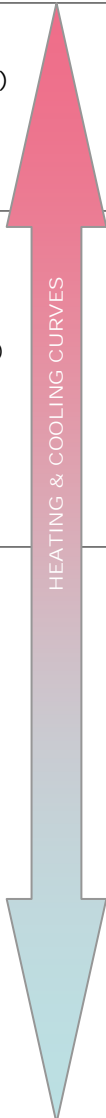


Thermal Analysis Capabilities

M+P Labs uses state-of-the-art thermal analysis instruments from TA Instruments to determine the thermal and thermal mechanical properties of a wide variety of materials to characterize and qualify materials, assess fit for applications, troubleshoot production issues, qualify processing changes and perform failure analysis.



Method	Specimens	Temp (°C)	Common Applications	
DSC Differential Scanning Calorimetry	5 – 50 mg	(-150) to 700	<ul style="list-style-type: none"> Melting/freezing/crystallization Glass transition temperature Percent crystallinity 	<ul style="list-style-type: none"> Heat of fusion Specific Heat Capacity Modulated DSC
TMA Thermomechanical Analysis <small>Measures dimensional changes under controlled conditions of temperature, atmosphere, time, force</small>	Maximum dimensions: Cylinder 10 mm (d) x 26 mm (l) Film/Fiber 26 mm (l) x 4.7 mm (w) X 1.0 mm (t)	(-150) to 1000	<ul style="list-style-type: none"> Melting/freezing point Softening/melting behavior Glass transition temperature Coefficient of Thermal Expansion Deflection/distortion temperatures Stress/strain/relaxation/creep 	<ul style="list-style-type: none"> Penetration Compression/tension 3 point bend/flexure Shrinkage Multi-layer film analysis Time to delamination
Simultaneous DSC-TGA & TGA-DTA				
DTA Differential Thermal Analysis		200 to 1500	<ul style="list-style-type: none"> Glass transition temperature Polymorphic phase transitions Solidus/liquidus temperatures 	<ul style="list-style-type: none"> Melting/freezing/crystallization Filler/residual content Moisture content
TGA Thermogravimetric Analysis		RT to 1500	<ul style="list-style-type: none"> Braze/solder melting/crystallization properties Degradation/decomposition profiles Oxidation behavior 	<ul style="list-style-type: none"> Hydrate characterization Volatiles analysis Quantitative compositional analysis
DSC Differential Scanning Calorimetry		RT to 1500	<ul style="list-style-type: none"> Characterizing cure reactions Enthalpy & instantaneous weight loss measurements 	<ul style="list-style-type: none"> Effect of additives Kinetics/activation energy



All testing is performed in compliance with the quality requirements mandated by:

