µDSC7 evo

Microcalorimetry

From -45 °C to 120 °C

- CALISTO software

3D sensor inside

SETARAM Instrumentation
KEP Technologies

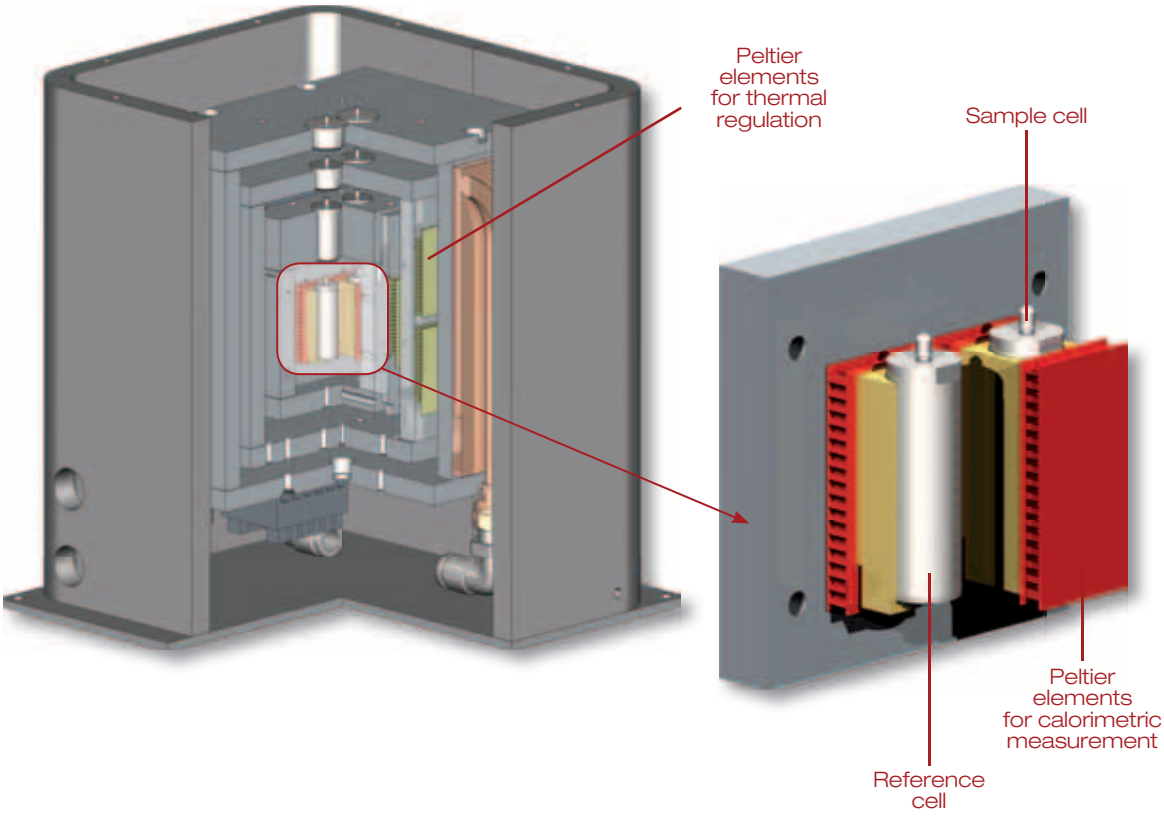
Inspiring Imagination for **Material Science**

Featuring the exclusive "3D Calvet Sensor Inside" Technology, the µDSC7 evo microcalorimeter is designed for the study of samples (denaturation, transition, gelification, reaction, etc.) in isothermal and scanning mode (no external cooling system is needed) over a wide temperature range (–45 to 120°C).

The HIGHLIGHTS

- **Wide operating temperature range** (from -45 °C to 120 °C): cooling of the calorimeter does not require an external source.
- **Use in isothermal or temperature programming (DSC) mode.**
- **Possibility to study samples in all forms:** liquids, gel, powder, solid.
- **Variety of closed and removable experimental cells.**
- **DSC measurements under very high pressure (up to 1000 bars):** with the use of specific high pressure gas panel and cells.

SENSOR



The **µDSC7 evo** features the exclusive Calvet three-dimensional sensor with Joule effect calibration for highly sensitive and precise calorimetric measurements.

Each cell is surrounded by high sensitivity Peltier elements ensuring the thermal contact with the calorimetric block. These detectors are good thermal conductors that keep the temperature in the cells identical to that in the calorimetric block. Setting the two transducers in opposition on the “measurement" and "reference" cells eliminates variations common to the two cells. The heat-flow-measuring transducer thus provides high sensitivity to the **µDSC7 evo** and precise measuring accuracy.

Using two stages of Peltier thermo elements provides perfect temperature homogeneity and stability within the calorimetric block.

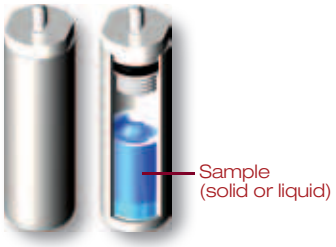
CELLS

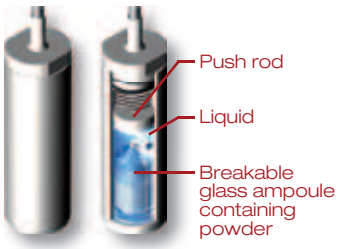
The **µDSC7 evo** offers various closed and removable cells.

All the cells can be used in either isothermal or DSC mode. They are made of Hastelloy C, have a volume of approximately 1 cm^3 and are readily removed and easily cleaned.

- **Closed "batch" cells for the analysis of raw solid or liquid samples.**

These cells are sealed, and can withstand internal pressures of up to 20 bar.



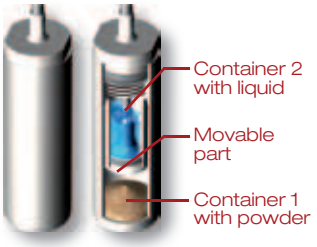


- **Ampoule vessel to study powder wetting or hydration.**

The powder is first degassed in the ampoule under vacuum prior to sealing. The sealed ampoule is then immersed in the liquid. The ampoule is broken by a push rod, ensuring immediate wetting of the powder.

- **Mixing "batch" cell for studying reactions between a powder and a liquid.**

The mixing "batch" cell comprises two separate sample chambers. The samples are brought into contact and mixed using a push rod, the end of which ensures effective stirring of the mix. This cell is ideal for the study of enzymatic, wetting and mixing reactions, etc.



HIGH PRESSURE µDSC7 EVO

Originally designed under a IFP (Institut Français du Petrole) license to study the gas hydrates formation and dissociation, the **high pressure version of the µDSC7 evo** offers unique capabilities on the market: on a wide temperature range, from the subambient temperature of -45°C up to 120° C, it is possible to carry out high sensitive DSC measurements under high and very high pressure, up to 1000 bars (14 600 psi). Experiments under gas supercritical conditions, such as CO_2, are also available.

The high pressure µDSC7 evo comprises three elements:

- the highly sensitive microcalorimeter **µDSC7 evo** providing a temperature range from -45 up to 120°C,
- **a pair of dedicated gas-tight high-pressure cells:** they are designed to work up to 400 bars (5800 psi) and to contain 0.5 ml of sample. They are made of Hastelloy C276, which allows the analysis of corrosive fluids. They can be re-used after a suitable cleaning. Very-high-pressure cells with pressure capabilities up to 1000 bars (14600 psi) are also available on request,
- **a specific high pressure gas panel.**

High Pressure Gas Panel

For the control of sample pressure we offer two automated solutions for different pressure ranges:

200 bar Gas Panel
- Pressure regulation ± 0.1 bar
- Pressure regulation by means of a 300 ml buffer

1000 bar Gas Panel
- Pressure regulation ± 0.05 bar
- Measured quantity of injected gas
- Controlled increase of pressure

Applications

With its wide temperature range (-45 to 120°C), its various cells and its unique capabilities of measuring under high pressure (up to 1000 bars / 14 600 psi), the **µDSC7 evo** can meet a wide range of applications, especially when dealing with:

- **Life Sciences – Pharmaceuticals:** protein denaturation / aggregation in liquid, powder or gel form, solid state investigation (polymorphism, amorphism),
- **Food:** protein denaturation / aggregation, fusion / gelification of polysaccharides, gelatine, foam formation under gas pressure,
- **Polymers:** pressure influence on glass transition,
- **Gas Hydrates:** thermodynamic properties of formation / dissociation, stability, kinetics data,
- **Petroleum:** Gas hydrates formation / dissociation, stability, kinetics data, WAT (Wax Appearance Temperature),
- **Environmental:** CO_2 sequestration (gas hydrates).

View the application notes in your field, available for download, by visiting **www.setaram.com!**

A huge database is in the Application Library area of our website. We have also included a powerful search engine that will enable you to find the most applicable data.

Specifications

Temperature range	-45 °C to 120 °C Cooling under 0 °C requires the use of an auxiliary thermostat
Programmable temperature scanning rate (heating and cooling)	0.001 to 2 °C.min^{-1}
RMS Noise	0.4 µW
Resolution	0.02 µW / 0.002 µW
Cells	1 ml, made of Hastelloy C - Removable Batch, mixing batch, ampoule and high pressure
Pressure (measured & controlled)	400 bar / 5800 psi or 1000 bar / 14 600 psi requires the use of high pressure cells and gas panel
Weight	37.4 kg (82.5 lbs)
Dimensions	40 / 53 / 58 cm (15.7 / 20.9 / 22.8 in)
Power requirements	230 V / 50/60 Hz

Option: AKTS Thermokinetics software for comprehensive investigation of reaction or decomposition AKTS

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