

Requirements for Thermal Analysis Equipment

Differential Scanning Calorimetry (DSC)

- The temperature range has to be or equal to -180 to 725°C
- Temperature accuracy has to be or equal to $\pm 0.1^\circ\text{C}$
- Temperature precision has to be or equal to $\pm 0.01^\circ\text{C}$
- Calorimetric precision has to be or equal to (based on metal standards): $\pm 0.05\%$
- Maximum calorimetric sensitivity has to be or equal to $0.2 \mu\text{W}$
- Sensitivity/Resolution has to be or equal to $\geq 60 \text{ mW}/^\circ\text{C}$
- Baseline curvature has to be or equal to (-50° to 300°C): $10 \mu\text{W}$
- Baseline reproducibility has to be or equal to $10 \mu\text{W}$
- Baseline noise has to be or equal to (max. peak to peak): $< 1 \mu\text{W}$
- Dynamic range has to be or equal to $\pm 500 \text{ mW}$
- DSC has to have or equal to some type of modulation and/or step wise function to measure the specimen's heat capacity by measuring the change in heat flow that resulted from a change in the heating rate
- DSC has to have or equal to aluminum pan sets
- DSC has to have or equal to hermetic pan sets
- DSC has to have or equal to crimp press to crimp the aluminum pans
- DSC has to have or equal to liquid Nitrogen (LN_2) dewar
- DSC has to have or equal to a two-stage setup
- DSC has to have or equal to a computer system with USB ports
- DSC has to have or equal to different purge gas capabilities (Air, N_2 , Ar_2)
- DSC must include or equal to operating software, which allows for the instrument to be fully calibrated and verified automatically, without the need for operator presence
- Calibrations must include or equal to baseline, cell constant, and temperature
- DSC must also be capable of incorporating a sample-pan contact resistance measurement, which dramatically improves signal resolution
- DSC must be able to convert old files into new system