μDSC3 evo

Microcalorimetry

From -20 °C to 120 °C

- CALISTO software

3D sensor inside

SETARAM Instrumentation

KEP Technologies

Inspiring Imagination for **Material Science**

µDSC3 evo is the lastest generation of the most popular microcalorimeter of Setaram. Its high sensitivity and versatility makes this instrument a star in many industrial and academic research laboratories all around the world.

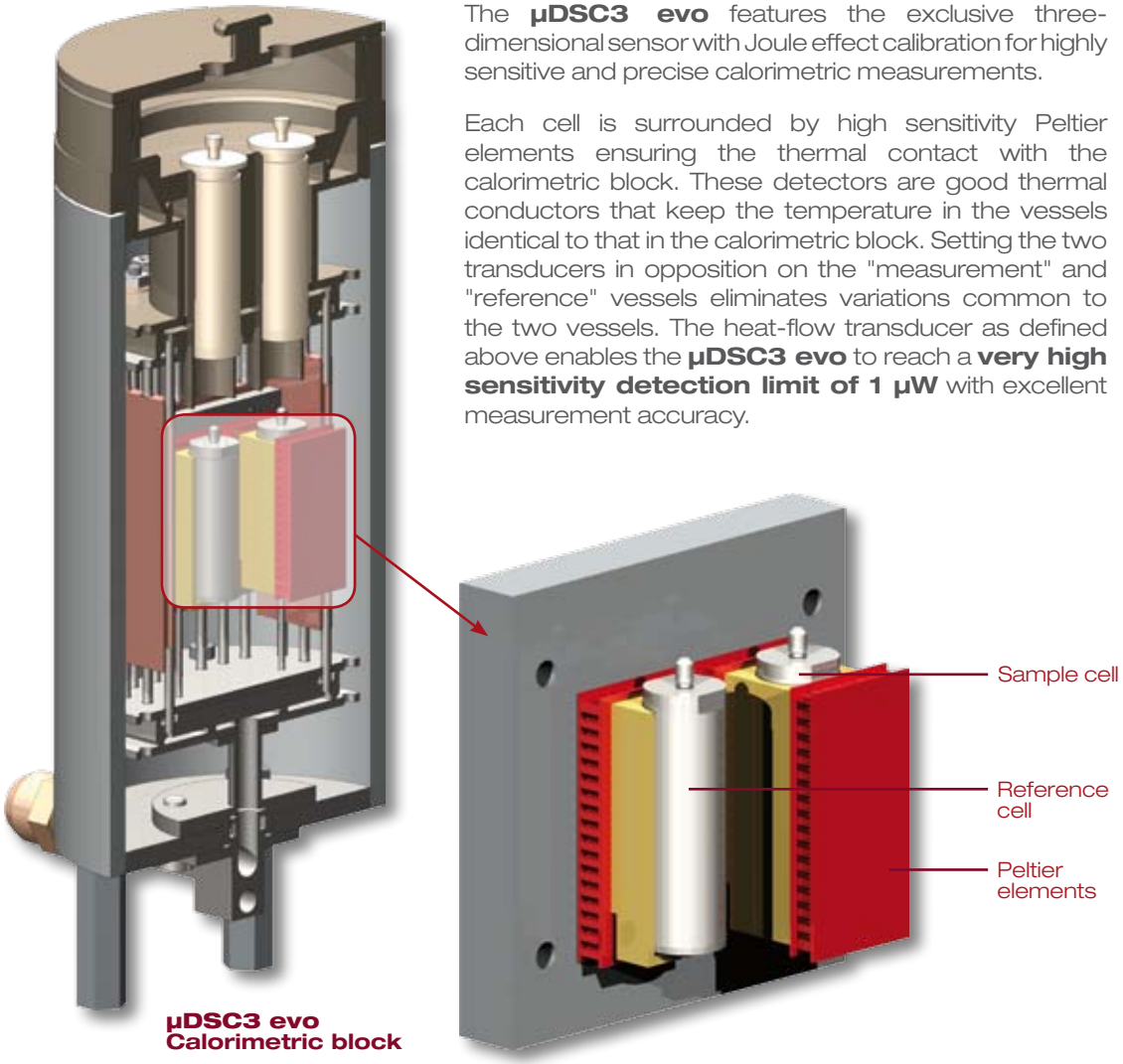
The HIGHLIGHTS

- **Wide operating temperature range** (from -20 °C to 120 °C): Cooling of the calorimeter does not require an external source.
- **Very low detection limit:** The **µDSC3 evo** detection limit is significantly lower (by a factor of about ten) than that of traditional DSCs. Calorimetric signals of less than one **Microwatt** can be detected. The very high sensitivity of the **µDSC3 evo** enables transition studies to be performed on small quantities of products and at very low programming speeds.
- **Use in isothermal or temperature programming (DSC) mode.**
- **Possibility of studying samples in all forms:** liquid, gel, powder, solid.
- **Large range of experimental cells:** including specific cells for studying reactions, providing numerous application possibilities.
- **Ease of operation:** dedicated market leading **CALISTO** software that is not only intuitive but powerful enough to perform all typical experiments and data treatment.

SENSOR

The **µDSC3 evo** features the exclusive 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 vessels identical to that in the calorimetric block. Setting the two transducers in opposition on the "measurement" and "reference" vessels eliminates variations common to the two vessels. The heat-flow transducer as defined above enables the **µDSC3 evo** to reach a **very high sensitivity detection limit of 1 µW** with excellent measurement accuracy.



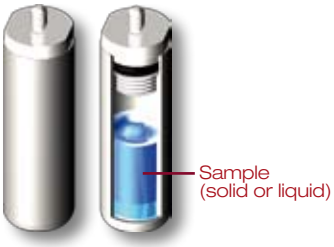
µDSC3 evo Calorimetric block

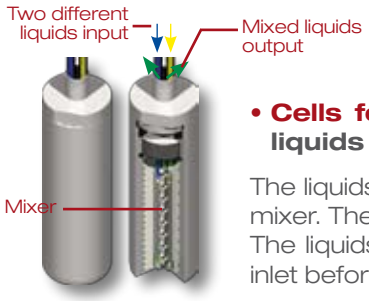
CELLS

The flexibility of the **µDSC3 evo** comes from the choice of experimental cells. The cells can be closed ("batch" type) or combined with fittings to introduce reactive agents ("flow" type). 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.



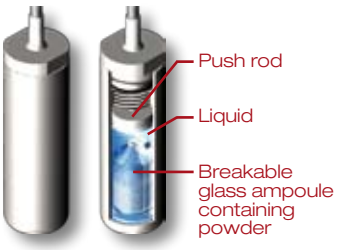


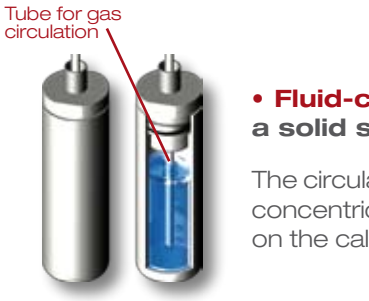
- **Cells for mixing circulating liquids to study the mixing of two liquids "'in situ".**

The liquids enter the celll through two separate tubes which join together in a mixer. The resulting mixture exits from the cell through a third concentric tube. The liquids are temperature controlled in the prestabilizer on the calorimeter inlet before mixing.

- **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.



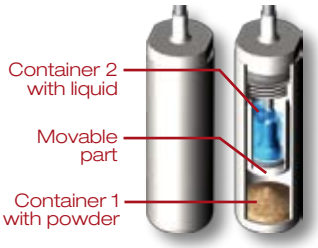


- **Fluid-circulation cell to study interactions between a fluid and a solid sample.**

The circulation vessel contains a tube for introducing a fluid (liquid or gas) and a concentric exhaust tube. The fluid is temperature controlled in the pre-stabilizer on the calorimeter inlet.

- **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.



- **Heat capacity cell to measure the heat capacity of liquids.**

The accuracy of measurement of the heat capacity of a liquid using the calorimetry depends on the correction due to the vapor phase above the liquid. To overcome this error the **µDSC3 evo** heat capacity cell is fitted with two tubes welded to the cell body. The cell is filled through one of the tubes to avoid having any vapor phase in the cell.

The heat capacity for the corresponding volume of liquid is determined by temperature increments to ensure greater accuracy (step scanning procedure). The closed "batch" celll is used to measure the heat capacity of solids.

Applications

With its temperature range (-20 °C to 120 °C) the **µDSC3 evo** can meet a wide range of applications, especially when dealing with:

- **Pharmaceuticals, Life Sciences and Food:** protein denaturation / aggregation in liquid, powder or gel form, enzymatic reaction, fusion/gelification of polysaccharides, gelatins, study of formulation and pre-formulation,
- **Cements, pigments:** wetting study,
- **Polymers:** association of polymers according to solvent, study of gels.

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	-20 °C to 120 °C Cooling under 0 °C requires the use of an auxiliary thermostat
Temperature accuracy	+/-0.1 °C
Temperature precision	+/-0.02 °C
Programmable temperature scanning rate (heating and cooling)	0.001 to 1.2 °C.min^{-1}
Cooling time	1h 30 (from 120 °C to ambient)
Enthalpy accuracy	+/-1 %
Calorimetric Precision	+/-0.1 %
RMS Noise	0.2 µW
Sensitivity (Joule effect at 30°C)	100 µV/mW
Resolution	0.02 µW / 0.002 µW
Dynamic range	+/-190 mW
Cells ("batch" or circulation)	1 ml, made of Hastelloy C, Removable
Pressure (measured & controlled)	400 bar / 5800 psi, requires the use of High Pressure cells and gas panel
Weight	37.4 kg (82.5 lbs)
Dimensions (Height / Width / Depth)	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

SETARAM Instrumentation
KEP Technologies

Offices in United Kingdom, Germany, Italy, Switzerland, China and Singapore

www.setaram.com
sales@setaram.com

SETARAM INSTRUMENTATION
7 rue de l'Oratoire
69300 Caluire - France
Phone +33(0)4 72 10 25 25
Fax +33(0)4 78 28 63 55

SETARAM Inc. (NJ office)
7905 Browning Rd, Suite 206
Pennsauken NJ 08 109-4323 - USA
Phone +1 (856) 910 9990
Fax +1 (856) 910 1150

SETARAM Inc. (HQ)
8430 Central Ave. Suite 3D
Newark, CA 94560 - USA
Phone +1 (510) 793 3345
Fax +1 (510) 402 4705