

# CSIR - NATIONAL PHYSICAL LABORATORY

Dr. K. S. Krishnan Marg,  
New Delhi – 110012 (INDIA)

Contact: 011 4560 8624  
Email: [sr.cosp@nplindia.org](mailto:sr.cosp@nplindia.org)  
[purchase-sol1@nplindia.org](mailto:purchase-sol1@nplindia.org)

From: Director, CSIR-NPL

Tender No. 4(6)(1-GTE)/RSR/2023-PB/T-193

Dated: 17.01.2024

## CORRIGENDUM

With reference to NPL's Global Tender ID: **2024\_CSIR\_739944\_1**, Pre-Bid Conference (PBC) was concluded on 16.01.2024 for "**Establishment of PM CEMS Reference System**". Consequent upon the outcome of PBC, **some changes have been made in the technical specification of captioned tender. Revised specifications are as follows:**

### Specifications for 'PM-CEMS Reference System'

1. **Complete Turnkey Solution should include the specified hardware and software components. All the parameters should be fully controlled by a single custom-made control software for making a fully integrated and automated system.**
2. **Compliance:** The output of system should comply with the following standards:
  - 2.1 EN 15267-3: Air quality - Certification of automated measuring systems: Performance criteria and test procedures for automated measuring systems for monitoring emissions from stationary sources.
  - 2.2 EN 14181: Quality assurance of continuous emission monitoring systems application of EN 14181 and BS EN 13284-2 (Specially for QAL 1).
  - 2.3 The compliance certificate for the above items in 2.1 and 2.2 should be provided
3. **The system must compose of the following hardware components:** High pressure blower (cast aluminum Material with Positive Temperature Coefficient (PTC) sensor), Duct electric heater, Solid aerosol generator (Compressed air operation), Flue gas Sampler, particulate Continuous Emission Monitor, Analytical Balance, Dew point sensor, Standard measuring chamber, Data control and acquisition system with Programmable Logic Control (PLC), and personal Computer (PC).
  - 3.1 **Testable parameter:** Total Particulate Matter in the 0 to 100 milligram per meter cube
  - 3.2 **Nineteen-inch rack** should be provided for mounting of complete electronic modules of the control and power management units.
  - 3.3 **High pressure blower should be provided with the following specification**
    - 3.3.1 Blower must be made of cast aluminum Material with Positive Temperature Coefficient (PTC) sensor
    - 3.3.2 Motor specification: 1 to 18 kilo watt power, and operating voltage of 400 volt (Compatible with Indian electrical standard)
    - 3.3.3 Air volume: 1000 meter cube per hour free blowing or better
    - 3.3.4 Pressure: Maximum 400 milli bar

3.3.5 Air filter must be provided

**3.4 Suction outlet pipe socket must be provided**

**3.5 Duct electric heater must be provided with the following specifications:**

3.5.1 Electrical specification: 9 kilo watts and 400volts (Compatible with Indian electrical standard)

3.5.2 Temperature more than 360 degree centigrade

3.5.3 The heater's enclosure should be made from galvanized steel sheet. The heating resistors shall be made from stainless steel. External terminal box houses connection terminal strip with overtemperature protection must be provided. The overtemperature protection for automatically reset temperature limiter should be provided. The ducted electric heater shall be equipped with gaskets at the connection ends. The ducted electric heater should be controlled by external temperature controller.

**3.6 Solid aerosol generator in compressed air must be provided with following specifications**

3.6.1 Operation pressure resistant version up to 3 bar or more

3.6.2 Must be capable of Generation of test aerosols from powders, pollens, and spores in operation up to 3 bar or more back pressure with mass flow approximately 0.08 to 750 gram per hour or

3.6.3 Volume flow: 10 to 150 normal liter per minute

3.6.4 Electrical connection: as Per Indian standard

3.6.5 Particle material: non-cohesive powders and dusts

3.6.6 Dosing time: Minimum 6 hours

3.6.7 Maximum particle number concentration: approx.  $10^7$  particles/cm<sup>3</sup>

3.6.8 Mass flow (particles): 0.08 to 750 gram per hour (at assumed packing density of 1 gram per centimeter cube)

3.6.9 Particle size range: 0.2 to 190 micrometer

3.6.10 Carrier/dispersing gas: air/ nitrogen

3.6.11 Inlet pressure: 5 to 12 bar

3.6.12 Maximum back pressure: 3 bar

3.6.13 Feed rate: 1 to 900 milli meter per hour

3.6.14 Compressed air connection: quick coupling

3.6.15 Connection (aerosol outlet): 6 to 10 milli meter

3.6.16 Automatic volume flow monitoring must be available

3.6.17 Display of volume flow, feed, filling level and brush speed must available

3.6.18 Control software for operation via PC must be available

**3.7 Stainless steel brush with ball bearing and coupling must be provided**

**3.8 Rust free storage container of suitable volume must be provided**

**3.9 Online dust monitor:** QAL1 certified (according to EN15267-3) online dust monitor as a reference monitor with the following specification must be provided.

3.9.1 Sensor with variable insertion length up to 600 milli meter, applicable for flue gas temperatures up to 250 degree centigrade

3.9.2 One interface module

3.9.3 One '4 to 20 milli ampere' current output port must be provided

3.9.4 Two relay outputs

3.9.5 One RS485 (MODBUS) port

3.9.6 10meter connection cable

**3.10 Flue gas sampler with the following specification must be provided**

- 3.10.1 Flow range: selectable from 1 to 5 liter per minute; controlled by a mass flow meter with differential pressure sensors, temperature, and pressure sensor with accuracy of  $\pm 1\%$  of full scale or better
- 3.10.2 Sampling control mode: Time or volume-controlled
- 3.10.3 Display of measurement parameters and other data in digital mode
- 3.10.4 Mode of operation: Unattended automatic operation. User selectable start and stop date and time, flow rate and volume control option for each individual sampling channel must be available. If the flow rate falls outside pre-set limits, the sampling stop and indicate that this sampling is not valid
- 3.10.5 Data storage: Provision for storage of all data and setting parameters must be provided
- 3.10.6 Sampling probe: Isokinetic sampling line must be provided for the determination of particulate matter and filter passing elements according to EN 13284-1/EPA5
- 3.10.7 Sampling Line with heated probe, heated plane filter, impinger, and automatic isokinetic sampler must be provided.
- 3.11 Analytical balance must be provided with the following specifications**
  - 3.11.1 Maximum load: 320 gram
  - 3.11.2 Readability: 0.05 milli gram
  - 3.11.3 Integrated methods
  - 3.11.4 Notepad for results
  - 3.11.5 Suspended weighing pan
  - 3.11.6 Easy cleaning
  - 3.11.7 With step dispensing clip
  - 3.11.8 With automatic dispensing options
  - 3.11.9 Repeatability-typical: 0.02 milli gram
  - 3.11.10 Settling time: 1.5 second with Internal (automatic) adjustment
  - 3.11.11 Vibration free table and chamber should be provided for placing the analytical balance
- 3.12 Dew point sensor must be provided with the following specifications**
  - 3.12.1 Sensor housing made of stainless steel must be provided with IP 65 protection
  - 3.12.2 Process connection: G  $\frac{1}{2}$  inch, stainless steel
  - 3.12.3 Sensor protection sinter filter must be provided
  - 3.12.4 Pressure: -1 to +50 bar
  - 3.12.5 Measuring temperature range: -80 to +20 degree centigrade with accuracy of  $\pm 3$  degree centigrade or better
  - 3.12.6 One analog output 4 to 20 milli ampere (3-wire)
  - 3.12.7 Serial interface RS 485, MODBUS-RTU
  - 3.12.8 Power supply 10 to 30 volt DC (compatible to Indian electrical standard)
- 3.13 **Process connection:** Barbed fitting NW 7.2 or  $\frac{1}{4}$  inch female thread for torsion without coupling
- 3.14 **Sensor connection:** G  $\frac{1}{2}$  inch, pressure range 2 to 16 bar, and flow rate 2 liters per minute
- 3.15 **Connection cables:** M12 of length 5meter(minimum)
- 3.16 Data control and acquisition system must compose of PLC, custom made control software and a PC with the following specification**
  - 3.16.1 **PLC technical specification:** 1 CPU, minimum 4 serial ports, 8 digital outputs, minimum 4 analog inputs (4 to 20 milli ampere), minimum 4 analog outputs (4 to 20 milli ampere) and webserver

**3.16.2 The technical specification of the PC for the control of the entire facility is given below:**

- 3.16.2.1 Tower type
- 3.16.2.2 Windows 10 pro or above operating system
- 3.16.2.3 64 bit processor of core i7 or equivalent
- 3.16.2.4 Speed 3 GHz or better
- 3.16.2.5 Random access memory of 8GB or better
- 3.16.2.6 SSD storage of 256 GB or better
- 3.16.2.7 Minimum four USB 3.1 Gen ports or better
- 3.16.2.8 Minimum four USB 2.0 ports or better
- 3.16.2.9 Minimum one HDMI connection or better
- 3.16.2.10 Display port must be provided
- 3.16.2.11 GB LAN network connection
- 3.16.2.12 Mouse and key board must be provided
- 3.16.2.13 49 inch or above size curved display monitor with integrated web cam must be provided.

**3.17 Single point custom made control software with minimum of 10 year or above license for the control of each equipment in the 'PM CEMS reference system' must be provided. The custom made control software must be capable to generate test report as per EN 14181 and BS EN 13284-2**

**3.18 On site Warranty of two years.**

**3.19 Installation must be done at CSIR-NPL, Delhi campus.**

**3.20 Hands on onsite training must be provided on the complete operation and maintenance of the system for minimum seven days.**

**3.21 Certificates:** Following calibration certificates for the system must be provided from the accredited lab.

- 3.21.1 Temperature
  - 3.21.2 Pressure
  - 3.21.3 Mass
  - 3.21.4 Flow
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All other terms & conditions of said tender will remain the same.

  
Sr. Controller of Stores & Purchase

**FORM TO BE USED BY TSC FOR FINALISING PRE-BID MINUTES**

**File No. 4(6)(1-GTE)/RSR/2023-PB/T-193**

**Date: 16-01-2024**

**TSC Minutes(To be typed clearly by the I/O)**

Based on the Pre-bid meeting and recommendation of I/O, following changes have been made in the specifications:

<b>Original Specifications</b>	<b>Final Specifications</b>
<b>Point no. 3.20 in the tender specification:</b> Hands on Training for five persons must be provided on the complete operation and maintenance of the system for seven days.	<b>“Hands on onsite training must be provided on the complete operation and maintenance of the system for minimum seven days”.</b>

The file is forwarded to Purchase Section for uploading the final specifications and TSC minutes on the website and CPPP Portal.

Declaration: We hereby declare that we have no conflict of interest with any of the bidder in this tender