Reference for PR No.10000020700 (RFx No. 6100000706)

Technical Specifications of Fast scanning differential scanning calorimetry (or Flash DSC)

1. The Fast-scanning differential scanning calorimetry or Flash DSC should permit measurement on samples of nanograms of quantities (e.g. thin film, nanoparticles, melted/solidified mass, droplets etc.) under effectively oxygen-free inert conditions.

2. The Fast-scanning differential scanning calorimetry or Flash DSC should be accompanied with a MEMS (micro-electromechanical system) chip sensor, which is equipped with at least 16 or more thermocouples for high sensitivity and excellent temperature resolution. In that case sets of 8 or more thermocouples should be arranged symmetrically around the measurement area on the sample and reference sides of the sensor, permitting temperatures to be measured with great accuracy, even at low heating and cooling rates. The MEMS chip sensor should be mounted on a stable base (e.g., ceramic substrate with electrical connections). sensor permits measurements in a wide temperature range from –95 to 420 °C.

3. The vendor should additionally supply 120 Flash DSC chip sensor. If those come as 10 per box, then 12 boxes need to be provided. If those sensor chips need thermal conditioning/calibration by heating/cooling or any other means, the methodology for the same has to be clearly mentioned.

4. The vendor/ OEM should be capable of producing and supplying appropriate MEMS based chip sensor for the entire lifetime of the instrument or upgrade the instrument to compatible sensor usage in future. Since ideally those chip sensors will be procured as consumables for sample preparation time to time, in future.

5. Sample preparation is to be carried out with the aid of a microscope (stereomicroscope). The microscope should also usable to accurately position very small samples onto the sensor. The microscope, should come as the integral part of the Flash DSC instrument, and in case, it is not manufactured by the OEM, it should be fully compatible with Flash DSC system. Additionally, any 'terms of conditions' (guarantee, maintenance, troubleshooting), as applicable for the Flash DSC system, should also be applicable to microscope and has to be addressed by the vendor/OEM.

6. Appropriate accessories for sample preparation and sample positioning needs to be provided.

7. The Flash DSC should be cooled by intracoolers – electrical cooling devices with a closed-loop cooling system. The vaporized coolant should be liquefied by means of compressors and heat exchangers. Should be able to provide cooling at least at 0.1 to 4000 K/s and heating at least at 0.1 to 40000 K/s. The intracooler, should come as the integral part of the Flash DSC instrument, and in case, it is not manufactured by the OEM, it should be fully compatible with Flash DSC system. Additionally, any 'terms of conditions' (guarantee, maintenance, troubleshooting), as applicable for the Flash DSC system, should also be applicable to intracooler and has to be addressed by the vendor/OEM.

8. There should be controllable and easy-to-read color touchscreen displaying the status of your instrument is located at the front of instrument. Individual sequences and queries may also be added directly via the touchscreen without the use of a PC

9. The software should have to be the latest available compatible with the intended thermal analysis experiments. Software should be capable to include running specific experiments, develop methods for advanced analyses and perform flexible result evaluations. The program should come up with separate sections/windows, e.g., method, experiment, analysis/evaluation etc. Any type of temperature profile, with up to 200 temperature segments, should have to be programmed in the Method Window of the software. Many complex operations – such as loops, or conditional termination of experiments has to be included in the method generation feature. The experiment window should allow one to select a method and enter the relevant data for the specified experiment. Such data, in a typical Flash DSC/fast scanning calorimetry experiment, should include the conditioning and correction procedure for the new MEMS sensor. The evaluation/ analysis window included in the software should offer the possibility of advanced evaluation tools, such as the Mathematics option, and a superior layout program.

10. The system and all its electronics should be rugged, sturdy and suitable for Mumbai climate. Before installation of the system, ideally the site should be inspected, and requisite pre-installations requirements has to be suggested by the vendor/OEM.

11. At least three years' warranty from the date of installation.

12. The vendor should have supplied minimum 10 DSC units (not necessarily Flash DSC) in reputed Indian Institutes (e.g. IITs), Universities or research laboratories during the past decade. The vendor should provide proof of after sales- service and availability of spares and accessories. The vendor must provide the release note from the principal and authorization letter from OEM, if applicable. The OEM should provide proprietary certificate; in case it is applicable.

Tabulated specifications are followed below:

Temperature data		
Temperature range	Air cooling	
	Intracooler (2-stage)	
Cooling rates (typical)		
Heating rates (typical)		
Sensor data		
Sensor membrane material		
Number of thermocouples		
Signal time constant		
Applied sample mass range		
DSC MEMS sensor		
Pmax heat flow signal		
Noise heat flow signal		
Isothermal drift heat flow signal		
Future supply		
Gas conditions for measurement		
Oxygen-reduced atmosphere		
Terminal		
Touch control		
Signal detection		
Sampling rate		
Resolution of temperature signal		
Noise temperature signal		
Communication		
With personal computer (PC)		
Dimensions		
Instrument dimensions (intracooler separate) (width * depth * height)		
Intracooler		
Optical Microscope		