



**CAL L92**

Ultimate  
**Micro**  
**Calorimeter**



[WWW.LINSEIS.COM](http://WWW.LINSEIS.COM)



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 .



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.



Engineering  
Innovation  
&



# Linseis Service

## Customized Solutions – The Linseis Advantage

At Linseis, we believe that every measurement challenge is unique — and so should be your instrument.

While many suppliers rely on standardized configurations, Linseis distinguishes itself through exceptional flexibility and the capability to deliver customer-specific adaptations in record time.

Our experienced engineering teams work hand in hand with you to design and implement fully customized solutions that meet your precise application requirements — whether that means a unique sensor configuration, an extended temperature range, or a specialized software integration.

With decades of experience and a modular product architecture, we turn customization into a standard service — fast, efficient, and reliable.

Choose Linseis and experience what true flexibility in thermal analysis and material characterization means.

**Contact form**





## Service & Support

### Redefining Ownership

When investing in analytical instrumentation, long-term value matters just as much as precision. That's why Linseis systems are engineered to deliver the lowest Total Cost of Ownership in their class — combining reliability, efficiency, and flexibility in every detail.

Our instruments are built with robust, high-quality components designed for longevity and minimal maintenance. This means fewer service interventions, shorter downtimes, and reduced operating costs over the entire product lifetime. Intelligent software updates and remote support further ensure that your system remains state-of-the-art, even years after installation.



# Ultimate Micro Calorimeter

The Ultimate micro calorimeter CAL L92 is a differential temperature scanning micro calorimeter offering unrivalled sensitivity, enabling the study of all types of materials, including the most dilute solutions. It operates as a conventional micro-calorimeter.

The CAL L92 unique, innovative design enables sensitive measurement at a level never achieved before for a micro-calorimeter with extractable cells/test crucibles.



Ultra sensitive



High performance



Ultra simple

## Available Cells

### 1 Batch cells

These cells can be used to study solids and liquids. They are the best for precise heat capacities measurements (better than 3%) of and they are reusables.

They can also be used to study transitions (melting/crystallisation) and liquid-solid or liquid-liquid phase diagrams.

**Useful volume:** 850  $\mu\text{l}$

**Pressure:** A few bars



## 2 High Pressure cells

They are identical to batch cells, with a pressurization tube to control pressure using the appropriate pressurization system.

**Useful volume:** Up to 330 µl (pressure dependent)

**Pressure:** Up to 1000 bars

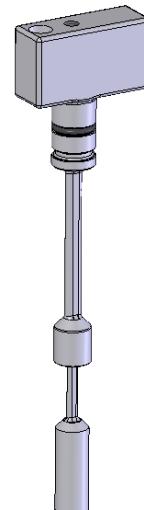


## 3 Liquid Cp cells - High pressure

These cells have been specifically developed to measure the heat capacity of liquids under pressure. Their unique design makes them easy to fill completely and clean. Measurements are carried out in constant volume and the cells are installed in the instrument for the entire measurement campaign. They do not need to be removed to change the liquid being measured, which means that the Cp volume can be measured with an accuracy of better than 1%.

These cells can be used to observe very weak liquid-liquid transitions such as „demixing“ or „degassing“. They can be used at atmospheric pressure or under a few bars and have been tested up to 100 bars. With the right equipment, these cells can also be filled under pressure.

They can therefore be used to analyse gas-laden solutions under pressure.



**Useful volume:** 750 µL

**Pressure:** 100 bar

## 4 BI-Compartment cells

These cells enable enthalpy of reaction measurements to be made by limiting the Cp effect of the injection. A liquid is loaded into the upper compartment and injected into the lower compartment (solid or liquid).

**Useful volumes:** 150 + 250µL (other volumes on request)

**Pressure:** A few bars



## 5 Continuous A + B reaction cells

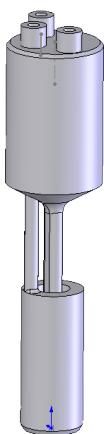
These cells measure the enthalpy of mixing of 2 fluids in a continuous flow (heat of chemical reaction, heat of gas dissolution or enthalpy of excess of a liquid mixture). The measurement is carried out dynamically. An internal tubing system is used to equilibrate the fluids to the temperature of interest, then mixing takes place within the measurement system and is discharged outside the calorimeter. The heat measured is directly proportional to the flow rates and heats measured.

### Continuous flow system

### Isothermal measurements

**Pressures:** up to 100 bar (higher pressures on request)

**Flow rates:** up to 1mL/min



## 6 ITC cell

UMC can be equipped with titration cells (1 ml) and with a suitable injection system (250  $\mu$ l or 500  $\mu$ l syringes). Injections are performed in both sample and reference cells to minimize the need for a “control experiment.”

This would enable isothermal titration calorimetry tests to be performed and interactions to be investigated. Accessible binding parameters are:

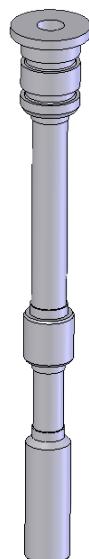
**Binding constant (K):** Indicates how strong the binding is.

**Enthalpy change ( $\Delta H$ ):** Indicates whether the binding is exothermic or endothermic.

**Entropy change ( $\Delta S$ ):** Provides information about changes in order in the system.

**Free energy ( $\Delta G$ ):** The combined thermodynamic expression of the binding

**Stoichiometry parameter (n):** How many ligands bind per target molecule



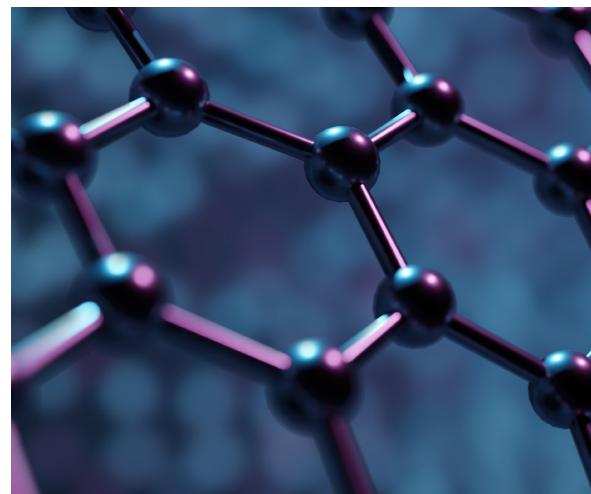
## 7 Customized Cells

If none of the above cells is suitable for your application, customized cells are also available on request.

# Unique Features

## Customized Cells

Wide range of customized cells depending on applications



## Temperature range

Direct sample temperature measurement; extended temperature range from -60 °C up to 170 °C

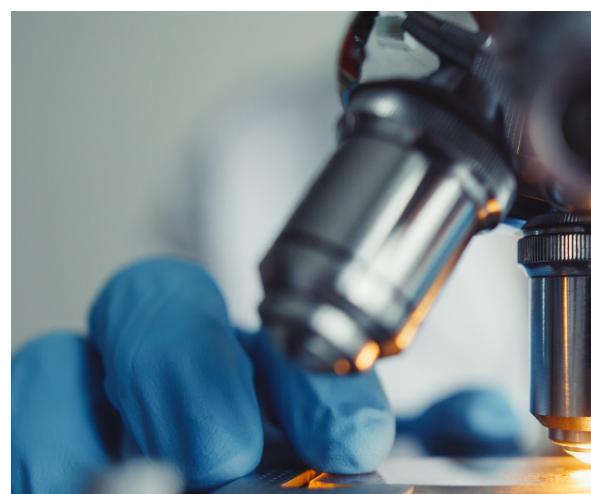


## Ultra stable temperature

(100  $\mu$ C) thanks to a patented furnace ( patent n° FR1360897 consisting in 3 successive thermally controlled chambers)

## ITC mode

Both DSC and ITC modes available in a single instrument



## Electrical calibration

Built in electrical calibration allowing for cells dependant calibration

## Unrivalled sensitivity

Unrivalled sensitivity (300  $\mu$ V/mW) with a Peltier éléments based sensor



# Technical Specifications

Temperature range	from -60 °C* up to 170 °C
Scanning rate	0.001 to 5 °C/min
Temperature precision regulation	100 µ °C
Measurement time	30 to 60 min
Sensors type	Peltier Elements
Sample volume	up to 850 µL **
Key metrological features	Direct T sample measurement Built-in Joule Effect calibration
Measurement range	+/- 150 mW
RMS noise	0.05 µWa
Dimensions	L*w*h = 700*650*500 mm

\* depends on chiller

\*\* depends on vessel type

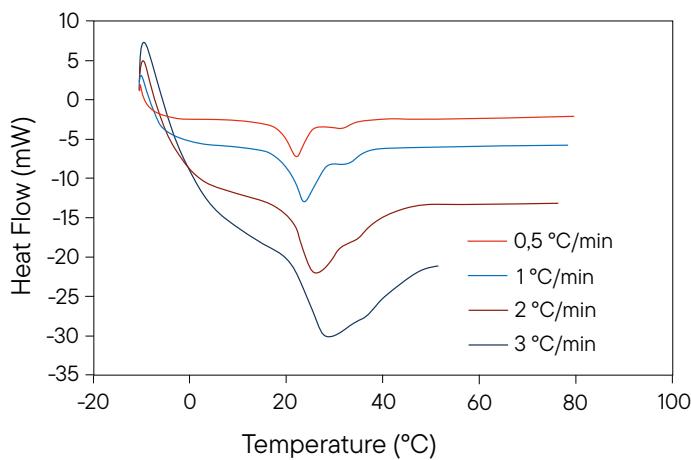


More Applications

# Applications

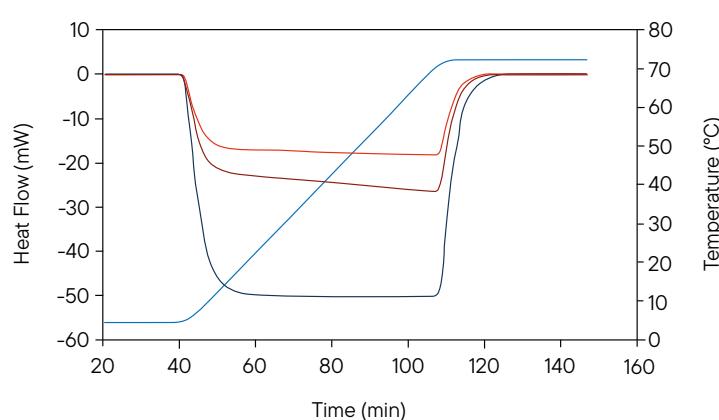
## PTFE Analysis

Measured with  
CAL L92



A 524 mg PTFE cylinder was placed in the measurement cell while the reference cell remained empty. The CAL L92 was programmed to perform several heating ramps between -10 °C and 80 °C, at scanning speeds of between 0.5 °C and 3 °C/min. The thermograms obtained are shown opposite. At all the speeds tested, the two Teflon phase transitions were observed. The separation of the two transitions is all the more marked on the thermograms when the scanning speed is low.

## Volumic heat capacity of liquids



Heat Capacities of ethanol, water and cyclohexane were measured using a scan rate of 1°C/min. Derived Cp values at 40°C (in J/mL/°C) perfectly match with literature:

Cp vol. at 40 °C (J/ml/°C)	Theoretical	Measured
Water	4.15	4.13
Ethanol absolute	1.99	1.99
Cyclohexane	1.45	1.45

**LINSEIS GmbH Germany**

Vielitzerstr. 43  
95100 Selb

Tel.: (+49) 9287 880 0  
E-mail: [info@linseis.de](mailto:info@linseis.de)

**LINSEIS Inc. USA**

109 North Gold Drive  
Robbinsville, NJ 08691

Tel.: (+1) 609 223 2070  
E-mail: [info@linseis.com](mailto:info@linseis.com)

**LINSEIS China**

Kaige Scientific Park  
Room 120, Building T3, No.1220  
Yuqiao Road, Pudong, Shanghai

Tel.: (+86) 61 90 12 03  
Tel.: (+86) 50 55 06 42  
E-mail: [info@linseis.com.cn](mailto:info@linseis.com.cn)

**LINSEIS India**

Plot 65, 2nd Floor, Sai Enclave,  
Sector 23, Dwarka05-800  
110077 New Delhi

Tel.: (+91) 11 42883851  
E-mail: [sales@linseis.in](mailto:sales@linseis.in)

