidity in supply air. Humidifier sensor shall be <math>\pm 2\%</math> RH accuracy full scale.</p> <p>c. Remote Temperature Sensors: Three remote rack inlet temperature sensors shall be shipped with the unit for placement in the field to provide control input based on rack inlet temperature.</p> <p>d. Water Temperature Sensors: Internal supply and return chilled water temperature sensors shall be installed into sealed wells. Wells are filled with thermal conducting heat transfer grease to provide accurate temperature sensors.</p>	

15.	<p><b>Flow Meter</b></p> <p>The flow meter shall be factory piped inside the unit and connected to microprocessor controls to provide water flow rate through the unit. The microprocessor controller shall also use this information to provide total unit capacity out of the unit while in operation. The flow meter shall be a glass filled nylon construction vortex-sensing meter.</p>									
16.	<p><b>Selectable Top Or Bottom Piping</b></p> <p>Pipe connections for field connection from either the top or bottom of the unit. Unit connections shall be made internal to the unit. The unit shall include two pipe adapters Pipe adapters shall ship loose with the unit for field installation where applicable.</p>									
17.	<p><b>Cable Water Detector</b></p> <p>Leak detection sensing cable can be shipped loose with the unit. If water or other conductive liquids contact the cable anywhere along its length, the main controller visually and audibly enunciates the leak.</p>									
18.	<p>The bidder has to warrant that all the goods are new, unused, and of the most recent or current supported models, and that they match in design and materials with the existing set up, unless provided otherwise in the Contract.</p>									
19.	<p>In the event of failure of any of the subsystems or components of the proposed solution, the bidder has to ensure that the defects are rectified as per following</p>									
	<table border="1"> <thead> <tr> <th data-bbox="354 1325 521 1486"><b>Equipment</b></th> <th data-bbox="521 1325 678 1486"><b>Minor Fault Resolution</b></th> <th data-bbox="678 1325 846 1486"><b>Major Fault Resolution</b></th> <th data-bbox="846 1325 1084 1486"><b>Part / Total Replacement</b></th> </tr> </thead> <tbody> <tr> <td data-bbox="354 1486 521 1612">In-Row Units</td> <td data-bbox="521 1486 678 1612">8 Hours</td> <td data-bbox="678 1486 846 1612">24 Hours</td> <td data-bbox="846 1486 1084 1612">72 Hours</td> </tr> </tbody> </table>	<b>Equipment</b>	<b>Minor Fault Resolution</b>	<b>Major Fault Resolution</b>	<b>Part / Total Replacement</b>	In-Row Units	8 Hours	24 Hours	72 Hours	
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20.	<p>The defects, if any, during the guarantee/warranty period are to be rectified free of charge by arranging free replacement wherever necessary.</p>									
21.	<p>During the warranty period, the bidder will have to undertake comprehensive maintenance of the entire</p>									

22.	<p>hardware components, equipment, software support and accessories supplied by the bidder at the place of installation of the equipment.</p> <p><b>Warranty</b> : Providing warranty support for the set up for 3 years after successful installation and commissioning.</p>	
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## D. Details of the proposed IN-ROW Units (Chilled Water Units)

<b>Sr. No</b>	<b>Particulars</b>	<b>Item Details</b>
1	Make of Chilled water based In Row units	
2	Net Sensible Capacity in KW	
3	Air Flow Capacity	
4	Power Source – Single / Dual	
5	Indoor unit dimension	
6	Design Life	
7	Years of Available Support	
8	Support Response & Resolution Time lines <ul style="list-style-type: none"><li>● Minor issues without spares / parts</li><li>● Major issues with spares / parts</li></ul>	
9	Confirm compliance to technical specification / BOQ particulars and in case of deviation, please mention.	
10	Catalog & Technical Data Sheet Enclosed	



## **E. Additional Terms & Conditions:**

1. The supplied equipment has to fit into the existing set up and all the auxiliary parts have to be sufficient to make the new as well as the existing facility function smoothly and reliably.
2. If any minor changes are required in the existing set up, it would be the sole responsibility of the bidder to carry out these changes in consultation with IIT Bombay authority.
3. Bidding OEM is expected to specify all the components required to meet the objectives mentioned in the scope of the work. List all the required components clearly as a part of their proposal.
4. Electricity will be supplied and will be charged as per actuals, and as per the prevailing energy charges on the basis of meter reading, provided the bidder arranges for an approved energy meter.
5. You are requested to contact Trirag Chowdhury and/or Mr. Santosh Sawant for commencement of the above work.