LINSEIS

pushing boundaries

L63 DSC

Differential Scanning **Calorimeter**

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Since 1957 LINSEIS Corporation has been delivering outstanding service, know-how and leading innovative products in the field of thermal analysis and thermo-physical properties.

Customer satisfaction, innovation, flexibility, and high quality are what LINSEIS represents. Thanks to these fundamentals, our company enjoys an exceptional reputation among the leading scientific and industrial organizations. LINSEIS has been offering highly innovative benchmark products for many years.

The LINSEIS business unit of thermal analysis is involved in the complete range of thermoanalytical equipment for R&D as well as quality control. We support applications in sectors such as polymers, chemical industry, inorganic building materials, and environmental analytics. In addition, thermophysical properties of solids, liquids, and melts can be analyzed.

Rooted in a strong family tradition, LINSEIS is proudly steered into its third generation, maintaining its core values and commitment to excellence, which have been passed down through the family leadership. This generational continuity strengthens our dedication to innovation and quality, embodying the essence of a true family-run business.

LINSEIS provides technological leadership. We develop and manufacture thermoanalytic and thermophysical testing equipment to the highest standards and precision. Due to our innovative drive and precision, we are a leading manufacturer of thermal analysis equipment.

The development of thermoanalytical testing machines requires significant research and a high degree of precision. LINSEIS Corp. invests in this research to the benefit of our customers.

C L A U S L I N S E I S

C E O D I P L . P H Y S .

Engineering & Innovation

To strive for the best due diligence and accountability is part of our DNA. Our history is affected by German engineering and strict quality control.

We want to deliver the latest and best technology for our customers. LINSEIS continues to innovate and enhance our existing thermal analyzers. Our goal is to constantly develop new technologies to enable continued discovery in Science.

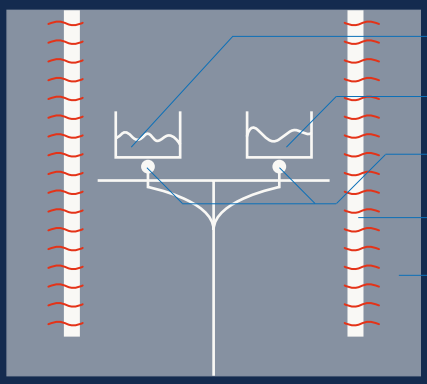
Differential Scanning **Calorimeter**

The Differential Scanning Calorimetry (DSC) is the most important thermal analysis technique to measure endothermic and exothermic transitions as a function of temperature and time.

The instrument is used to characterize polymers, pharmaceuticals, foods/biologicals, organic and inorganic chemicals. Transitions measured include glass transition, melting, crystallization, curing, cure kinetics, oxidation induction time and heat capacity.

Unsurpassed performance

- Unsurpassed sensitivity – for detection of melts and weak transitions
- Benchmark resolution – precise separation of close lying events
- Reliable automation – up to 96 position autosampler
- Widest temperature range – from -170 °C to 750 °C in one measurement



Accessories

DSC-sample-press

For optimum sample preparation of aluminum crucibles a ergonomic sample press is available.

Crucibles

Various crucibles made of aluminum, alumina, copper, gold, platinum and sapphire are available for measurements with the L63 DSC. Other crucibles are available on request.

User exchangeable Furnaces

The new user exchangable furnace can be replaced within a few screws. This innovative concept reduces the maintenance costs drastically.

The LINSEIS Differential Scanning Calorimeters (DSC) operate in agreement with national and international standards such as: **ASTM C 351, D 3417, D 3418, D 3895, D 4565, E 793, E 794, DIN 51004, 51007, 53765, 65467, DIN EN 728, ISO 10837, 11357, 11409**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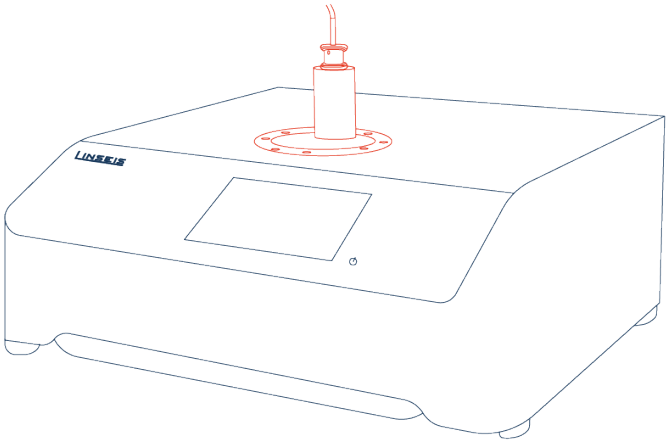
Hardware Options

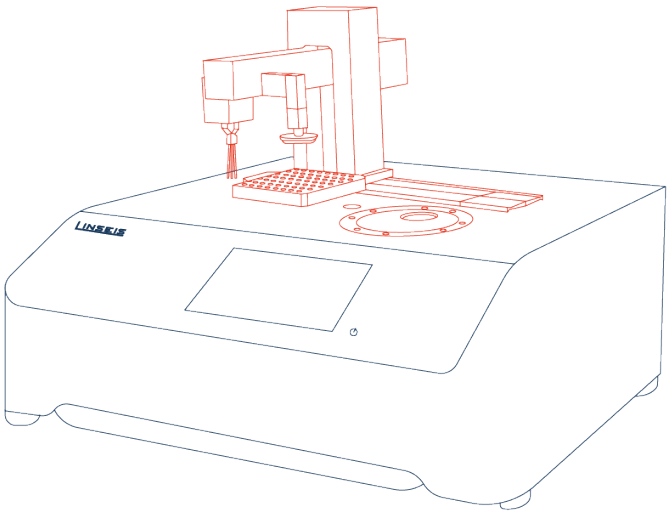
Optical DSC

The L63 DSC can be equipped with a CCD camera to observe the sample during the measurement. The visualization of the sample gives a much deeper insight to phase transitions and decomposition processes.



Sample Robot DSC

The sample robot for up to 96 samples increases the productivity significantly. The instrument can run automatically overnight or at the weekend. Together with the intuitive and intelligent software it reduces labour costs and saves time.



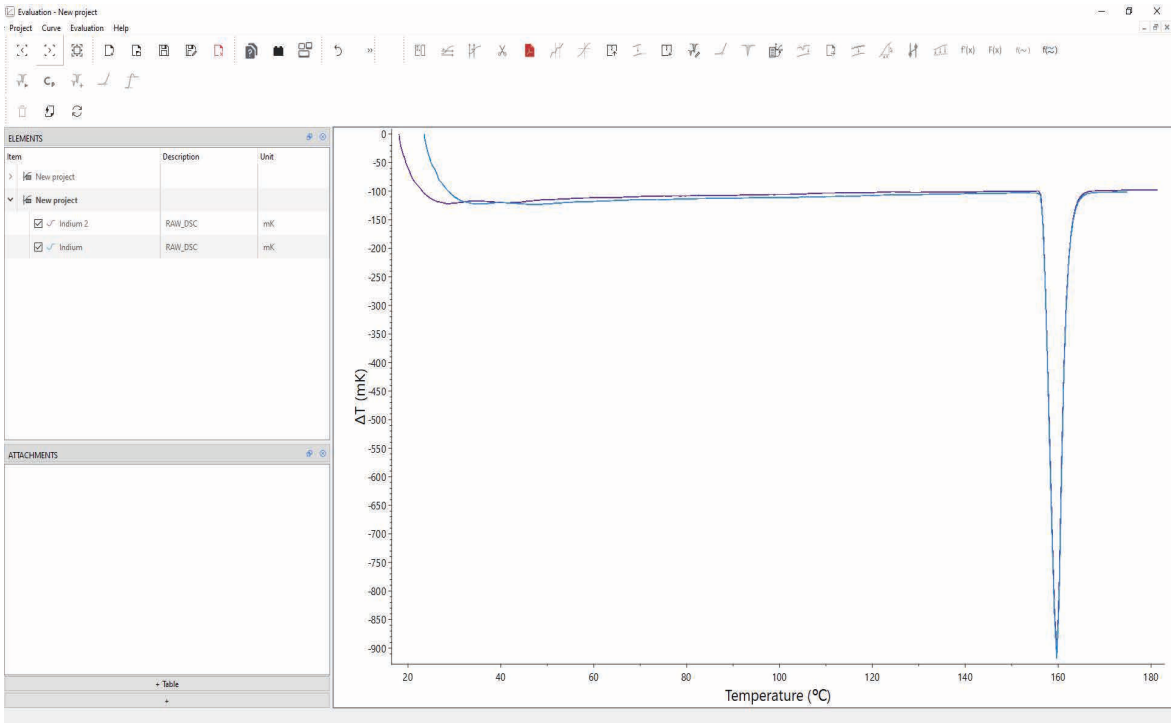
Crucibles

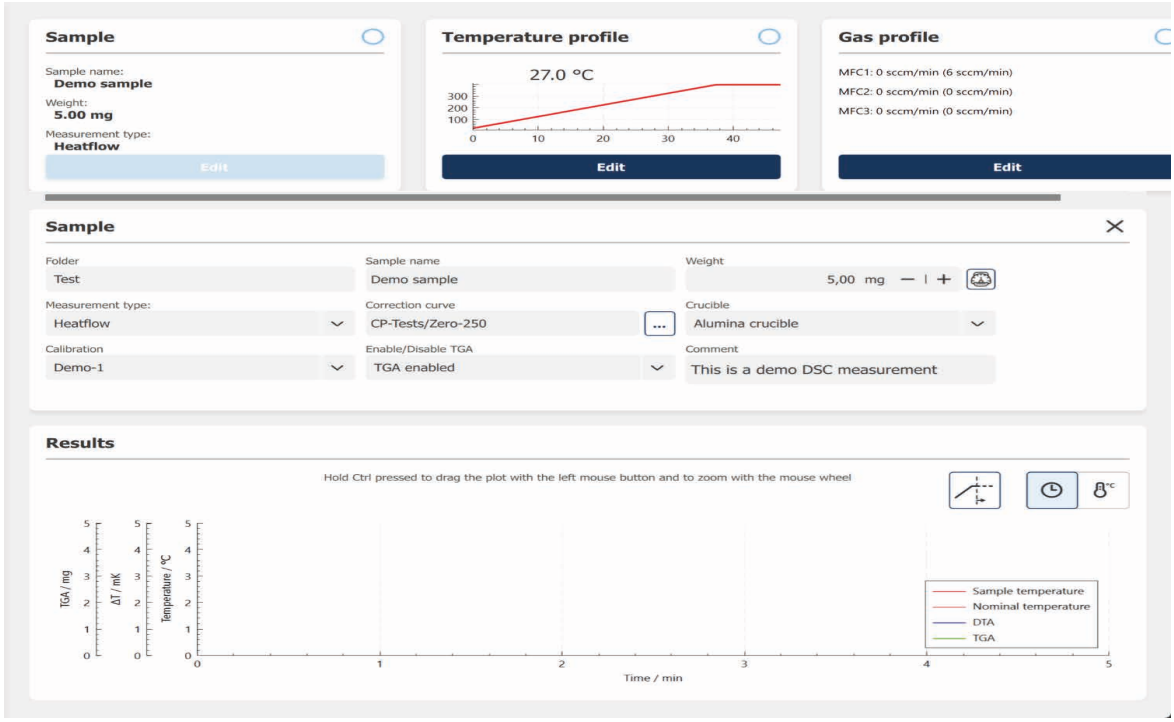
Name	Order number	Description	Picture
Al Standard crucible 6x1,5mm 40µl	30293042	The most lightweight crucible and easy to use	
Al crimpable crucible 100µl	30293043	The biggest crucible for voluminous samples. Crimpable to measure with atmosphere	
Al crimpable crucible 40µl	30293045	The small crimpable crucible to measure with atmosphere	
Al lid without hole	30293044	Compatible with 30293043 and 30293045	
Al lid with hole	30293046	Compatible with 30293043 and 30293045	
Al crucible for foils with lid	30293050	Crimpable crucible to measure foils and powders. Special crimping tool is needed.	
Al crucible for small samples with lid	30293051 30293052	Crimpable crucible to measure small samples. Special crimping tool is needed	
Cu crucible	30293049	The copper crucible to measure Oxidation induction time and Oxidation onset temperature	

Software

The software greatly enhances your workflow as the intuitive data handling only requires minimum parameter input. LiEAP offers a valuable guidance for the user when evaluating standard processes such as melting and crystallization points. The optional thermal library product identification tool, provides a database permitting an automatic identification tool for your tested materials such as polymers.

- Software packages are compatible with latest Windows operating system
- All specific measuring parameters (User, Lab, Sample, Company, etc.)
- Optional password and user levels
- Undo and redo function for all steps
- infinite heating, cooling or dwell time segments
- multiple language versions such as English, German, French, Spanish, Chinese, Japanese, Russian, etc. (user selectable)
- The evaluation software offers a wide range of functions for the comprehensive analysis of all data types
- Complete evaluation history (all steps can be undone)
- Data acquisition and evaluation can be performed simultaneously
- Data can be corrected using zero correction
- Data evaluation includes: software signal correction and smoothing, first and second derivative, curve arithmetic, data peak evaluation, glass point evaluation, zoom, multiple curve overlay, annotation, copy to clipboard function, multiple export features for graphic and data export, automatic gas control


Evaluation - New project
Project Curve Evaluation Help
ELEMENTS
Item Description Unit
New project
New project
Indium 2 RAW_DSC mK
Indium RAW_DSC mK
ATTACHMENTS
+ Table
ΔT (mK)
Temperature (°C)


Sample
Sample name:
Demo sample
Weight:
5.00 mg
Measurement type:
Heatflow
Edit
Temperature profile
27.0 °C
Edit
Gas profile
MFC1: 0 sccm/min (6 sccm/min)
MFC2: 0 sccm/min (0 sccm/min)
MFC3: 0 sccm/min (0 sccm/min)
Edit
Sample
Folder
Test
Sample name
Demo sample
Weight
5,00 mg
Measurement type:
Heatflow
Correction curve
CP-Tests/Zero-250
Crucible
Alumina crucible
Calibration
Demo-1
Enable/Disable TGA
TGA enabled
Comment
This is a demo DSC measurement
Results
Hold Ctrl pressed to drag the plot with the left mouse button and to zoom with the mouse wheel
TGA / mg
ΔT / mK
Temperature / °C
Time / min
Sample temperature
Nominal temperature
DTA
TGA

Technical Specifications

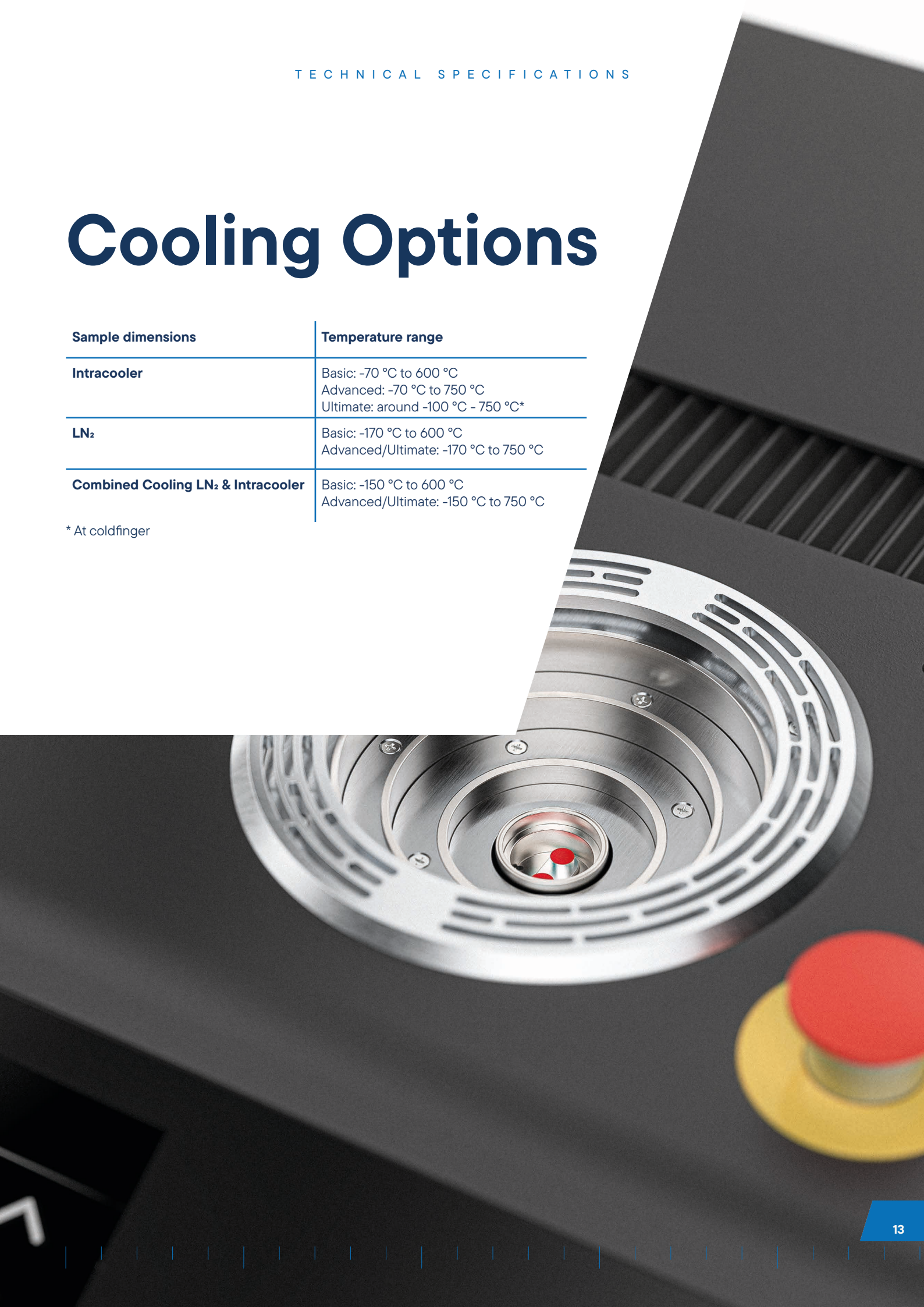
	Basic	Advanced	Ultimate
Heating rate	0.01 to 100 K/min	0.01 to 150 K/min	0.01 to 150 K/min
Cooling rate	Intracooler: 5 min (100 to 0 °C) LN_2: 10 min (100 to -100 °C)	Intracooler: 5 min (100 to 0 °C) LN_2: 10 min (100 to -100 °C)	Intracooler: 5 min (100 to 0 °C) LN_2: 10 min (100 to -100 °C)
Temperature range	-170 °C - 600 °C	-170 °C - 750 °C	-170 °C - 750 °C
User replaceable heatsink/cooling options	Yes	Yes	Yes
User replaceable furnace with sensors	Yes Furnace material: silver	Yes Furnace material: silver	Yes Furnace material: silver
Data capture	100 Hz	100 Hz	100 Hz
Temperature Accuracy	±0,1 K	±0,1 K	±0,1 K
Enthalpy Precision	<1 % (Indium, Zinc)	<1 % (Indium, Zinc)	<1 % (Indium, Zinc)
Measuring range	± 750 mW	± 750 mW	± 750 mW
MFC (with 3 gases)	Optional	Integrated	Integrated
Unlimited warranty	Optional*	Optional*	Optional*

* In connection with a maintenance agreement

Cooling Options

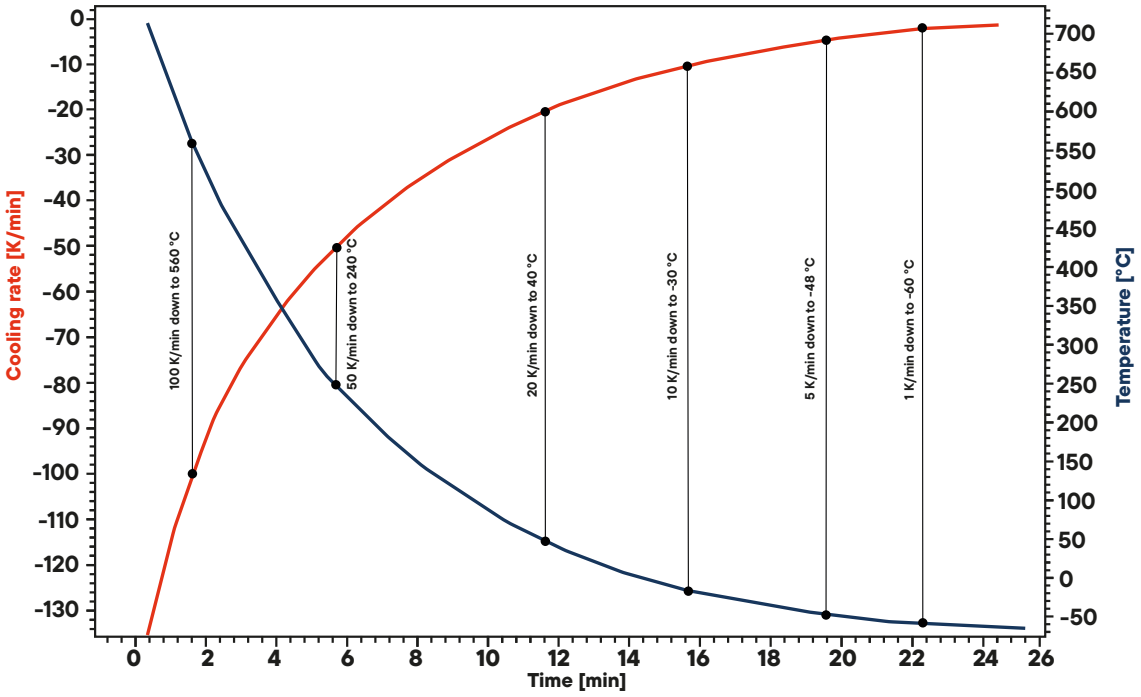
Sample dimensions	Temperature range
Intracooler	Basic: -70 °C to 600 °C Advanced: -70 °C to 750 °C Ultimate: around -100 °C - 750 °C*
LN_2	Basic: -170 °C to 600 °C Advanced/Ultimate: -170 °C to 750 °C
Combined Cooling LN_2 & Intracooler	Basic: -150 °C to 600 °C Advanced/Ultimate: -150 °C to 750 °C

* At coldfinger



Applications
L63 DSC

Cooling rate with an Intracooler



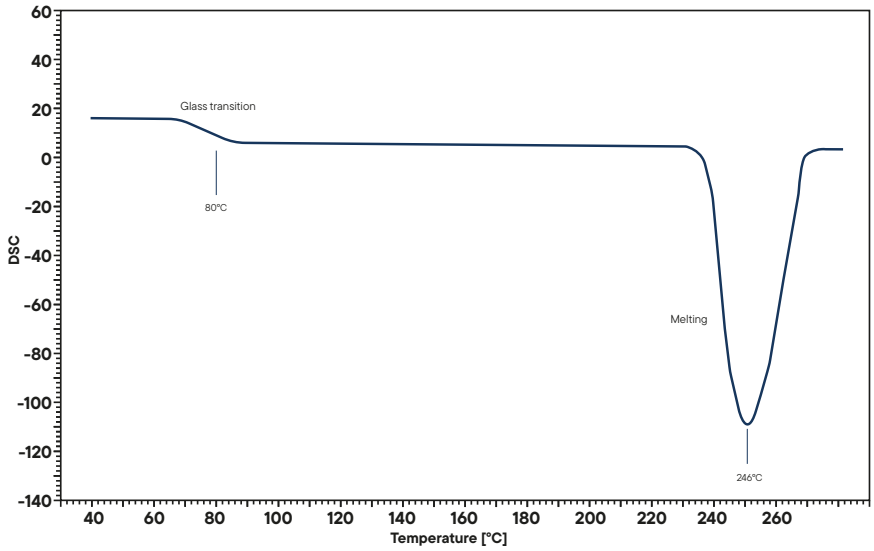
The new DSC system offers an innovative design with a wide temperature range from -70 °C to 750 °C, without having to adjust the cooling options. This allows for a more efficient workflow by eliminating time-consuming adjustments. The instrument enables seamless transitions between low and high temperatures, making it ideal for demanding applications such as material research, polymer analysis, and quality control. With its high flexibility and user-friendly operation, this DSC sets a new standard for advanced thermal analysis.

In the graph shown above, you can see how the intracooler ensures efficient and rapid cooling.

Cooling rate	Up to the lower temperature
100 K/min	560 °C
50 K/min	240 °C
20 K/min	40 °C
10 K/min	-30 °C
5 K/min	-48 °C
1 K/min	-70 °C

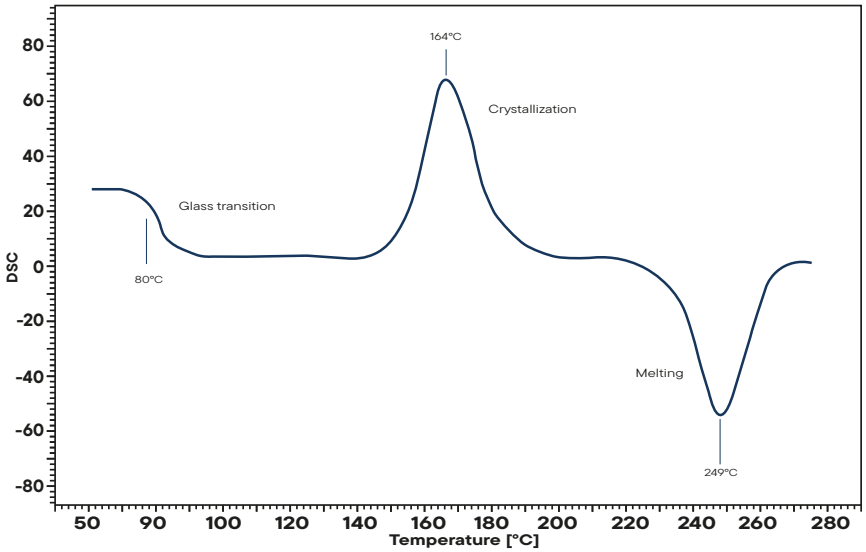
Linseis Service Lab

PET Granulate 1. Heating



The analysis of polymers is one of the main applications of DSC. Effects such as glass transitions, melting, and crystallization points are of interest and sometimes hard to detect. The new LINSEIS L63 DSC offers high resolution and sensitivity, making it an ideal instrument for this type of analysis. With its innovative design, it is now possible to analyze important properties of the sample even during the initial heating of the PET granulate using the L63 DSC at a linear heating rate of 20 K/min. The curve shows a significant glass transition around 80 °C, followed by a melting peak at 246°C.

PET Granulate 2. Heating



Depending on the cooling rate, the degree of crystallinity of the polymer changes significantly. During a subsequent heating run, cold crystallization can be observed with a linear heating rate of 20 K/min. The curve reveals a distinct glass transition around 80 °C, followed by cold crystallization of the amorphous regions starting at approximately 148 °C and a melting peak at starting 230 °C. This allows the complete characterization of the sample with just two heating cycles.

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03/2025