



Division of Chemical Sciences  
Indian Institute of Science  
Bangalore 560012

Tender No.: IISc/CSB/DC/2022/02

Date: 9<sup>th</sup> Nov 2022

## Corrigendum - 1

**Subject:** Revision in the content of Chemical Sciences Building (CSB) Data Centre tender (Tender No.: IISc/CSB/DC/2022/02) for the supply and installation of data centre infrastructure with server racks, cooling and management systems

**References:** Tender No.: IISc/CSB/DC/2022/02

Indian Institute of Science, Bengaluru has issued the above tender on 28/10/2022. Revisions to the above-mentioned tender document are made as follows:

### Important Dates:

Publication of Tender	28/10/2022
Deadline for submission of pre-bid queries (by email only)	04/11/2022, 5:00 pm IST
Release of corrigendum (if needed)	09/11/2022, 5:00 pm IST
Start of submission of bids	11/11/2022, 5:00 pm IST
Deadline for submission of bids	18/11/2022, 5:00 pm IST
Opening of technical bids	To be declared later
Opening of price bids	To be declared later

### Revision-1 (Page-4, Section-3, Schedule of Requirements, Point-3)

**Previous Content:** The following components from the solution must be from a single OEM, and also installed, supported and serviced by the same OEM for seamless integration and better service support

- i. PAC Units
- ii. Integrated Racks
- iii. Integrated Monitoring System along with temperature and humidity sensors

iv. Uninterrupted power supply (UPS) system

The model numbers for each of the components must be specified and should be readily verifiable from the public domain. Without this information the bidder will be automatically disqualified.

**Revised Content:** The following components from the solution must be from a single OEM, and installed, supported and serviced by the same OEM for seamless integration and better service support

- i. PAC Units
- ii. Integrated Racks
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The model numbers for each of the components must be specified and should be readily verifiable from the public domain. Without this information the bidder will be automatically disqualified.

**Revision-2 (Page-6, Section-4, PAC Units, Point-2.d)**

**Previous Content:** The PAC units should be able to deliver cold air at a rate of minimum 5000 CFM per PAC unit. The units should automatically modulate the airflow as per the operational cooling needs of the servers, for example based upon return air temperature, at any given time. Also, the cold air delivery should be directable to the front of the racks with uniformity across the vertical height of the racks.

**Revised Content:** The PAC units should be able to deliver cold air at a rate of minimum 4000 CFM per PAC unit. The units should automatically modulate the airflow as per the operational cooling needs of the servers, for example based upon return air temperature, at any given time. Also, the cold air delivery should be directable to the front of the racks with uniformity across the vertical height of the racks.

**Revision-3 (Page-7, Section-4, Server Racks, Point-3.b)**

**Previous Content:** Each rack should have at least 42U of usable space for compute/storage servers and network switches. The rack width and depth should be of standard dimensions (W x D = 600 mm x 1000 mm), and the hot and cold aisle containment should be a minimum of 300 mm each.

**Revised Content:** Each rack should have at least 42U of usable space for compute/storage servers and network switches. The rack width and depth should be of standard dimensions (W x D = 600 mm x 1000 mm). The OEM should design the hot and cold aisle containment to achieve 15 kW of cooling for each rack.

**Revision-4 (Page-7, Section-4, Server Racks, Point-3.d)**

**Previous Content:** Each rack should be provided with 2 nos. of 230 V, 32A, 3-phase vertical basic PDUs.

**Revised Content:** Each rack should be provided with 2 nos. of 400 V, 32 A, 3-phase vertical basic PDUs.

**Revision-5 (Page-7, Section-4, Server Racks, Point-3.i)**

**Previous Content:** The PDU should support high operating temperatures up to 60 deg C to withstand the high temperatures at the back of the rack.

**Revised Content:** The PDU should support high operating temperatures up to 50 deg C to withstand the high temperatures at the back of the rack.

**Revision-6 (Page-7, Section-4, Uninterrupted Power Supply System, Point-4.a)**

**Previous Content:** A true online, double conversion, high efficiency, and unit power factor modular uninterruptible power supply (UPS) system with a minimum of **four** hot-swappable power modules, each of capacity 30 kVA/kW. The total capacity of the UPS should be a minimum of 120 kVA/kW (4 \* 30 kVA/kW).

**Revised Content:** A true online, double conversion, high efficiency, and unit power factor modular uninterruptible power supply (UPS) system with hot-swappable power modules. The capacity of each module **should be at least** 20 kVA/kW. The total capacity of the UPS should be a **minimum of 120 kVA/kW**. We should be able to add additional modules if required to expand the capacity of the UPS in the future. This **single UPS system** should power the two PDUs in each rack.

**Revision-7 (Page-8, Section-4, Uninterrupted Power Systems, Point-4.c)**

**Previous Content:** The UPS should support all the nodes in the eight racks, monitoring system, BMS components and the exhaust fan. The UPS should not support the PAC units.

**Revised Content:** The modular UPS should support all the nodes in the eight racks, monitoring system, and BMS components. The UPS should not support the PAC units and the exhaust fan.

**Revision-8 (Page-8, Section-4, Uninterrupted Power Systems, Point-4.f)**

**Previous Content:** Both the modular UPS and batteries shall be kept in a rack in the UPS marked room. The physical sizing of the UPS and the battery rack should take into account the size of the UPS room.

**Revised Content:** Both the modular UPS and batteries shall be kept in **separate racks** in the UPS marked room. The physical sizing of the UPS and the battery rack should consider the size of the UPS room.

**Revision-9 (Page-8, Section-4, Overall enclosure, Point-5.d.b)**

**Previous Content:** The menu driven system should allow to display and control the following: thermal management, power supply, PDUs, BMS information, alarms, logs, etc.

**Revised Content:** The menu driven system should allow to display and control the following: thermal management, power supply, BMS information, alarms, logs, etc.

**Revision-10 (Page-9, Section-4, Overall enclosure, Point-5.f)**

**Previous Content:** Door access to both the front and the rear of the racks must be available. The front door should be of glass for complete visibility of 42U and the rear door should be split metal door. Electro-magnetic locks with push buttons for manual access to the rack doors are adequate; biometric access is not required. In the closed/locked position, the doors should keep the cold or hot air sealed within the enclosure. Both the front and back rack doors should open automatically in the event of a cooling failure and when the temperature exceeds a user defined programmable threshold. The exhaust fan installed in the room should start working upon the rack doors opening. Automatic door closure on the resumption of the PAC units working is not required.

**Revised Content:** Door access to both the front and the rear of the racks must be available. The front door should be of glass for complete visibility of 42U and the rear door can be a split metal door or a single door. The doors should have electro-magnetic locks with common biometric access system. In the closed/locked position, the doors should keep the cold or hot air sealed within the enclosure. Both the front and back rack doors should open automatically in the event of a cooling failure and when the temperature exceeds a user defined programmable threshold. The exhaust fan installed in the room should start working upon the rack doors opening. Automatic door closure on the resumption of the PAC units working is not required.

**Revision-11 (Page-9, Section-4, Electrical Components, Point-6.f)**

**Previous Content:** One emergency heavy duty exhaust fan of 4000 CFM with static pressure of 10-30 mm of water column on the north side wall with exhaust shutters should be provided. The exhaust fan should be connected to the UPS and integrated into the monitoring system. The exhaust fan should start automatically when the rack doors open in the event of the cooling failure.

**Revised Content:** One emergency heavy duty exhaust fan of 4000 CFM with static pressure of 10-30 mm of water column on the north side wall with exhaust shutters should be provided. **The exhaust fan should be connected to a separate 10 KVA UPS supplied by IISc, and integrated into the monitoring system.** The exhaust fan should start automatically when the rack doors open in the event of the cooling failure.

**Revision-12 (Page-22, Section-16, Payment Terms, Point-2)**

**Previous Content:** IISc shall release 100% payment against delivery, inspection, successful installation, Commissioning, and acceptance of the equipment at IISc Bangalore in good and functional condition and to the entire satisfaction of the Purchaser (IISc) and on the production of unconditional performance bank guarantee of 3% of the total order value valid for 3 months beyond all contractual obligations. Requests for partial payments will not be entertained.

**Revised Content:** IISc shall release 100% payment against delivery, inspection, successful installation, commissioning, and acceptance of the equipment at IISc Bangalore in good and functional condition and to the entire satisfaction of the Purchaser (IISc) and on the production of unconditional performance bank guarantee of 3% of the total order value valid for 3 months beyond all contractual obligations. Requests for partial payments will not be entertained.

If the bidder belongs to a micro, small and medium enterprise (MSME), then under the Make-in-India clause, 70% of the payment will be against supply of materials and 30% against installation, commissioning and acceptance of the equipment at IISc Bangalore in good and functional condition.

The bidder should provide audited financial documents as evidence that they are MSME.

**Revision-13 (Page- 10 to 15, Section-6, Technical Details/BoQ Compliance Sheet (to be submitted with Technical Bid)**

**Revised Content:**

**Technical Details/BoQ Compliance Sheet (to be submitted with Technical Bid)**

Bidders must ensure that the price is **NOT** mentioned in this table.

<b>S. No</b>	<b>Description of Requirements</b>	<b>Yes/No</b>	<b>Remarks/Make /Model</b>
1	<p>Row-based integrated cooling solution with inbuilt hot and cold aisle separation and integrated BMS components. (Make and Model No.)</p> <p>The critical components PACs, server racks, and monitoring system should be from a single OEM. These components must be installed, supported and serviced by the same OEM. Make and model number <b>MUST</b> be provided, else the bidder will be disqualified.</p>		
2	<p>a. <b>PAC units (Make and Model No.)</b></p> <p>b. Precision Air Conditioner should have following Features:</p> <p>a. PAC units should be of at least 35 kW capacity each.</p> <p>b. Indicate the number of PAC units</p> <p>c. <b>PAC units deliver cold air at a rate of minimum 4000 CFM</b></p> <p>d. Parameters for the PAC units:</p>		

	<ul style="list-style-type: none"> <li>a. Supply air temperature: <math>20 \pm 1</math> deg C</li> <li>b. Maximum return air temperature: 35 deg C</li> <li>c. Ambient temperature: 35 deg C</li> <li>d. Humidity: 40-65 RH</li> <li>e. N+1 redundancy for cooling of 8 racks with a power load of up to 15 kW per rack.</li> <li>f. The monitoring and control system in the units has a provision to switch between the units to provide N+1 redundancy in a pre-programmed manner by the user or automatically based on the cooling needs in the event of a unit failure.</li> <li>g. If the working of three PAC units is not sufficient to fulfill the cooling requirements of the racks when under heavy load (above 100 kW), then the four PAC units should automatically work, overriding the redundancy requirement.</li> <li>h. PAC units should be able to cool all racks uniformly from 1<sup>st</sup> U to 42<sup>nd</sup> U</li> <li>i. PAC units provide DX-based cooling</li> <li>j. PAC units operate using R-410A refrigerant</li> <li>k. PAC units consist of an inlet filter, drawn through direct-drive electronically commutated (EC) Motors and backward curved EC fans or axial fans</li> <li>l. PAC units have provision to collect the condensate from the units and drain it outside the data center room using a drain present in the room.</li> <li>m. The Outdoor Condenser units comprise of Condenser AC/EC/DC fans &amp; motor, Condenser cooling coil. The AC and DC fans have fan-speed controllers.</li> </ul>		
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	<ul style="list-style-type: none"> <li>n. PAC units are interfaced with the onsite/remote monitoring and control system</li> <li>o. Inbuilt heater and humidifier to cater IT load</li> </ul>		
3	<p><b>Server Racks</b></p> <ul style="list-style-type: none"> <li>a. Server racks make and model No.</li> <li>b. 8 server racks</li> <li>c. Dimensions of rack (Width x Depth = 600 mm x 1000 mm)</li> <li>d. Each rack has at least 42U of usable space</li> <li>e. Each rack has 30 number of 1U blanking panels</li> <li>f. 1U Rack mounted 18” foldable LCD Display (or better) with Keyboard and mouse per Rack. VGA, HDMI and USB cables of sufficient (at least 4 m) should be provided</li> <li>g. Each rack has 2U closed hinged type cable manager or equivalent</li> <li>h. PDUs make and model No.</li> <li>i. Each rack has 2 nos. of 400 V, 32A 3-phase vertical basic PDUs</li> <li>j. Each PDU has at least 30 nos. of C-13 sockets and at least 4 nos. of C-19 sockets</li> <li>k. The PDU supports the entire rack at full load (up to 15 kW)</li> <li>l. The PDU supports high operating temperatures up to 50 deg C</li> <li>m. Door access to both front and back of racks</li> <li>n. Front door is glass. The rear door is split or single metal door. The doors have electro-magnetic locking system with common biometric access system</li> <li>o. Front and back doors open automatically in the event of power and cooling failure and when the temperature exceeds a user defined threshold</li> </ul>		

	<p>p. The exhaust fan automatically starts when the rack doors open upon cooling failure</p>		
4	<p><b>UPS</b></p> <ul style="list-style-type: none"> <li>a. Modular UPS. Hot-swappable power modules, each of capacity at least 20 kVA/kW.</li> <li>b. The total capacity of the UPS is at least 120 kVA.</li> <li>c. Make and model number of the UPS modules</li> <li>d. Failure of any individual power module in the UPS does not affect the working of the remaining power modules.</li> <li>e. Each power module has its own intelligent control logic to avoid a single point of failure.</li> <li>f. The UPS support all the nodes in the eight racks, monitoring system, BMS components and the exhaust fan.</li> <li>g. UPS should support the 2 PDUs in each rack</li> <li>h. UPS must have 15 minutes of battery backup on full load, excluding the PAC units.</li> <li>i. The batteries are of SMF type, and the capacity of each battery is at least 100 Amp-hr.</li> <li>j. The UPS should have a web interface for monitoring and control. It should also be possible to configure alerts and set up a shutdown command that can be sent to the master nodes and/or broadcast on a subnet.</li> </ul>		
5	<p><b>Integrated BMS components</b></p> <ul style="list-style-type: none"> <li>a. Smoke detector</li> </ul>		



	<ul style="list-style-type: none"> <li>b. Fire detection and alarm system</li> <li>c. Fire suppression system - NOVEC 1230 based</li> <li>d. Water leak detection system</li> <li>e. Temperature &amp; Humidity sensor (two per rack. One on the cold aisle and the other on the hot aisle)</li> <li>f. Door sensors for racks</li> <li>g. Alarm beacon</li> <li>h. Rodent repellent</li> <li>i. Exhaust fan</li> </ul>		
6	<p><b>Electrical Low Side Work</b></p> <ul style="list-style-type: none"> <li>a. All electrical cabling and any additional panels as required for the solution towards power for the PAC units as well as UPS power for the racks will be provide by the bidder.</li> <li>b. Dedicated earthing should be provided for the equipment installed wherever necessary by the bidder.</li> </ul>		
7	<p><b>Monitoring</b></p> <p>Row-based cooling units should have functionality to graphically monitor the infrastructure</p> <ul style="list-style-type: none"> <li>a. Monitoring system make and model No.</li> <li>b. Touch screen display with a user-friendly interface</li> <li>c. It should be menu driven system to display and control thermal management, power supply, BMS information, alarms, logs, exhaust fan, etc.</li> <li>d. Remote monitoring of all critical physical and environmental parameters through a web-based interface in a single dashboard</li> <li>e. Monitoring system is active in the event of power/cooling failure</li> <li>f. Access to the control system is secured preferably through a numeric passcode-based security system</li> </ul>		

