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From: Director, CSIR-NPL
No. 14-VII/KT(3056-GTE)25PB/T-145 Dated:29.01.2026

CORRIGENDUM

With reference to NPL's Global Tender ID: **2026_CSIR_825889_1** for "**Spark Plasma Sintering Machine**". All the prospective bidders are hereby informed that some changes have been made in the technical specification of captioned tender. Revised specifications are as follows:

Original Specifications	Final Specifications
As tendered	Attached as Annexure I

Revised Technical specifications (Annexure-I) is also ATTACHED with this Corrigendum. Accordingly, all the interested bidders may submit their Offer as per revised technical specification.

Please also note that bids submitted without taking these changes into consideration will be rejected summarily.

All other terms will remain the same. The same is also available on CSIR-NPL official website http://www.nplindia.in under Tender link.

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Sr. Controller of Stores and Purchase

FORM TO BE FILLED BY IO WHILE CONVENING PRE-BID MEETING OF TSC

File No. 14-VII/KT(3056-GTE)25-PB/T-145 **DATE: 20/01/2026**

Pre- bid Meeting (To be typed clearly by the I/O)

Name of Indentor: **Dr. Kriti Tyagi**

Indent No.: **PR4031382025 dated 11.09.2025**

Item Description: **Spark Plasma Sintering Machine**

No. of Budgetary Quotes: Two

(1) A pre-bid meeting of TCS was held on 20/01/2026

(2) Following queries were raised by participating Bidders

Name of the Firm	Queries Raised	Remarks, If any
SYINCO Technologies	No Query	--
Cool Tech Engineers	No Query	--
NB Instruments Pvt. Ltd.	1. Details about submission of a bid security declaration form instead of actual EMD amount 2. Request to add PLC controller in pt. no. 1.3 and 3.8 of the technical specifications	1. Requested to kindly refer to CoSP (purchase) for the details. 2. Modified to include 'PID or PLC or both compatible to control operational parameters of the machine' 3. *Vendor is requested to ensure vacuum requirement of '1x10^{-3} mbar or better' as against vacuum limit of 9x10^{-2} mbar mentioned in brochure provided by NB instruments.*
KG PEMCO Pvt. Ltd.	1. Request to add AC power output in addition to DC power output 2. Request to modify the current vacuum requirement of '1x10^{-3} mbar or better' to 20mbar	1. User requirement is DC pulse generator only. 2. User requirement is '1x10^{-3} mbar or better'

Indentor's recommendation

1. The comments, as received from bidders during PBC, and our response is as follows:

Tender Specification and its number	Comment of bidder	Response of Indentor (Accepted/ Not	Revised Specification (if any)	Justif ication for non-accept

			Accepted)		ance
1. Sintering Machine Unit	1.3 Pressure Control System: Dual mode - Manual and automatic control with PID pressure controller and temperature controller	NB Instruments - Request to add PLC controller	Accepted	Pressure Control System: Dual mode - Manual and automatic control with PID or PLC or both pressure controller and temperature controller	NA
2. Energizing system	2.1 DC pulse generator	KG PEMCO Pvt. Ltd. - Request to add AC power output in addition to DC power output	Not Accepted	NA	User requirement is DC pulse generator only.
3. Vacuum/inert chamber	3.3 Vacuum limit and speed: Rotary vacuum in the level $1x10^{-3}$ mbar or better (suitable for prevention of material oxidation) to be reached from atmospheric pressure within 5-15 minutes	KG PEMCO Pvt. Ltd. Request to modify the current vacuum requirement of '$1x10^{-3}$ mbar or better' to 20mbar	Not Accepted	NA	User requirement is '$1x10^{-3}$ mbar or better'
	3.8 Automatic temperature control: PID digital programmable temperature controller	NB Instruments - Request to add PLC controller	Accepted	Automatic temperature control: PID or PLC or both digital programmable temperature controller compatible to control operational parameters of the machine	NA

Final recommended specification are as attached at Annexure 1 and signed by I/O: with change

Corrigendum to Tender may be issued/ may not be issued

Recommended Revised date of Tender submission (if any) is: NA

The specification are generic and broad based.

Submitted to TSC for necessary approvals.

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

FILE NO. 14-VII/KT(3056-GTE)25-PB/T-145 **DATE: 20/01/2026**

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 specification:

Original Specifications		**Final Specifications**	
1. Sintering Machine Unit	1.1 Sintering Pressure: Minimum 5kN or lower, Maximum 20kN or higher 1.2 Opening height: Suitable for sample mechanism placement, minimum day-light opening ≥ 120 mm under no load conditions. 1.3 Pressure Control System: Dual mode - Manual and automatic control with PID pressure controller and temperature controller 1.4 Sintering Electrodes: with special sealed for water cooling 1.5 Z-axis position display: Digital readout with minimum reading of 1 micrometre 1.6 Safety devices: Warning alarm and emergency stop system 1.7 Control Panel: Up and down selector switch 1.8 Graphite Electrode size: suitable for sample placement mechanism 1.9 Specimen dimensions: 5 – 12.7 mm diameter or higher. Pressure display on HMI with real time graphing	1. Sintering Machine Unit	1.1 Sintering Pressure: Minimum 5kN or lower, Maximum 20kN or higher 1.2 Opening height: Suitable for sample mechanism placement, minimum day-light opening ≥ 120 mm under no load conditions. 1.3 Pressure Control System: Dual mode - Manual and automatic control with PID or PLC or both pressure controller and temperature controller 1.4 Sintering Electrodes: with special sealed for water cooling 1.5 Z-axis position display: Digital readout with minimum reading of 1 micrometre 1.6 Safety devices: Warning alarm and emergency stop system 1.7 Control Panel: Up and down selector switch 1.8 Graphite Electrode size: suitable for sample placement mechanism 1.9 Specimen dimensions: 5 – 12.7 mm diameter or higher. Pressure display on HMI with real time graphing
2. Energizing system	2.1DC pulse generator 2.2 AC input: compatible with Indian electrical supply conditions. 2.3 DC output: ≥1000A; with multiple tappings compatible for synthesis	2. Energizing system	2.1 DC pulse generator 2.2 AC input: compatible with Indian electrical supply conditions. 2.3 DC output: ≥1000A; with multiple tappings compatible for synthesis
3. Vacuum/inert chamber	3.1 Vacuum chamber: Stainless steel chamber or compatible insulating alloy chamber to withstand 2400°C with water cooling jacket 3.2 .Dimension: Inside diameter	3. Vacuum/inert chamber	3.1 Vacuum chamber: Stainless steel chamber or compatible insulating alloy chamber to withstand 2400°C with water cooling jacket 3.2 Dimension: Inside diameter

	suitable for easy loading/unloading 3.3 Vacuum limit and speed: Rotary vacuum in the level $1x10^{-3}$ mbar or better (suitable for prevention of material oxidation) to be reached from atmospheric pressure within 5-15 minutes 3.4 Sintering ambience: vacuum/inert gas (N_2/Ar) 3.5 Viewing windows: quartz window 3.6 Vacuum meters: Pirani vacuum gauge and plus-minus Bourdon pressure gauge 3.7 Solenoid valve with flowmeter included 3.8 Automatic temperature control: PID digital programmable temperature controller 3.9 Temperature detector: 2 way system: a. Thermocouple system (Maximum 1000°C (K-type) and b. optical pyrometer that can measure from 600 to 3000°C 3.10 Pyrometer emissivity value adjustable 3.11 Operation temperature of chamber: Maximum temperature 2400°C 3.12 Cooling water: chiller parameter must be suitable to keep system cool. 3.13 Inert gas N_2/Ar with solenoid valve & flowmeter control provision.		suitable for easy loading/unloading 3.3 Vacuum limit and speed: Rotary vacuum in the level $1x10^{-3}$ mbar or better (suitable for prevention of material oxidation) to be reached from atmospheric pressure within 5-15 minutes 3.4 Sintering ambience: vacuum/inert gas (N_2/Ar) 3.5 Viewing windows: quartz window 3.6 Vacuum meters: Pirani vacuum gauge and plus-minus Bourdon pressure gauge 3.7 Solenoid valve with flowmeter included 3.8 Automatic temperature control: PID or PLC or both digital programmable temperature controller compatible to control operational parameters of the machine 3.9 Temperature detector: 2 way system: a. Thermocouple system (Maximum 1000°C (K-type) and b. optical pyrometer that can measure from 600 to 3000°C 3.10 Pyrometer emissivity value adjustable 3.11 Operation temperature of chamber: Maximum temperature 2400°C 3.12 Cooling water: chiller parameter must be suitable to keep system cool. 3.13 Inert gas N_2/Ar with solenoid valve & flowmeter control provision.
4. Cooling System	4.1 Chiller unit to be included with the system. 4.2 Included in Chiller unit- water filtration, flow sensors and temperature alarms	4. Cooling System	4.1 Chiller unit to be included with the system. 4.2 Included in Chiller unit- water filtration, flow sensors and temperature alarms
5. Safety System	5.1 Safety exhaust system for removal of hazardous gases 5.2 Emergency stop button 5.3 Over-temperature protection, over-pressure protection, audible and visual alarms. 5.4 Must interface with rotary	5. Safety System	5.1 Safety exhaust system for removal of hazardous gases 5.2 Emergency stop button 5.3 Over-temperature protection, over-pressure protection, audible and visual alarms. 5.4 Must interface with rotary

	pump outlet		pump outlet
6. Material Synthesis Compatibility	6.1 Must be compatible for synthesis of thermoelectric and structural material systems like chalcogenides, skutterudites, Half heuslers, oxides, silicides, intermetallics etc.	6. Material Synthesis Compatibility	6.1 Must be compatible for synthesis of thermoelectric and structural material systems like chalcogenides, skutterudites, Half heuslers, oxides, silicides, intermetallics etc.
7. Standard mandatory accessories	7.1 Operation Materials: 2 sets. 7.2 Tools: 1 set. 7.3 Graphite spacers for SPS: 8 numbers. 7.4 Fuse: 2 numbers. 7.5 K-type thermocouple: 3 numbers + 1 spare. 7.6 Radiation thermometer: 1 number. 7.7 SPS sintering die & punch: graphite die punches set (2 numbers). 7.8 1 no. graphite die & punch set: Inner die diameter: 8mm, height 30mm and 2 punches. 7.9 1 no. graphite die & punch set: Inner die diameter: 10mm, height 30mm and 2 punches. 7.10 1 no. graphite die& punch set: Inner die diameter: 12.7mm, height 30mm and 2 punches. 7.11 Graphite sheet/felt 7.12 O-ring: 4 pairs. 7.13 Clamping tool: 1 pc. 7.14 Compatible Matching transformer (if required): 1 number. 7.15 Essential spares should be available for next 10 year from date of installation – list to be provided by supplier 7.16 The tool kit for maintenance and essential safety equipment should be provided (01 set) 7.17 All operating accessories to be provided along with machine required for synthesis 7.18 Synthesised pellet ejection system (desirable)	7. Standard mandatory accessories	7.1 Operation Materials: 2 sets. 7.2 Tools: 1 set. 7.3 Graphite spacers for SPS: 8 numbers. 7.4 Fuse: 2 numbers. 7.5 K-type thermocouple: 3 numbers + 1 spare. 7.6 Radiation thermometer: 1 number. 7.7 SPS sintering die & punch: graphite die punches set (2 numbers). 7.8 1 no. graphite die & punch set: Inner die diameter: 8mm, height 30mm and 2 punches. 7.9 1 no. graphite die & punch set: Inner die diameter: 10mm, height 30mm and 2 punches. 7.10 1 no. graphite die& punch set: Inner die diameter: 12.7mm, height 30mm and 2 punches. 7.11 Graphite sheet/felt 7.12 O-ring: 4 pairs. 7.13 Clamping tool: 1 pc. 7.14 Compatible Matching transformer (if required): 1 number. 7.15 Essential spares should be available for next 10 year from date of installation – list to be provided by supplier 7.16 The tool kit for maintenance and essential safety equipment should be provided (01 set) 7.17 All operating accessories to be provided along with machine required for synthesis 7.18 Synthesised pellet ejection system (desirable)
8. Warranty	8.1 Two years 8.2 All electronics PSU, PLC, transformer, chiller etc. must be covered.	8. Warranty	8.1 Two years 8.2 All electronics PSU, PID/PLC, transformer, chiller etc. must be covered.

9. Operation system	9.1 PC Interface: USB 3.0 -02 Nos., USB 2.0 – 02 Nos., HDMI Display port. 9.2 Attached PC/laptop with Operating System: Windows 11/Latest OS. 9.3 Compatible Desktop/Laptop: system software must be windows based OS compatible. 9.4 Laser color Printer: 1 number. 9.5 Ethernet port. 9.6 Ports for data transfer.	9. Operation system	9.1 PC Interface: USB 3.0 -02 Nos., USB 2.0 – 02 Nos., HDMI Display port. 9.2 Attached PC/laptop with Operating System: Windows 11/Latest OS. 9.3 Compatible Desktop/Laptop: system software must be windows based OS compatible. 9.4 Laser color Printer: 1 number. 9.5 Ethernet port. 9.6 Ports for data transfer.
10. Demonstration of sintering capability	10.1 The bidder may be required to demonstrate the sintering/compaction capability of the offered SPS by carrying out an actual synthesis trial using thermoelectric powders provided by CSIR-NPL. 10.2 Minimum densification target: ≥98% of theoretical density for supplied material powder (chalcogenide, skutterudite/HH etc.)	10. Demonstration of sintering capability	10.1 The bidder may be required to demonstrate the sintering/compaction capability of the offered SPS by carrying out an actual synthesis trial using thermoelectric powders provided by CSIR-NPL. 10.2 Minimum densification target: ≥98% of theoretical density for supplied material powder (chalcogenide, skutterudite/HH etc.)
11. Acceptance Criteria	11.1 After the Successful installation of the equipment, it is desirable to conduct necessary testing with the specimens prepared and the resultant parameters will be validated with the known results.	11. Acceptance Criteria	11.1 After the Successful installation of the equipment, it is desirable to conduct necessary testing with the specimens prepared and the resultant parameters will be validated with the known results.
12. Documentation	12.1 Operation manual, maintenance manual, electrical diagrams and calibration certificates (if any) must be provided 12.2 Lifetime remote support must be included	12. Documentation	12.1 Operation manual, maintenance manual, electrical diagrams and calibration certificates (if any) must be provided 12.2 Lifetime remote support must be included