

DSC/TGA System Specifications:

1. An integrated system capable of performing both Differential Scanning Calorimeter (DSC) and Thermo gravimetric (TGA) Analysis. System shall be able to conduct simultaneous DSC and TGA measurements independently. A single data system shall control both instruments and perform data acquisition and analysis for both instruments.
2. Minimum performance specifications for the DSC (without baseline correction) are baseline linearity (defined as the average absolute deviation from a best fit linear regression of a baseline scan without any smoothing or blank subtraction applied) and repeatability (defined as the average standard deviation of at least 10 empty cell baseline scans (data collected at 1°C intervals), opening and closing the lid in between each run) of $\pm 5\mu\text{W}$, baseline noise (defined as the average rms noise over the temperature range noted) from -50° to 400°C): $< 0.08\ \mu\text{W}$, Indium Response Ratio test value of ≥ 90 (this is an industry standard test), operate over the temperature range -180 to 725°C, includes a user-replaceable cell, self-calibrating 50-position auto-sampler, Gas Delivery Module (GDM) for automated and precise control and switching of the measurement atmosphere, and Modulated DSC technology.
3. Press and die sets kit for DSC including three (3) die sets, and one box each of Pans and Lids (100 / box).
4. Minimum performance specifications for the TGA are: a sensitive vertical thermobalance (100 mg sample weight range), a responsive infrared furnace, a horizontal gas purge system, linear heating rates to 500 °C/min and ballistic heating rates to $> 2,000^\circ\text{C}/\text{min}$, dynamic baseline drift (defined as the maximum deviation from the smallest measured weight to the largest measured weight of an empty platinum pan, while being heated at 20°C/min in flowing nitrogen atmosphere (without any blank subtraction applied)) from 50 to 1,000 °C $< 10\ \mu\text{g}$ (with platinum pans), baseline linearity (defined as the average absolute deviation from a best fit linear regression of a baseline scan without any smoothing or blank subtraction applied) from 50 to 1,000°C: $< 1\ \mu\text{g}$ (with platinum pans), furnace cooling rate (using forced air) 1000°C to 35°C in < 10 minutes, operating modes shall include Hi-Res(tm) TGA, Modulated(tm) TGA, a 25-position autosampler with a contamination-free sealed pan punching system, two mass flow controllers with automated gas switching, integrated Curie Point temperature calibration procedure. TGA shall be capable of integrating with a mass-spec.
5. A TGA accessory kit containing platinum and ceramic sample pans, calibration and test materials, plus tools.
6. IR MS Interface Kit including: a clamping system to support the mass spec transfer line, a heated connection (200°C) to eliminate potential "cold spots" at the interface of the transfer line and the exit tube of the TGA furnace, other required fittings, and an event triggering cable.
7. Benchtop quadrupole mass spectrometer (MS), 110/220V: capable of analyzing all gases evolved during thermogravimetric experiments, parts per billion (ppb) sensitivity over the mass range 1-300 amu (gas dependent), a closed ion source, a triple mass

filter and a dual (Faraday and Secondary Electron Multiplier) detector system. Data collection can be triggered directly from the TGA software, and the resulting MS data (trend scans) can be combined directly for overlaying with the corresponding TGA results.

8. Delivery no later than 60 days after award.
9. Installation & Training within 2 weeks of delivery for up to 6 operators (training to follow installation).
10. All documentation shall be preinstalled on control system and available on CD as a backup.
11. 1 year warranty of DCS and TGA systems, 2 year warranty on MS.