DSC 600

Differential Scanning Calorimeter

Instrument Specialists

The DSC 600: Precision Thermal Analysis

The DSC 600 from Instrument Specialists is the next generation of Differential Scanning Calorimeters (DSC), crafted to meet the evolving needs of professionals in materials research, chemical engineering, quality control, petrochemicals, and pharmaceuticals. Designed for precision, reliability, and affordability, the DSC 600 sets new standards in thermal analysis.

At the heart of the DSC 600 is its innovative heat flux plate, engineered to capture the smallest energy changes with unmatched sensitivity and accuracy. This powerful capability enables precise measurements across a broad spectrum of applications, including: enthalpy, glass transition, heat of crystallization, purity determination, and heat capacity.

Equipped with an ultra-light furnace, the DSC 600 ensures excellent thermal conductivity and stability, delivering consistent performance across a wide temperature range. With a selection of specialized heat flux plates, it can be tailored to meet diverse testing needs, enhancing efficiency and flexibility in every lab.

Reliable

The high-sensitivity heat flux plate is designed to meet the demands of advanced material research and quality control.

Robust

The ultra-light furnace and durable design withstand rigorous testing while ensuring accuracy and stability across a wide temperature range.

Affordable

ISI family products are known for delivering excellent performance at a competitive price, offering the best value in the industry.

Measurement Capabilities

- Melting Temperature
- Crystallization Temperature
- Heat of Chemical Reaction
- Glass Transition Temperature
- Specific Heat Capacity
- Degree of Crystallinity
- Degree of Cure
- Oxidative Stability
- Thermal Stability
- Solid-State Phase Transition
- Liquid Crystal Phase Transition
- Aging of Materials
- Polymorph

Key Features

Multi-Channel Gas Selector Option

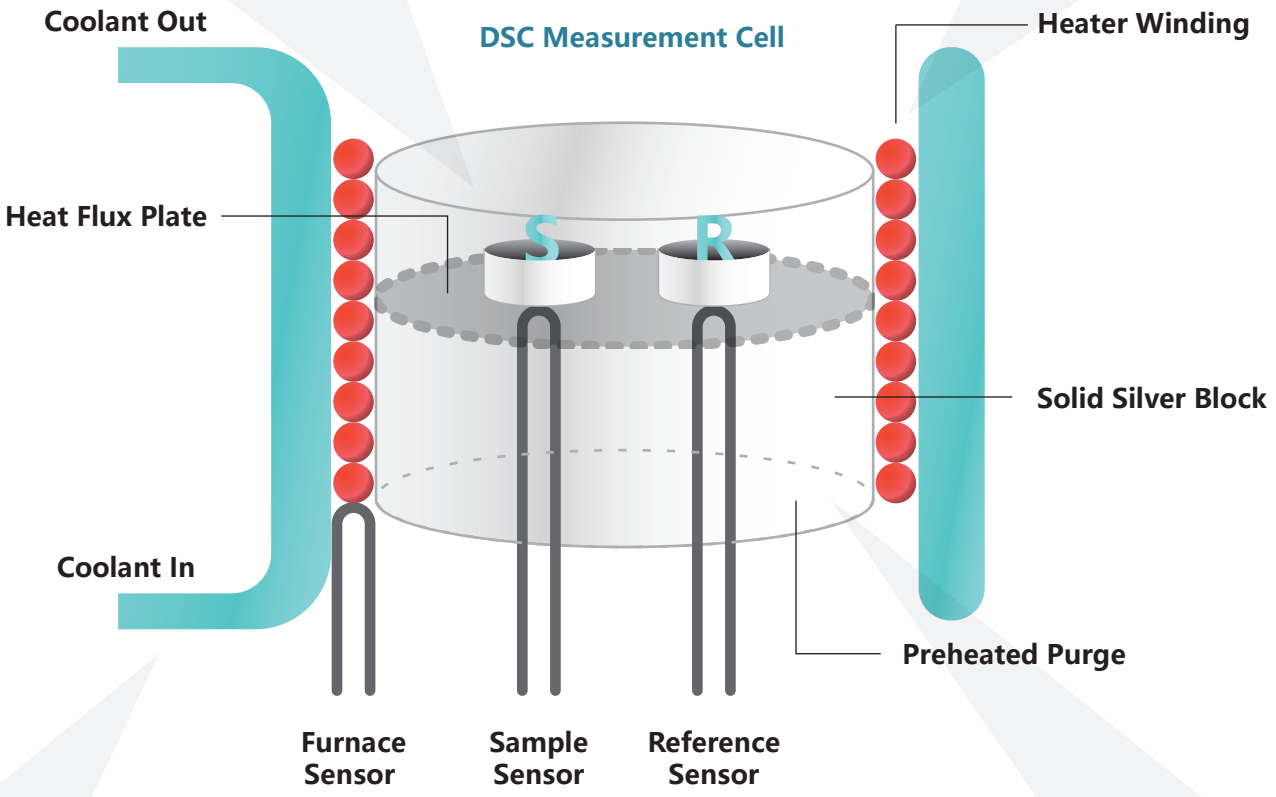
The DSC 600 offers optional automatic gas switching with configurations for 4 channels, catering to a variety of experimental needs. This feature enhances flexibility and ease of operation in the laboratory.

Four Types of Heat Flux Plates

The DSC 600 is engineered to adapt to diverse application needs with four specialized heat-flux plate options. The Standard plate is ideal for most non-reactive samples, while the Corrosion-Resistant plate ensures durability in chemically reactive or corrosive environments. For unmatched precision, the Highly Sensitive plate detects subtle thermal events, and the Highly Sensitive Corrosion-Resistant plate is perfect for high-precision work with reactive materials

Precise Temperature Control

Equipped with enhanced uniform heating technology and a unique dual PID control system, the DSC600 precisely maintains the sample's adherence to the programmed temperature profile during heating and cooling cycles. With a temperature control accuracy of ± 0.0 1°C, it minimizes the influence of temperature fluctuations on experimental outcomes, ensuring reliable and consistent results.



Cooling Systems

The system provides three cooling options: water cooling, refrigerated cooling, and liquid nitrogen cooling. These options enable rapid sample cooling, significantly reducing experimental time and enhancing efficiency. Additionally, the energy-efficient design minimizes overall energy consumption.

Ultra-Light Mineral Furnace

The furnace is constructed from pure silver, providing exceptional thermal conductivity and stability for precise temperature control and rapid thermal response. This high-purity silver minimizes heat loss, improves analytical efficiency, and ensures uniformity during sample heating and cooling. Additionally, its superior corrosion resistance enhances the instrument's durability, allowing it to perform reliably in diverse and challenging experimental environments.

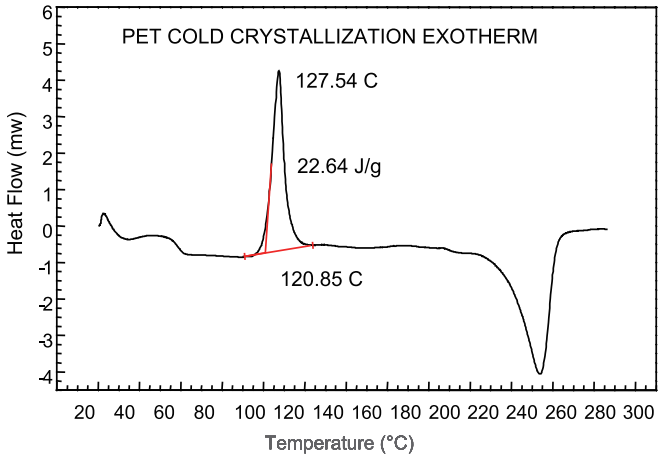
Gas Preheating

The furnace includes an air inlet with a heated gas pathway, preheating the gas before it enters the sample cell.

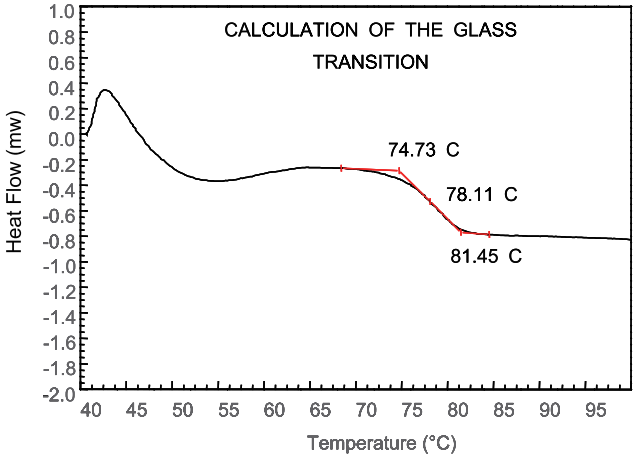
Technical Specifications

Temperature Range	-150-600℃		
Temperature Accuracy	±0.1℃		
Temperature Precision	±0.01℃		
Program Rate	0.1-200℃/min		
Cooling Mode	Water Cooling	Refrigerated Cooling	Liquid Nitrogen Cooling
Maximum Temperature	600℃	450℃	600℃
Minimum Temperature	Ambient	-40℃ or -90℃	-150℃
Calorimetric Accuracy	±0.1%		
Noise	0.5 μw		
Gas	Nitrogen, Argon, Helium, Compressed air, Oxygen, etc.		
Sampling Frequency	10 Hz		
Weight	27 lbs.		
Dimensions	17.0 * 16.7 * 9.5 in.		
Options			
Gas Selector	4 Channel Automatic Gas Switching		
Software Functions	Specific Heat Capacity		

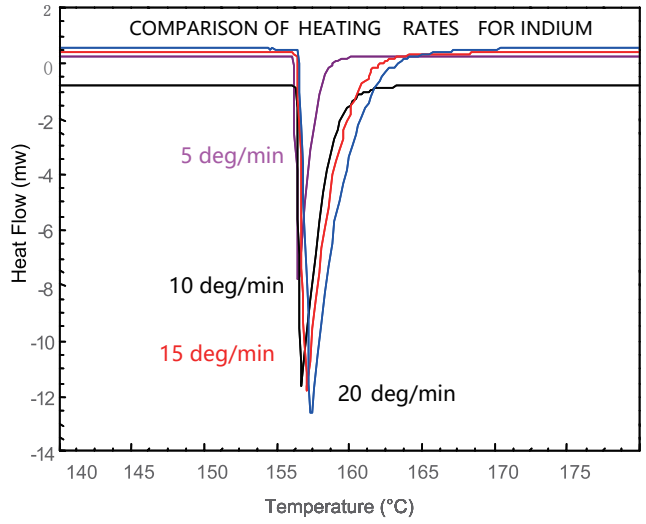
Applications



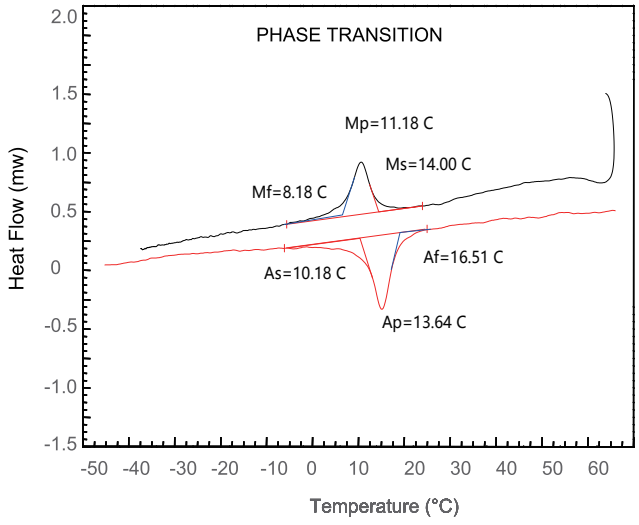
The growth and degree of crystallization of the crystals depend on the type of polymer, cooling rate, and isothermal aging time. The calculation method for crystallization enthalpy is the same as for melting enthalpy. Cold crystallization is the process in which crystals grow upon heating. This exothermic process occurs prior to crystallization melting.



The glass transition temperature (Tg) of a polymer is the temperature range at which the polymer transitions from a rigid "glass" state to a flexible "rubber" state, affecting its usability, especially in elastomers. Understanding Tg is crucial for quality control, optimizing processes, ensuring product performance, and maintaining material consistency.



Endothermic Peak (Melting) refers to the phenomenon where a material absorbs heat and undergoes a phase transition during heating in thermal analysis. It typically appears as a distinct temperature peak, reflecting the material's melting temperature and thermal properties. The shape and width of the peak indicate the sample's purity, with pure crystalline materials displaying sharp peaks. Slower heating rates can further enhance the clarity of the peak.



The Af temperature refers to the phase transition temperature of nickel-titanium alloy, which is the temperature at which the alloy transitions from the high-temperature phase (a-phase) to the low temperature phase (f-phase). In the high temperature phase, the crystal structure of the nickel-titanium alloy is cubic, while in the low temperature phase, it changes to a monoclinic crystal structure. This phase transition temperature variation gives nickel-titanium alloys their shape memory properties. These shape memory characteristics make nickel-titanium alloys highly valuable in various fields, including medical devices, aerospace, and mechanical engineering.

Typical Applications

- Thermoplastics
- Thermosets
- Rubbers
- Catalysts
- Phenolics
- Pharmaceuticals
- Chemicals
- Coals and other fuels
- Nuclear Research
- Foods
- Cosmetics
- Explosives

PDSC

Pressure Differential Scanning Calorimeter

Product Introduction

The Pressure Differential Scanning Calorimeter (PDSC) is capable of conducting calorimetric tests under both high and ambient-pressure conditions. In practical applications, many raw materials and finished products are processed or used under high temperature and high pressure, making it essential to understand their performance under these extreme conditions. While traditional calorimeters are effective in characterizing the physical and chemical properties of materials, the PDSC extends this characterization to extreme pressure environments. It allows for an in-depth analysis of the heat flow changes during phase transitions and chemical reactions under high or ambient pressure. In a sealed crucible, changes in internal pressure can cause DSC test results to differ from those obtained under atmospheric pressure. The PDSC enables precise pressure control, which allows researchers to investigate the effects of varying pressures on samples and uncover thermal behavior differences in different environments. For material research in extreme test conditions, the PDSC offers superior capabilities in characterizing heat changes during reaction processes. At the core of the PDSC is a high-performance heat flow sensor platform, specifically designed to study minute energy changes and the relationship between energy, temperature, and pressure.

Temperature Range	**-150-600℃ Quench-cooling only**
Maximum Pressure	**1000 psi.**
Program Rate	**0.1-200℃/min**
Gas	**Nitrogen, Argon, Helium, Compressed air, Oxygen, etc.**

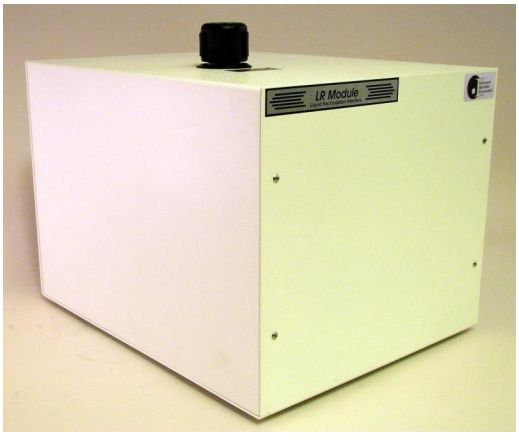
Accessories and Consumables

Crucible

In thermal analysis measurements, the crucible serves as the sample container, effectively protecting the sensor and preventing contamination of the measurements. The choice of crucible type is crucial to the quality of the results. We offer a variety of crucible options to meet different testing needs, ensuring that you obtain accurate and reliable measurement outcomes.

Sample Crimper and Sealer

The crimper improves sample preparation for optimal performance and convenience, making it ideal for routine and sealed testing of various materials. The standard crimper is designed specifically for solid sample crucibles, while the universal crimper accommodates both solid and liquid crucibles, offering enhanced flexibility for diverse experimental needs.



Fully Automated Chiller

The fully automated recirculating bath provides precise and continuous temperature control. When used in conjunction with the water cooled DSC600, it enables rapid cooling of the furnace, significantly improving experimental efficiency.

Gas Selector Accessory

The gas selector supports one-button switching across multiple gases, accommodating up to 4 input ports. It simplifies valve disassembly and assembly when sampling different gases, effectively minimizing leakage risks associated with manual switching. Additionally, the instrument features an automatic purging process, ensuring efficient gas line purification and seamless, automated switching between gases.

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