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1	Updated Technical Specification after Pre-Bid meeting for Nitridation Reactor	Updated specification for Supply, Installation, Commissioning, Demonstration and Training of Nitridation Reactor	09-Feb-2024 04:18 PM	<a href="#">upspecNR.pdf</a> 	355.34

**Chapter-4**  
**Updated Specification**  
**(After Pre-Bid Meeting)**

**File No.: CIMFR/PUR-14(03)2023**

**Nitridation Reactor**

**Quantity: 01 Set**

The technical specifications finalized is as below.

1.	<p>Nitridation Reactor:</p> <ul style="list-style-type: none"> <li>The vertical reactor capable of nitridation of minimum 1kg/batch of fly ash, coal, coal washery rejects and other raw materials at 1500 °C. The details of the reactor are indicated in Figure 1.</li> </ul>
2.	<p>Temperature of Operation:</p> <ul style="list-style-type: none"> <li>1500 °C for continuous 10 hours operation in N<sub>2</sub> atmosphere. Hot zone capable of handling 1 kg raw material (2 litre volume). Hot zone 400 mm, with uniform heating zone 200 mm, temperature fluctuation should be within 10 °C.</li> </ul> <p>Temperature control and monitoring:</p> <ul style="list-style-type: none"> <li>programmable profile controller, thyrister, energy meter, thermocouple calibrated from accredited lab. R type thermocouple (with ceramic sheath) placed outside the work tube. One spare R type thermocouple (with ceramic sheath) to be provided. Above 800 °C, the heating/ cooling rate to be controlled (4°C/ min or less) as needed for the life of the ceramic work tube.</li> </ul>
3.	<p>Materials of construction:</p> <ul style="list-style-type: none"> <li>Furnace should be made of stainless steel, non-carcinogenic fiber insulation, MoSi<sub>2</sub> / SiC heating element. In case of SiC, certificate from OEM regarding working temperature at 1500 °C is needed.</li> </ul>
4.	<p>Work tube</p> <ul style="list-style-type: none"> <li>The work tube should be made of high alumina (99.5 % or above); length 1000 mm or above; width ID: 75 mm or above. Three number of work tubes with grouted ends to be provided.</li> </ul>
5.	<p>Gas distribution:</p> <ul style="list-style-type: none"> <li>The bottom of work tube to be filled with fiber ceramic balls/cubes (Fig-1). One extra full set of ceramic balls/ cubes to be provided as a consumable. Gas control panel with rotameter solenoid valve for control of N<sub>2</sub> gas (50 – 500 LPH) into the reactor. The samples (1 kg granules) will be placed on the bed of ceramic cubes/balls. Above the sample bed, the head space of the work tube to be filled with ceramic balls/ cubes to prevent heat radiation to the top flange.</li> </ul>
6.	<p>Flanges</p> <ul style="list-style-type: none"> <li>SS water cooled flanges, sealed by double vitono-rings. with gas purging ball valves, analogue pressure gauge at gas entry port, bottom flange should support gas dispersing tube. Hinged top flange for easy sample loading. Five sets of o-rings to be provided. Suitable chiller should be provided for cooling the flanges.</li> </ul>
7.	<p>Accessories:</p> <ul style="list-style-type: none"> <li>Suitable transformer, power cables, sample placement tongues (2 nos), thermal gloves(3 sets), tool kit to be provided as needed for the application and servicing.</li> <li>Sensors and required systems for data logging of furnace temperature. All sensors to be provided with calibration certificate.</li> <li>10 KVA (as needed for furnace and chiller) online UPS with isolation transformer, along with batteries for 30 minutes power backup, metallic battery stand. Two years warranty for battery.</li> </ul>
8.	<p>Safety:</p> <ul style="list-style-type: none"> <li>Over temperature, over current, protection features to be provided.</li> </ul>

9.	<p>Warranty and AMC</p> <ul style="list-style-type: none"> <li>One-year onsite comprehensive warranty for the entire system including thermocouple, heating element, associated cables.</li> <li>AMC charges for the 2<sup>nd</sup> and 3<sup>rd</sup> year (i.e after the completion of one-year standard warranty) to be quoted. The charges will be freezed and payment will be made after the completion of the service period. During AMC period two preventive maintenance visit and break down visits to be made as and when required.</li> </ul>	
10.	<p>Delivery and transportation</p> <ul style="list-style-type: none"> <li>Loading, unloading, delivery at CSIR-CIMFR Digwadih Campus is under the scope of the supplier.</li> </ul>	
11	<p>Installation &amp; commissioning :</p> <ul style="list-style-type: none"> <li>Drawing along with pre-installation requirements to be provided in the technical bid.</li> <li>For successful commissioning, minimum three successful experimental runs (1450 °C for 7-10 hrs) to be demonstrated at site.</li> <li>Training for trouble free operation to be provided to CSIR-CIMFR staffs.</li> </ul>	
Schedule	Buyer's time frame	Reference
Expected delivery period	4 months (written) BJ	From the date of purchase order
Expected installation commissioning and demonstration	4 weeks	From the date of delivery in CIMFR store.

**NOTE:**

1. Basis of evaluation of price bids will be sum of equipment cost, comprehensive warranty for one year and cost of Non Comprehensive AMC for 2 years.
2. General arrangement drawing of the offered nitridation reactor with major components and bill of material shall be submitted with the technical bid.

