

micro DSC 7 evo

Microcalorimetry
From $-45\text{ }^{\circ}\text{C}$ to $120\text{ }^{\circ}\text{C}$
by Setaram



A trademark of KEP Technologies group

micro DSC 7 evo



Featuring the exclusive «3D Calvet Sensor Inside» Technology, the μ DSC7 evo microcalorimeter is designed for the study of samples (crude oil, emulsions, biopolymers, carbohydrates, phase change materials, etc.) in isothermal and scanning mode (no external cooling system is needed) over a wide temperature range (-45 °C to 120 °C).

HIGHLIGHTS include:

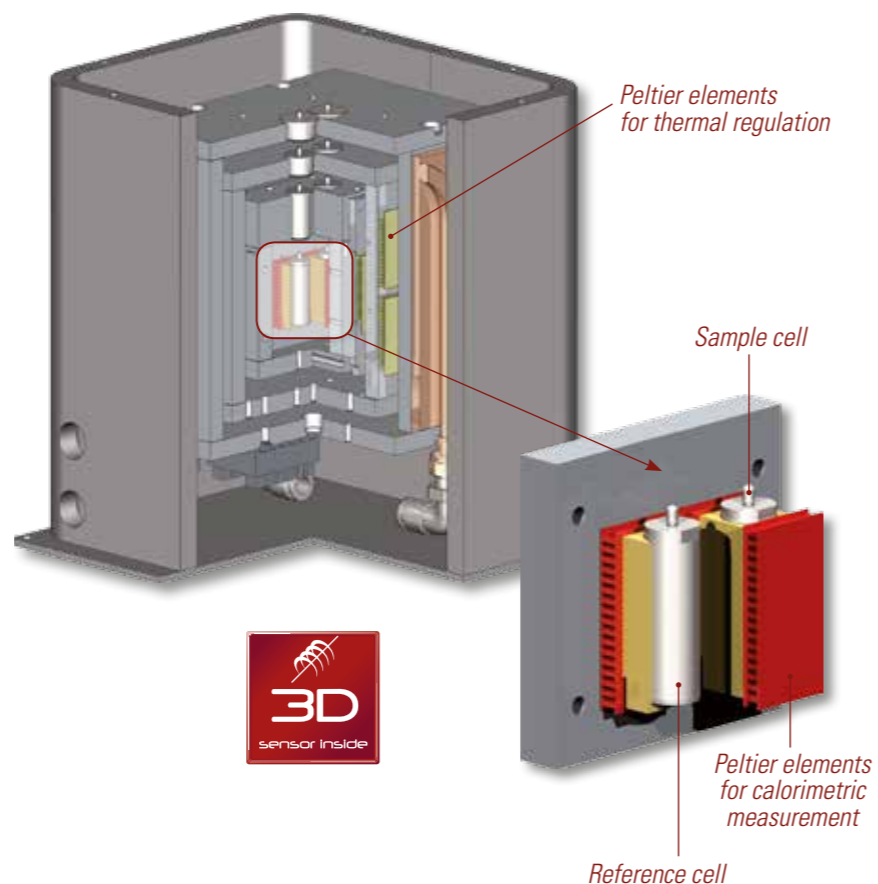
- Wide operating temperature range (from -45 °C to 120 °C).
- Use in isothermal or temperature programming (DSC) mode.
- Possibility to study samples in all forms: liquids, gel, powder, solid.
- Variety of closed and removable experimental cells.
- DSC measurements under very high pressure (up to 1 000 bar / 14 600 psi): with the use of specific high pressure gas panel and cells.

SENSOR

The μ DSC7 evo features the exclusive Calvet three-dimensional sensor with Joule effect calibration for highly accurate 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 μ DSC7 evo and high measuring accuracy.

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



See micro DSC 7 evo application notes

CELLS

The μ DSC7 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 mL 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.



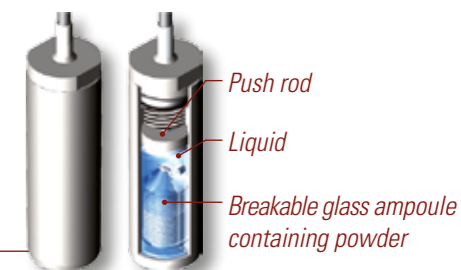
Ampoule vessel

For immersion calorimetry or hydration experiments.

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.



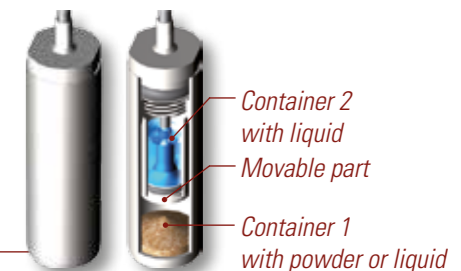
Mixing «batch» cell

For studying reactions between two liquids or 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 reactions, wetting or mixing, etc.



HIGH PRESSURE μ DSC7 EVO

Originally designed under an IFPEN (French Institute of Petroleum) license to study the gas hydrates formation and dissociation, the high pressure version of the μ DSC7 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 accurate DSC measurements under high and very high pressure, up to 1 000 bar (14 600 psi).

The high pressure μ DSC7 evo comprises three elements:

- the highly sensitive microcalorimeter μ DSC7 evo providing a temperature range from -45 °C up to 120 °C,
- a pair of dedicated gas-tight high-pressure cells: they are designed to work up to 400 bar (5 800 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 1 000 bar (14 600 psi) are also available,
- a dedicated pressure gas panel.

High Pressure Gas Panel

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

200 bar Gas Panel

- Pressure control ± 0.1 bar (if temperature stable)
- Pressure control by means of a 300 ml buffer

1 000 bar Gas Panel

- Pressure control ± 0.05 bar
- Controlled injection rate

APPLICATIONS

With its wide temperature range (-45 °C to 120 °C), its various cells and its unique capabilities of measuring under high pressure (up to 1 000 bar / 14 600 psi), the μ DSC7 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 starch, emulsion stability,
- **Polymers:** influence of pressure on glass transition up to supercritical conditions,
- **Gas Hydrates:** thermodynamic properties of formation / dissociation, stability, kinetics data,
- **Petroleum:** flow assurance data, WAT (Wax Appearance Temperature), under atmospheric or high pressure conditions,
- **Environmental:** CO₂ sequestration (gas hydrates), phase change materials or other thermal energy storage systems.

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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 μ W
Resolution	0.02 μ W / 0.002 μ W
Cells	1 ml, made of Hastelloy C - Removable Batch, mixing batch, ampoule and high pressure
Pressure (measured & controlled)	400 bar / 5 800 psi or 1 000 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 

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