



**CSIR - NATIONAL METALLURGICAL LABORATORY**  
(Council of Scientific & Industrial Research)  
BURMAMINES, JAMSHEDPUR - 831 007  
Tel: 0657 2345129/132, Fax: 0657 2345131  
Email: spo@nmlindia.org Website: www.nmlindia.org



No. NML-FG/AMP-PKM/38-19/Corr-I


Date: 15.11.2019

CORRIGENDUM - I

Sub: Tender for supply of Temperature Modulated-Differential Scanning Calorimetry (TM-DSC) for Metallic Alloys.

Ref: 1) Enquiry No. NML-FG/ AMP-PKM/38-19 Dated 31.10.2019  
2) CPPP Tender ID No. 2019\_CSIR\_488813\_1

With reference to the above procurement, It is informed that technical specifications have been revised as per Annexure I. The bid may be submitted as per the revised technical specifications. All other terms and conditions will remain unaltered.

  
(N.K. Singh) 15.11.19

Stores & Purchase Officer

नलिन कुमार सिंह/NALIN KUMAR SINGH  
भंडार एवं क्रय अधिकारी/Stores & Purchase Officer  
एन०एम०एल०, जमशेदपुर/NML, Jamshedpur-831007

## Annexure-I

S.No	Specification	Requirement
01	General Description	State of the art Temperature Modulated DSC system capable of measuring Glass transition, crystallization, phase transformation, melting, enthalpy and Specific heat capacity ( $C_p$ ) of metallic alloys.
02	Sensor /Principle of Operation	Power compensation or Heat Flux technology
03	Temperature range	-85°C to 700 °C (experimentation temperature)
04	Temperature accuracy	$\leq 0.2$ °C
05	Temperature Precision	$\leq 0.05$ °C
06	Programmable Temperature Scanning Rate (Heating and Cooling)	0.1 °C to 200°C /min for heating rate 0.1°C to 100°C /min for cooling rate
07	Calorimetric Enthalpy accuracy	$\leq 1\%$
08	Calorimetric Enthalpy Precision	$\leq 0.2\%$
09	Calibration and standards	<ul style="list-style-type: none"> <li>a) sensitivity, temperature, enthalpy, baseline calibration for entire temperature range.</li> <li>b) The system should be supplied with certified standards for calibration.               <ul style="list-style-type: none"> <li>i. 2 sets of standard reference materials - Sapphire (<math>C_p</math>)</li> <li>ii. Indium, Zinc/Tin (Melting &amp; Enthalpy)</li> </ul> </li> </ul>
10	TM-DSC measurement range	$\pm 350$ mW or better
11	Calorimetric Precision	$\pm 1\%$ based on metal standards
12	Baseline Flatness	$\leq 100\mu$ W
13	Atmosphere	Air, Inert and oxidizing atmosphere
14	Mass Gas Flow Controller	Automatic software controlled mass flow meter
15	Cooling system	Cooling systems for operating in the temperature range of -85°C to 700 °C temperature range
16	Experimentation	Static (iso-thermal) and dynamic (non-isothermal)
17	Software	a) Capable of measuring, analyzing and quantifying Phase transformations, glass

		<p>transition and crystallization, heat capacity (Cp) and melting point.</p> <p><u>Data Analysis</u></p> <ul style="list-style-type: none"> <li>b) Dedicated Kinetic analysis software containing kinetic models, activation energy determination.</li> <li>c) Software should separate Thermodynamic and Kinetic contributions from Modulated DSC heat flow curve.</li> <li>d) Storing and retrieval of both RAW and ASCII files. Universal application range (ASCII files import/ export, word/ excel compatibility, pdf formats).</li> <li>e) analysis software should have data and graphic export facilities in MS Office, Origin, Acrobat etc (.csv and .dat format). Software should be compatible with the latest windows version.</li> <li>f) Licensed Software must be supplied.</li> </ul>
18	Work Station	<p>A suitable branded computer for system control &amp; data acquisition. It should have following minimum specs:</p> <p>i5 processor, 4GB RAM, 1 TB HDD or above, DVD combo drive, 2 USB Ports, 30" TFT/LED Colour Monitor, Keyboard, wireless Optical mouse, with original operating system,</p>
19	Essential Accessories (Sealing Press, Sample handling kit, Pan)	<p>Tools and Kits for repair and handling of samples/pans.</p> <ul style="list-style-type: none"> <li>a) Kits/Press for sealing of pan /lid suitable for experimentation</li> <li>b) Non- magnetic Tweezers, cleaning brush</li> </ul> <p><u>Crucibles</u></p> <ul style="list-style-type: none"> <li>a) Aluminium -300 nos</li> <li>b) Copper – 500 nos</li> <li>c) Platinum – 05 nos</li> <li>d) Alumina – 05 nos</li> </ul>

20	Manual and Training	<ul style="list-style-type: none"> <li>a. One set of hardware and service manual (both hard and soft copy in English) should be supplied with the equipment.</li> <li>b. Training for equipment calibration, performing experiments for the determination of Glass transition, crystallization, phase transformation, melting, enthalpy (<math>\Delta H</math>), Specific heat capacity (<math>C_p</math>) of metallic alloys and Temperature modulation features</li> </ul>
21	Pre-Installation requirements	<ul style="list-style-type: none"> <li>a. CSIR-NML will only provide space, Air-conditioning unit and standard electrical supply arrangement (single phase, 230V, 50 Hz) for installation.</li> <li>b. Any special requirements other than the above has to be mentioned or communicated to CSIR-NML in advance.</li> </ul>
22	Document requirements (Vendor Qualification & equipment performance)	<ul style="list-style-type: none"> <li>a. The vendor must furnish list of TM-DSC supplied to various Govt and Industrial R &amp;D labs, Higher Academic Institutions in India in last three years.</li> <li>b. Minimum 3 recent successful installations of quoted TM-DSC and related documents are necessary.</li> <li>c. Technical Brochure of the quoted model</li> </ul>
23	Proof of capability and Performance/Acceptance test	<p>The Vendor should provide thermogram obtained from quoted model depicting following capabilities:</p> <ul style="list-style-type: none"> <li>a. Temperature range (as specified S. No 3)</li> <li>b. Glass Transition Temperature</li> <li>c. Heating/Cooling Rate</li> <li>d. Enthalpy</li> <li>e. Specific Heat</li> <li>f. Sensitivity</li> </ul>
24	Warranty	<ul style="list-style-type: none"> <li>a. One-year Comprehensive warranty from the date of successful installation and acceptance at CSIR-NML.</li> <li>b. One year of non-comprehensive AMC after the warranty period</li> </ul>

25	Other conditions	<ul style="list-style-type: none"> <li>a. Software Upgrade should be incorporated by the vendor as and when the new versions are available without any extra cost.</li> <li>b. The offered system should be available in official web site</li> <li>c. The technical compliance chart has to be attached detailing individual technical specifications of quoted model as per the numbering followed in the specifications. (A mere mention of compliance is not considered)</li> </ul>
26	UPS	Vendor must provide suitable UPS backup for 2 hours of operation
27	Auto Sampler	Handling 30 or more samples
28	Basis of Bid evaluation	<p>The bids will be evaluated based on the compliance to</p> <ul style="list-style-type: none"> <li>1. Technical specifications as per Annexure-I</li> <li>2. One year Comprehensive Warranty and One year non-comprehensive Annual Maintenance Contract (AMC) .</li> </ul>