C160-E013B

SHIMADZU
Excellence in Science

Differential Scanning Calorimeter

DSC-60 Plus Series

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Differential Scanning Calorimeter

DSC-60 Plus addresses the various DSC applications.

The DSC-60 Plus is an indispensable thermal analyzer for materials characterization in R&D and quality control applications in such areas as polymers, pharmaceuticals, electronic parts , foods , etc . It offers the sensitivity and easy operation required for the development of high-performance, highly functional new materials.

1 High-Performance DSC

- High sensitivity and high resolution
- Stable baseline from ultra-low to high temperatures

The new detector in the DSC-60 Plus series and the unique furnace construction achieve a stable baseline across the entire measured temperature range (-140-600°C) as well as top-class calorimetric sensitivity for a DSC. It features a wide dynamic measurement range of ±150 mW.

2 Diverse Measurements by Simple Operations

- Cooling chamber installed as standard
- Sample loading temperature function is convenient for sample replacement

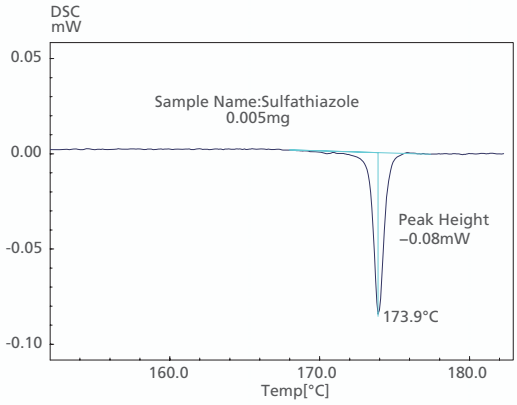
The liquid-nitrogen cooling chamber permits easy measurements below room temperature without having to install special accessories. The sample loading temperature function enables quick sample change during sequential analysis without moisture codensation.

3 Complies with Analytical Laboratory Regulations

The DSC-60 Plus series complies with various guidelines involving analytical laboratories, such as the PIC/S GMP guidelines, and electronic record/electronic signature (ER/ES) regulations, including the US FDA 21 CFR Part11. In addition, it is compatible with other analytical instruments and connected network systems.

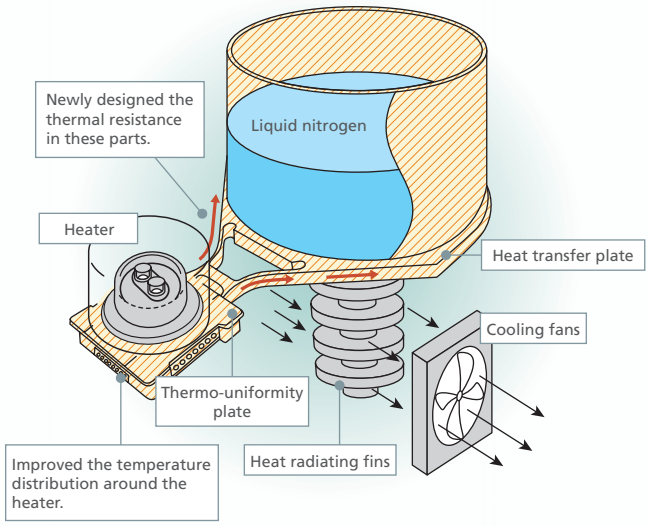
High-sensitivity analysis across the entire measured temperature range

High-Sensitivity Measurements of Trace Samples



A stable baseline and S/N performance enable the detection of a minute calorimetric change during trace analysis.

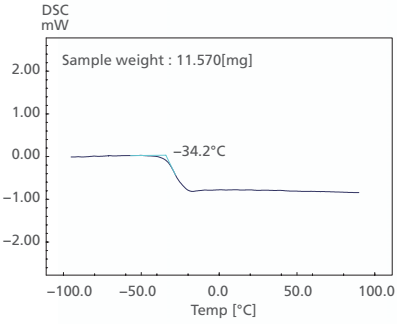
Structure of the DSC-60 Plus Furnace



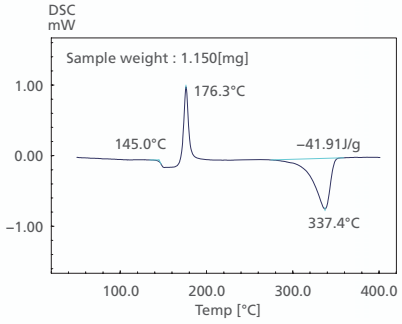
The new detector and new unique furnace construction achieves a noise level of less than 0.5μW, ensuring a stable baseline.

Rubber and Plastic Materials

In the analysis of rubbers and plastics, which are used in various industries, the DSC-60 Plus enables the detection of a complicated calorimetric change from low to high temperatures and the evaluation of the features of these materials.



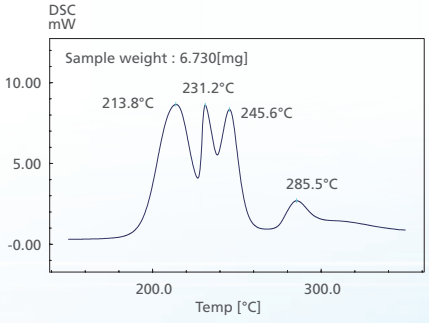
Glass Transition of NBR Rubber



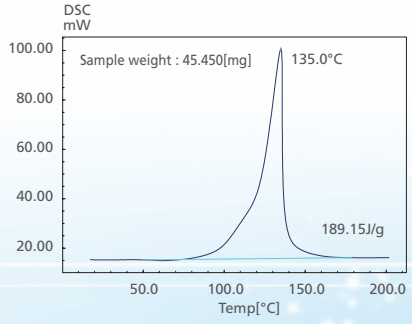
Measurement of Engineering Plastic (PEEK)

Battery and Electronic Parts

The calorimetric measurement range has been extended three times (compared to previous Shimadzu instruments) to ±150 mW. It offers an adequate dynamic range for the assessment of the reactivity of chemical substances with comparatively large calorimetric change and for the measurement of the hardening reactions of adhesives.



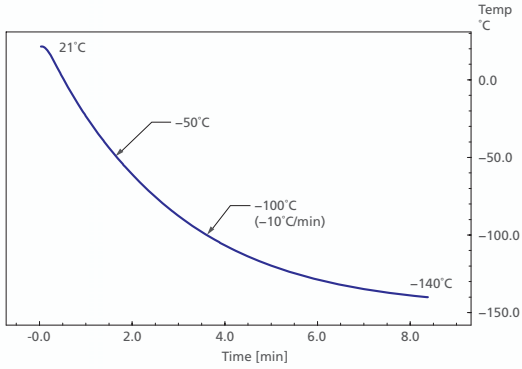
Measurement of Battery Material (LiB. Active material)



Adhesive Hardening Reaction

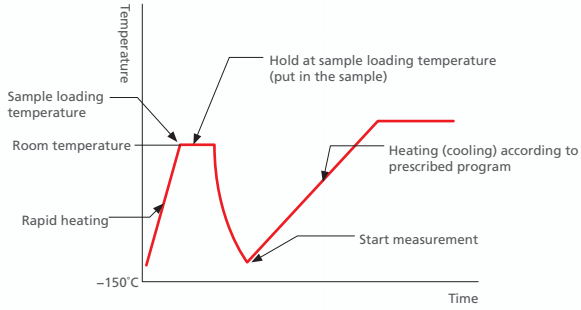
Diverse Measurements by Simple Operations

The DSC-60 Plus series features a cooling chamber as standard. Measurements below room temperature can be performed by pouring liquid nitrogen through the inlet into the chamber to lower the temperature. This is extremely convenient, as it eliminates the need to install special accessories. It achieves 10 °C/minute performance at –100 °C, which is adequate for measurements during a controlled cooling process.



Cooling Performance with Liquid Nitrogen

While running a series of analyses below room temperature, the furnace temperature has to be returned to near room temperature during sample replacement.
The sample loading temperature function heats only the region around the sample when the sample is replaced, so that measurement can be rapidly resumed without moisture condensation.



Sample Loading Temperature Function

Eco-Friendly

The newly designed furnace unit reduces energy consumption by over 20 % when heating from room temperature to 300 °C at a 20 °C/minute heating rate (compared to previous Shimadzu instruments). When making measurements below room temperature, the liquid nitrogen consumption savings exceed 30 % (compared to previous Shimadzu instruments). The instrument footprint has also been minimized.

DSC-60A Plus Automatic Differential Scanning Calorimeter Capable of Continuous Unattended Measurement

The built-in compact autosampler permits automated measurement, analysis, and report printout for up to 24 loaded samples. It improves the efficiency of screening during product development and the efficiency of quality control activities. The footprint is the same as the standard model.

Complies with analytical laboratory regulations

Thermal analyzers are important analytical instruments for drug development and quality control. This field demands rapid compliance with the PIC/S GMP guidelines.
And record/electronic signature (ER/ES) regulations and policies, including the US FDA 21 CFR Part11.
Shimadzu thermal analyzers can work collaboratively with various analytical instruments to ensure a laboratory's compliance with the regulations.

Integrated Management of Analytical Data by CLASS-Agent

Shimadzu 60 Series Thermal Analysis Instruments

Options

Liquid Nitrogen Auto-cooling System TAC-60L

Consecutive Measurement with liquid nitorogen is enabled at a temperature from -130 to 500°C . the cooling capacity is -10°C/min. (at -80°C). The tank internal pressure is optimally controlled according to the residual amount of liquid nitrogen in the tank to keep the supply flow rate constant. Pulsation is reduced, and the DSC baseline remains stable even during cooling measurement.

*Requires a separate FC-60A controller

Electric Auto-cooling Attachment TAC-60i

Consecutive measurement at a temperature from -50 to 500°C is enabled by connecting a commercially available immersion cooler. the cooling capacity is -5°C/min. (at -30°C). Since this cooling system does not use liquid nitrogen, it can be easily and safely operated. Using this cooling system together with the DSC-60A Plus enables automatic cooling measurement.

* Does not include an intracooler
* Requires a separate FC-60A controller

Flow controller FC-60A (P/N : 346-67995-91)

The FC-60A flow controller is used to control the flow rate of atmosphere gases (of two channels). Since the gas ON/OFF control is performed according to a temperature program, the atmosphere can be automatically changed during a measurement.

Sample sealer/crimper SSCP-1

(P/N : 222-13130-91)

Used to crimp sample pan ① or to seal sample pans⑧,⑩,⑫,⑬,⑭.

Handpress SSP-10A

(P/N 200-64174)

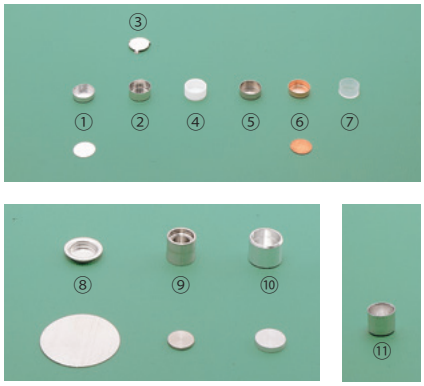
Used to pressure-proof stainless steel pans⑨.

Sealer adapter for pressure stainless steel hermetic pan

(P/N 222-01875-91)

Used to pressure-proof stainless steel pans⑨.

Sample pans



P/N	
①201-52943	Al（Aluminium) crimp pans + lids, ø6 × 1.5 (50/set)
②201-51976	Platinum pan, ø6 × 2.5
③201-56927	Platinum lid, ø6
④201-54321	Alumina pan, ø6 × 2.5
⑤201-53102-84	Nickel pans, ø6 × 2 (50/set)
⑥201-58294-90	Copper pans, ø6 × 1.5 (50/set)
⑦201-54439	Quartz pan, ø6 × 2.5
⑧201-53090	Al hermetic pans, ø6 × 1.6 (50/set), limit pressure: 0.3 MPa
⑨222-02067-92	Pressure-proof stainless steel hermetic pans ø6 × 5 (50/set), limit pressure: 5 MPa Max.500℃
⑩222-13073-91	Pressure-proof Al hermetic pans ø6 × 5 (50/set), limit pressure: 5 MPa Max.300℃
⑪201-57268-90	Al macro pans, ø6 × 5 (50/set)
Other pans	
⑫346-66963-91	Al crimp pans and lids for autosampler, ø6 × 3 (100/set)
⑬346-68518-91	Al hermetic pans for autosampler (DSC) , limit pressure: 0.3MPa, ø4.4 × 4 (100/set)
⑭346-68796-91	Al hermetic pans for autosampler (DTG) , limit pressure: 0.3MPa, ø6 × 4 (100/set)
⑮346-68334-91	Copper pans for Autosampler, ø6 × 3 (100/set) Max.300℃

DSC-60 Plus Specifications

Measurement principle	Heat-flux type
Temperature range	-140 to 600°C *1 (With standard cooling chamber and using liquid nitrogen)
Calorimetric measurement range	±150mW
Noise level	Less than 0.5μW (rms, when held at 150°C)
Sample quantity (pan quantity)	Standard AL crimp pan approx.40μl
Programmable heating/cooling rate	+/- 0.1 to +/- 99.9°C /min (0.1°C /hr or 0.1°C /min step)
Programmable hold time	1min - 999hr (1min or 1hr step)
Atmosphere	Nitrogen, inert gas, dry air gas flow
Interface	RS-232C, 1
Control software	Thermal analysis workstation TA-60WS
Power supply	AC100V, 120V, 230V 50/60Hz MAX 800VA *2
Size	W:320 x H:500 x D:500 (mm)
Weight	28kg

*1 Temperature range of Automatic Cooling model (TAC/L) is -130-600°C. The measurement temperature is different when using an automatic cooling unit.
*2 This indicates only the power supply for the main unit. Installation of the stabilized power supply is recommended according to the power supply circumstances.

Pre Installation Requirements

Analytical balances

To weigh the sample, prepare an analytical balance which allows precise reading up to 0.01 mg.

Other

Do not install the device in a place exposed to direct sunlight, a place exposed to direct wind from an air conditioner, a dusty place, a place subject to large vibrations, or a place subject to large temperature fluctuation.

Gas

Purge gas (atmospheric gas to be used)
Cleaning air tank or air compressor

Note) • To perform cooling measurement with the DSC, dry gas (nitrogen or dry air) is additionally required.
• Prepare a tank, pressure reducer and gas flow rate regulator separately.

Shimadzu Corporation
www.shimadzu.com/an/