Applications

With its high precision and wide temperature range (-120 to 830 °C) the **SENSYS evo DSC** has a wide range of applications, especially in the fields of thermodynamics (Specific Heat Capacity Cp precision within +/-1 %), pharmaceuticals (phase diagram, polymorphism, purity, thermal stability), safety of chemical process (transition, decomposition under high pressure), energy (catalysis, hydrogen storage, hydrogen adsorption), polymers (glass transition, measurement under pressure), etc.

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	Ambient to 830 °C
With cooling accessory	-120 °C to 200 °C (Liquid Nitrogen Accessory)
Programmable temperature scanning rate (heating and cooling)	0.01 to 30 °C.min^{-1}
Cooling time	17 min (from 50 °C to -100 °C) with Liquid Nitrogen Accessory
RMS Noise	0.2 µW
Resolution	0.35 µW / 0.035 µW
Autosampler	48 samples even under pressure
Gases	3 carrier gases (MFC from 4 to 200 ml/min) + 1 auxiliary or reactive gas (MFC from 0.3 to 16 ml/min)*
Crucibles	120 µl, 160 µl, 320 µl aluminium, incoloy, gold plated incoloy, graphite, alumina, platinum, etc.
Pressure (non controlled)	High Pressure Crucible (up to 500 bars / 7250 psi at 600 °C)
Pressure (measured & controlled)	High Pressure Crucible (up to 400 bars / 5800 psi at 600 °C)
Weight	45 kg (99 lbs)
Dimensions (Height / Width / Depth)	45 / 53 / 58 cm (17.7 / 20.9 / 22.8 in)
Power requirements	230 V - 50/60 Hz

*MFC = Mass Flow Controller

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

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SENSYS evo DSC

Differential Scanning Calorimetry

From -120 °C to 830 °C
Up to 500 bars at 600 °C

- Accurate enthalpy measurements
- Cp measurements within a 1 %
- Unequalled adsorption and TPD measurements
- Robotic DSC with 48 samples, even under pressure
- TG-DSC option
- Coupling to gas analysis (BET, gas sorption, FTIR, MS)
- CALISTO software

3D sensor inside

SETARAM Instrumentation
KEP Technologies

senSys evo DSC

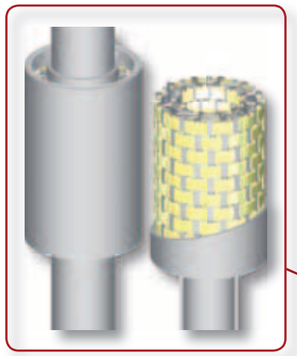
Inspiring Imagination for Material Science

The SENSYS evo DSC offers the most precise DSC sensor with parameter independent calibration to give *YOU* a DSC system that not only has totally unmatched performance, it also can measure under pressure and reactive atmospheres without compromising your baseline or sensitivity. For the first time you can perform experiments under your conditions not those dictated by your DSC. The SENSYS evo can be coupled with a large number of technologies (BET, FTIR, MS, GC, gas sorption, fluorescence, Raman).

The HIGHLIGHTS

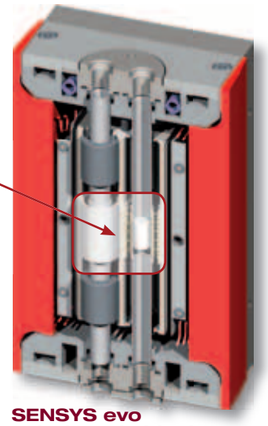
- **Incomparable precision:** the unique 3D sensor totally surrounds your sample and reference crucibles so that the entire energy of any transformation is monitored thereby giving you an unequalled accuracy of measurement.
- **Ease of operation:** dedicated market leading **CALISTO** software that is not only intuitive but powerful enough to perform every typical experiments and data treatment.
- **Parameter Independent Calibration:** because of the 3D transducer the calibration of **SENSYS evo** is independent of:
  - mass and form (powder, fibre, liquid, etc.) of the sample,
  - contact between the sample and the transducer,
  - crucible type
  - sweeping gas (inert, oxidizing, reducing, wet, pressure) and flow rate.
- **DSC measurement under High Pressure:** two models of sealed "High Pressure" crucibles are available in which only the sample and not the sensor is pressurized, thus allowing for the calibration, baseline and sensitivity to remain unchanged.
- **Large sample volumes:** The working volumes of the crucibles (up to 250 µl) are highly suited to the study of heterogeneous samples, or low-energy phase transitions. They are intended for analyses where the pressure generated by the sample remains low. Crucibles are available in alumina, aluminium, rhodiated platinum.

3D DSC SENSOR



3D Sensor

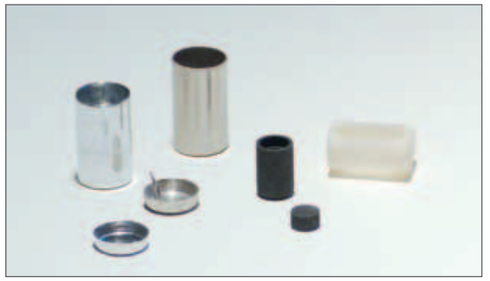
The sample and reference sensors are composed of **120 thermocouples mounted** in a cylinder that totally surrounds the measurement zone. These two cylinders can measure up to 94 % of all heat exchanged with the sample/reference, as compared to 20% typically (50 % absolute maximum) with 2D place sensors. The sensors are mounted in a calorimetric block that is further water cooled to eliminate any environmental variations and therefore giving you a highly precise and robust sensor with a unique level of specific sensitivity.



SENSYS evo calorimetric block

For studies at sub-ambient temperature, an automated cooling device utilizing evaporation of liquid nitrogen can be fitted onto the calorimetric unit.
A simple and ingenious swivel joint system enables the transducer to be pivoted in complete safety to transform a **horizontal SENSYS evo DSC** into a **vertical SENSYS evo DSC** or a **SENSYS evo TG-DSC** in less than one minute! **Whatever the configuration, the performance of SENSYS evo is unaffected.**

CRUCIBLES



- **Regular crucibles**

We offer a wide range of DSC crucibles for both horizontal and vertical uses of the **SENSYS evo DSC**: open alumina dish, closed but non-sealed crucibles in aluminium (250 µl), alumina (160 µl) or platinum rhodium (250 µl), graphite liner, etc.

- **High pressure crucibles**

High Pressure crucible (140 µl) for pressures up to 500 bars (7 400 psi) at 600 °C (non-controlled pressure). This crucible meets European Directive 97/23/CE relative to user safety.

Crucible to measure and/or control the pressure up to 400 bars (5 800 psi) at 600 °C. Sealed by a simple screw-in cap, this crucible is reusable, and can be used to vary pressure or gas during an experiment. Pressure sensor is available as an option to accurately measure the pressure under gas flow.

ROBOTIC SYSTEM

From routine QC to the determination of a complex formulation within R&D, a robotic autosampler is the ideal solution when high sample throughput is essential.

The **SENSYS evo DSC** Robot offers the possibility of performing unattended analysis of up to 48 samples.

The **SENSYS evo DSC** robot is the only automated DSC capable of working with high pressure Incoloy crucibles.

- **Vertical SENSYS DSC evo**

The vertical configuration of **SENSYS evo DSC** is particularly suitable for studying the adsorption of gas on catalysts. Using a specific silica reactor inserted into the calorimetric block, **measurements on heats of adsorption are obtained with a very high level of precision.**

- **SENSYS TG-DSC evo**

The unique 3D-Sensor can be combined with a symmetrical balance beam. The performances of the **SENSYS evo TG-DSC** result from the absolute symmetry of this unique system in which the TG and DSC transducers, which are mechanically independent, retain their specific characteristics.

See SENSYS evo TG-DSC brochure