

Addendum 01

The Pre – Bid Meeting was held on **25/11/2019** at **3.00 p.m.** in the **Board Room**, NITK Surathkal for the purchase of “**Vacuum Assisted High Temperature Furnace**” (Tender Notification No: **NITK/CRF/VAHTF/04** Dated: **04/11/2019**). The following queries were discussed & the Reply/Clarification given to the prospective bidders.

Queries & Reply/Clarification

Sl. No.	NITK Tender Specifications	Questions asked by the vendor	Reply/Clarification	Changes to the Tender
1	Commercial queries	We will be submitting our quote on EURO currency and it is CIP Bangalore Airport price basis.	In case of import, CIP rates should be quoted. All components of expenditure to arrive by air at Bangalore need to be explicitly specified. If ship by sea, the nearest seaport is Mangalore / Chennai. However, during financial Comparison 6% additional charges will be levied to cover customs clearance and local transport. This will be done through NITK approved agent.	Committee decided to modify it as Under Tender Document, section 2: CONDITIONS OF CONTRACT , page no. 13 of 32, Clause no: 2 may be read as “ In case of import, CIP rates should be quoted. All components of expenditure to arrive by air at Bangalore need to be explicitly specified. If ship by sea, the nearest seaport is Mangalore / Chennai. However, during financial comparison 6% additional charges will be levied to cover customs clearance and local transport ”

2	Commercial queries	<p>Please confirm if below documents will be provided by you:</p> <p>a. Customs duty exemption certificate. b. GST exemption certificate.</p>	Yes	As per the tender document, (Please refer page no. 13 of 32, "section 2: conditions of contract", Point No. 3)
3	Commercial queries	Customs clearance charges, local transport charges and delivery charges: Mention who will bear these expenses.	NITK will bear this, however during financial comparison 6% additional charges will be levied to cover customs clearance and local transport	NITK will bear this, however during financial comparison 6% additional charges will be levied to cover customs clearance and local transport
4	This will be a research grade tubular furnace, which can be operated in vacuum or under controlled atmosphere	<p>Please confirm which mode of atmospheres is required for furnace operation as given below?</p> <ul style="list-style-type: none"> Do you need Research grade tubular furnace to be operated in vacuum atmosphere or under controlled atmosphere? Do you need Research grade tubular furnace to be operated in both vacuum atmosphere and under controlled atmosphere? 	This will be a research grade tubular furnace, which could be operated in air, vacuum and under controlled atmosphere. However, at a time only one type of operation will be done.	<p>Under Tender Document, Annexure-H, page no. 30/32, Under Detailed Technical Specifications,</p> <p>It may be read as "This will be a research grade tubular furnace, which could be operated in air, vacuum and under controlled atmosphere. However, at a time only one type of operation will be done".</p>

5	<p>Max temperature: $\geq 1500\text{ }^{\circ}\text{C}$</p>	<ol style="list-style-type: none"> 1. Confirm maximum temperature: $1500\text{ }^{\circ}\text{C}$ mentioned in specifications is meant for <u>“operation in air, vacuum atmosphere and controlled / modified atmosphere.”</u> 2. If operation of furnace is required in three atmospheres (air, vacuum atmospheres and controlled atmospheres), kindly mention the same in specifications. 3. If maximum temperature: $1500\text{ }^{\circ}\text{C}$ is required then include <u>“maximum continuous operating temperature: 1400 Degrees C.”</u> 4. Since maximum continuous operating temperature is always $100\text{ }^{\circ}\text{C}$ less than maximum temperature, include <u>“Maximum continuous operating temperature: 1400 Degrees C.” to the existing specifications.</u> 	<p>Maximum temperature is $1500\text{ }^{\circ}\text{C}$, operation in air, vacuum atmosphere and controlled / modified atmosphere.</p> <p>However maximum operating temperature is equal to minimum $1400\text{ }^{\circ}\text{C}$ (operated for 8 hrs. continuously)</p>	<p>Under Tender Document, Annexure-H, page no. 30/32, Under Detailed Technical Specifications,</p> <p>It may be read as “Maximum temperature is $1500\text{ }^{\circ}\text{C}$, operation in air, vacuum atmosphere and controlled / modified atmosphere.</p> <p>However max operating temperature equal to minimum $1400\text{ }^{\circ}\text{C}$ (operated for 8 hrs. continuously)”</p>
6	<p>Tube dimensions: length 1000 to 1200 mm x tube ID $\geq 70\text{ mm}$</p> <p>Tube materials: Alumina based ceramic with tube thickness in the range of 5-6 mm, with locking end plugs.</p> <p>Total tube length: 700 mm to 800 mm</p>	<ol style="list-style-type: none"> 1. As tube dimensions: Length 1000 to 1200 mm X tube ID: $\geq 70\text{ mm}$ are given for operation in vacuum atmosphere and controlled / modified atmosphere, <u>mention that tube dimensions are meant for operation in vacuum atmosphere and controlled / modified atmosphere.</u> 2. As the required tube material is alumina based ceramic tube, <u>please specify in specifications that tube material is Recrystallised Alumina work tube with thickness in the range</u> 	<p>Tube dimensions: length 1000 to 1200 mm x tube ID $\geq 70\text{ mm}$, when operated in vacuum and controlled atmosphere, however for operation in air, length could be 700mm to 900mm.</p> <p>Material could be Alumina based ceramics with thickness in the range of 5mm to 12mm, with locking end plugs, insulation wool, etc.</p>	<p>Under Tender Document, Annexure-H, page no. 30/32, Under Detailed Technical Specifications,</p> <p>It may be read as “Tube dimensions may be read as <u>“Tube dimensions: length 1000 to 1200 mm x tube ID $\geq 70\text{ mm}$, when operated in vacuum and controlled atmosphere, however for operation in air length could be between 700mm to 900mm.</u></p>

		<p>of 5-12 mm.</p> <p>3. Kindly confirm that tube length of 700 to 800 mm is required for operation in air. <u>Please include tube with dimensions of 700 to 900 mm x tube ID ≥70 mm for operation in air.</u></p>		<p>Material could be Alumina based ceramics with thickness in the range of 5mm to 12mm, with locking end plugs, insulation wool, etc.”</p>
7	<p>Constant temperature zone > 230 mm</p>	<p>1. <u>Heated tube length: ≥450 mm (Please mention this specification since uniform length / constant length is derived from heated tube length only)</u></p> <p>2. Please note constant temperature zone: > 230 mm is given in the specifications.</p> <p>This is very short length and allows one or two crucibles (crucibles / boats containing samples) inside the constant /uniform zone. To accommodate large number of crucibles/ boats (crucibles/ boats containing samples) higher constant / uniform length is required. <u>Depending upon your applications / area of research work using research grade tube furnace, kindly decide the desired constant length/ uniform length as per your requirement and incorporate the same as furnaces with higher uniform lengths are available in the market now.</u></p>	<p>Constant temperature zone > 230 mm</p> <p>Heated tube length: ≥450 mm</p>	<p>Under Tender Document, Annexure-H, page no. 30/32, Under Detailed Technical Specifications,</p> <p>It may be read as “Constant temperature zone > 230 mm”</p> <p>Heated tube length: ≥450 mm”</p>

8	Heating power requirements <14 kW, Heating time to peak temperatures <30 min	"Heating time to peak temperature < 30 minutes." is not applicable to tube furnaces with ceramic work tube. Since heat up time is limited to 5°C per minute this specification is not applicable.	Heating power requirements <14 kW, Heating rate $\geq 5^{\circ}\text{C}/\text{minute}$ up to final temperature	Under Tender Document, Annexure-H, page no. 30/32, Under Detailed Technical Specifications, It may be read as " Heating power requirements <14 kW, Heating rate $\geq 5^{\circ}\text{C}/\text{minute}$ up to final temperature ".
9	Weight <100 kg; only table top operations	Please note in general all systems with weight < 50 kg are considered as bench top systems & systems with > 50 kg weight are treated as floor mounting systems.	There is no rigid convention	No change, as per tender document
10	Controller: Microprocessor based PID temperature controller, with LCD display and USB logging interface. Preferably control system should be below the furnace base	Since controllers are available with touch screen we request you to put Controller/Touch screen Controller	Controller: Microprocessor based PID temperature controller, with LCD display or touch screen controller and USB logging interface. Preferably control system should be below the furnace base	Under Tender Document, Annexure-H, page no. 30/32, Under Detailed Technical Specifications, It may be read as " Controller: Microprocessor based PID temperature controller, with LCD display or touch screen controller and USB logging interface. Preferably control system should be below the furnace base ".
11	Program storage capacity: 5 or more (each program can have multiple segments or steps, i.e ramp-soak pairs)	<u>Program storage capacity: 10 (each program can have > 20 segments or steps, i.e. ramp-soak pairs), Change the word "multiple segments" and modify as > 20 segments or steps. Put / "Edit button for segment control to be provided"</u>	Accepted, program storage capacity 10 (each program can have segments greater than 20, Segment means steps, ramp-soak pairs etc.). Editing of segments should be possible. Program editing in terms of 1°C or 1 min. Operating time, temperature and	Under Tender Document, Annexure-H, page no. 30/32, Under Detailed Technical Specifications, It may be read as " Program storage capacity 10 (each program can have

			power consumption should be available.	segments equal or greater than 20, Segment means steps, ramp-soak pairs etc.). Editing of segments should be possible". Program editing in terms of 1°C or 1 min. Operating time, temperature and power consumption should be available.
12	GLP and GMP Complaint Dual non-rust textured stainless steel furnace casing	<u>GLP and GMP Compliant Dual non – rust textured stain less steel furnace casing: / EN 10088-2:2005 compliant stainless-steel furnace casing.</u>	GLP AND GMP (or equivalent) Complaint Dual non-rust textured stainless steel furnace casing. Certificate to be provided for the materials used.	Under Tender Document, Annexure-H, page no. 30/32, Under Detailed Technical Specifications, It may be read as " GLP AND GMP (or equivalent) Complaint Dual non-rust textured stainless steel furnace casing. Certificate to be provided for the materials used ".
13	Active cooling system should be provided to ensure low surface temperature	<u>Active cooling system should be provided to ensure low surface temperature: / Water-cooled stainless-steel flanges should be provided.</u> <u>Furnace system to comply with protection requirements of Low Voltage Directive 2014 /35/EU by BSEN 61010-2-010:2014 safety requirements.</u>	Active cooling or passive cooling surface temperature should not exceed 70 °C, when operated at 1400 °C for 8 hrs. If active cooling is followed, accessories like pump, water tubes, connectors etc. to be provided by the bidder. Electrical safety should be ensured	Under Tender Document, Annexure-H, page no. 30/32, Under Detailed Technical Specifications, It may be read as " Active cooling or passive cooling surface temperature should not exceed 70 °C, when operated at 1400 °C for 8 hrs. If active cooling is followed, accessories like chiller, pump, water tubes, connectors etc. to be

				provided by the bidder”. “Electrical safety should be ensured”.
14	All lining materials and insulating materials should be made from non-carcinogenic materials	<u>All lining materials and insulating materials should be made from non-carcinogenic materials. / Product to comply with Directive 2011/65/EU-RoHS2 on the restriction of the use of certain hazardous substances</u>	All lining materials and insulating materials should be made from non-carcinogenic materials (Certificate to be provided)	Under Tender Document, Annexure-H, page no. 30/32, Under Detailed Technical Specifications, It may be read as “All lining materials and insulating materials should be made from non-carcinogenic materials (Certificate to be provided)”.
15	Thermocouple: Type S	<u>Since R & S type thermo couples are rated for same temperature measurement, applications we request you to put Thermocouple: Type S: /Type: R.</u>	Type S or Equivalent with certificates.	Under Tender Document, Annexure-H, page no. 30/32, Under Detailed Technical Specifications, It may be read as “Type S or Equivalent with certificates”.
16	Additional spares (quote as optional item): 1 spare tube including locking end plugs, 1 set spare heating elements, one set of spare washers, O rings, etc.	<u>Additional spares: 1 Set of heating elements: One set of heating elements (Quantity / number of heating elements to be indicated) required for replacement in offered furnace model to be quoted separately</u>	Additional spares: 1 Spare tube (both for air and controlled environment), 1 set spare heating element for complete replacement, one set of spare washers, O rings, etc. to be provided.	Under Tender Document, Annexure-H, page no. 31/32, Under Detailed Technical Specifications, It may be read as “Additional spares: 1 Spare tube (both for air and controlled environment), 1 set spare heating element for complete replacement, one set of spare washers, O rings, etc. to be provided”.

17	<p>Gas tight protective gas applications with non flammable gases or vacuum operations (upto 10⁻⁵ mbar or better) This can be with the same tube or with a separate one which can replace initial one (replacement tube again with alumina base)-this should be a gas tight working tube with stainless steel flanges. Mounting support systems with brackets for tubes and flanges to be provided Gas system for one nonflammable protective gas (Ar/He/N₂/O₂/CO₂/N₂+H₂/Ar+H₂ etc) with complete shutoff value and manual flow meter with control valve (volume flow 50-500 l/hr), gas outlet pressure relief valve. Gas piping and other items required for complete and safe operation is to provided One set of gas cylinders (Ar, He, N₂, O₂, CO₂ and H₂), regulators, cylinder trolleys, etc to be provided/quoted</p>	<p>1. <u>Gas tight protective gas applications: Kindly provide below data.</u></p> <ul style="list-style-type: none"> • <u>Please specify your applications using High temperature tube furnace in vacuum/controlled atmospheres.</u> • <u>Confirm the number of individual gases (Ar, He, N₂, O₂, CO₂) and number of mixture gases (N₂ + H₂, Ar+H₂) required for your applications.</u> • Please specifically mention above detailed specifications along with quantity so that all vendors will quote the similar items and same quantity as per your tender specifications/ requirements. 	<p>Gas tight protective gas applications with non flammable gases or vacuum operations (upto 10⁻⁵ mbar or better).</p> <p>Gas tight working tube with stainless steel flanges. Mounting support systems with brackets for tubes and flanges to be provided.</p> <p>Following gas system to be provided (with certificates):</p> <p>Ar gas cylinder with 46.7 litres capacity filled with 99.999% purity Ar gas.</p> <p>He gas cylinder with 46.7 litres capacity filled with 99.999% purity He gas.</p> <p>N₂ gas cylinder with 46.7 litres capacity filled with 99.999% purity N₂ gas.</p> <p>O₂ gas cylinder with 31 Kg capacity filled with 99.9% purity O₂ gas.</p> <p>CO₂ gas cylinder with 46.7 litres capacity filled with 99.99% purity CO₂ gas.</p> <p>H₂ gas cylinder with 46.7 litres capacity filled with 99.99% purity H₂ gas.</p>	<p>Under Tender Document, Annexure-H, page no. 31/32, Under Detailed Technical Specifications,</p> <p>It may be read as“Gas tight protective gas applications with non flammable gases or vacuum operations (upto 10⁻⁵ mbar or better).</p> <p>Gas tight working tube with stainless steel flanges. Mounting support systems with brackets for tubes and flanges to be provided.</p> <p>Following gas system to be provided (with certificates):</p> <p>Ar gas cylinder with 46.7 litres capacity filled with 99.999% purity Ar gas.</p> <p>He gas cylinder with 46.7 litres capacity filled with 99.999% purity He gas.</p> <p>N₂ gas cylinder with 46.7 litres capacity filled with 99.999% purity N₂ gas.</p> <p>O₂ gas cylinder with 31 Kg capacity filled with 99.9% purity O₂ gas.</p> <p>CO₂ gas cylinder with 46.7</p>
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			<p>N₂+H₂ Mixture gas cylinder with 46.7 litres capacity filled with 95% N₂ + 5% H₂.</p> <p>Ar+H₂ Mixture gas cylinder with 46.7 litres capacity filled with 95% Ar + 5% H₂.</p> <p>Gas system for one nonflammable protective gas (Ar/He/N₂/O₂/CO₂/N₂+H₂/Ar+H₂ etc) with complete shutoff value and manual flow meter with control valve (volume flow 50-500 l/hr), gas outlet pressure relief valve. Gas piping and other items required for complete and safe operation is to be provided.</p>	<p>litres capacity filled with 99.99% purity CO₂ gas.</p> <p>H₂ gas cylinder with 46.7 litres capacity filled with 99.99% purity H₂ gas.</p> <p>N₂+H₂ Mixture gas cylinder with 46.7 litres capacity filled with 95% N₂ + 5% H₂.</p> <p>Ar+H₂ Mixture gas cylinder with 46.7 litres capacity filled with 95% Ar + 5% H₂.</p> <p>Gas system for one nonflammable protective gas (Ar/He/N₂/O₂/CO₂/N₂+H₂/Ar+H₂ etc) with complete shutoff value and manual flow meter with control valve (volume flow 50-500 l/hr), gas outlet pressure relief valve. Gas piping and other items required for complete and safe operation is to be provided”.</p>
18		Please provide the information on how many flow meters are to be fitted on tube furnace? (This information is required in order to make provision for keeping flow meters on tube furnace during manufacturing time. Specify the number of flow meters like 2 or 3 or 4)	<p>3 flow meters for individual gases and one for mixture of gases to be provided.</p> <p>Provision for fitting this on the tube furnace to be provided.</p>	<p>3 flow meters for individual gases and one for mixture of gases to be provided.</p> <p>Provision for fitting this on the tube furnace to be provided.</p>

19	Gas system for one nonflammable protective gas	Please add this requirement of Gas Safety system if you wish to use H2 gas > 5%.	H2 gas concentration less than 5%.	Under Tender Document, Annexure-H, page no. 31/32, Under Detailed Technical Specifications, It may be read as " H₂ gas concentration less than 5% ".
20	One set of gas cylinders (Ar, He, N2, O2, CO2 and H2), regulators, cylinder trolleys, etc to be provided/quoted.	Please specify the capacity of trolley required? Single cylinder holding trolley / Multi cylinders holding trolley?	One set of gas cylinders (Ar, He, N2, O2, CO2 and H2), regulators, cylinder trolleys, etc to be provided/quoted. Cylinder trolley could be 2 Cylinders x 3 trolleys or 3 Cylinders x 2 trolleys.	Under Tender Document, Annexure-H, page no. 31/32, Under Detailed Technical Specifications, It may be read as " One set of gas cylinders (Ar, He, N2, O2, CO2 and H2), regulators, cylinder trolleys, etc to be provided/quoted. " Cylinder trolley could be 2 Cylinders x 3 trolleys or 3 Cylinders x 2 trolleys ".
21	High vacuum pump systems (for vacuum generation and gas supply) compatible with the "Gas system for one nonflammable protective gas", being quoted in this tender. It will have a rotary and turbomolecular pump which can generate a vacuum of 10 -5 mbar in the tube. There should be a pressure/vacuum sensor and a display unit.	Whether the Vacuum Pump system to generate 10-5 mbar vacuum would be in the scope of supply of vendor or we just need to make a provision and NITK would make arrangement for the same.	Yes	No change, as per tender document
22	Gas system for one nonflammable protective gas	What is the % level of H2 gas required in the chamber.	H2 gas concentration less than 5%.	Under Tender Document, Annexure-H, page no. 31/32, Under Detailed Technical Specifications, It may be read as " H₂ gas concentration less than 5% ".

Following points to be included in the Addendum 01:

- Insulation seals, end plates, water cooled vacuum flanges, appropriate chiller, rotary pumps, turbo molecular pumps etc. required for operation in air, vacuum and controlled atmosphere to be provided.
- Chiller and Turbo Molecular Pump should be OEM make.
- If exhaust piping is not part of the system, provide a small compatible exhaust facility / exhaust system for exhaust gases
- Electrical safety should be ensured and a certificate should be attached
- Any breakdown/service issue is to be sorted out within 96 hours. In case of delay beyond 96 hours, the warranty period will be proportionally extended
- Please submit contact details of 5 central funded technical institute who are your customers.
- Warranty period –minimum 3 years. Also quote AMC rate for 2 years, after warranty period. Price comparison will include both.

It is decided to extend the Bid submission date by following dates

Last date for request tender document	: 03/01/2020, before 3.00 p. m.
Last date for Bid submission	: 03/01/2020 before 4.00 p. m.
Bid opening date(tentative)	: 06/01/2020 @ 3.00 p.m.

Sd/-
Buyer
Dr. Ravishankar K. S.

Sd/-
Chairman
Central Research Facility
NITK, Surathkal