

# Contract testing Catalogue



## Thermal Analysis at your service

DSC, Calorimetry, TGA, TG-DTA,  
TG-DSC, TMA, Evolved Gas  
Analysis, Sorption

2023 / 2024



## CONTRACT TESTING

You may be challenged with new characterization tests using techniques that you are not familiar with or that are not available in your laboratory. Contract testing brings a real added value!

As there are many different needs, we offer:

**A laboratory and its network of partners for a complete characterization of a material over a wide range of temperatures (-196°C to 2400°C), pressures (primary vacuum to 500 bar) and atmospheres (inert, oxidizing and reducing) :**

- Characterization of the composition (TGA, TGA-GC/MS, FTIR, ICP-EOS, UV-Vis)
- Crystallographic characterization (DTA, DRX, MEB)
- Mechanical characterization (TMA, DMA)
- Physical characterization (DSC, porosimetry, refractometry, colorimetry)
- Thermal characterization (TGA, DSC, calorimetric bomb)

### Support from an experienced team:

- Training
- Analysis and Application support
- Contract testing
- Demonstrations

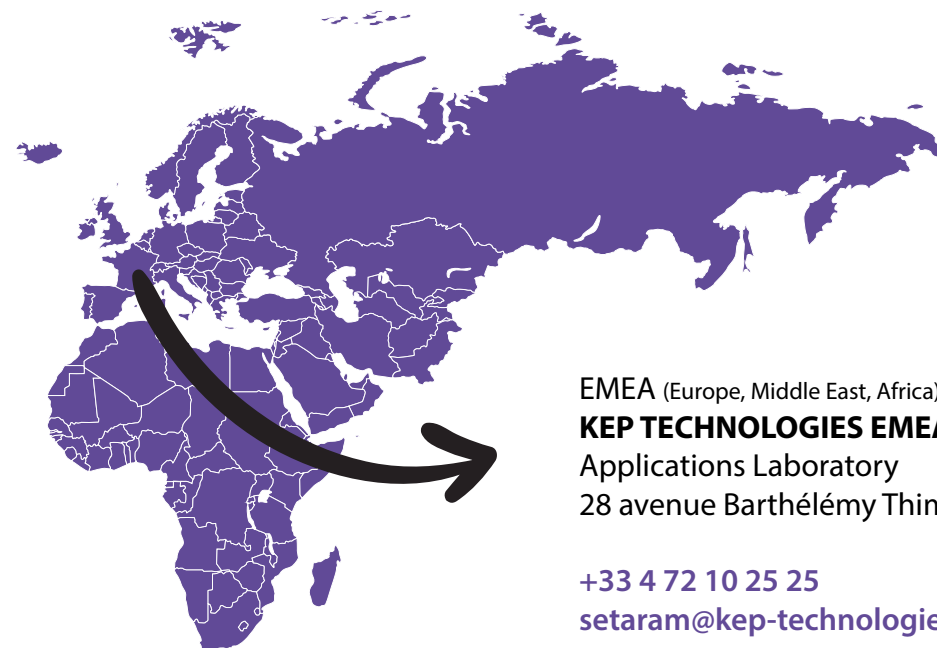
### Our solutions benefit from our vast experience and deliver real added value:

- Save time by outsourcing your tests to focus on your other daily challenges.
- Benefit from the qualification provided by an independent laboratory with local and international references.
- Access new techniques to support and develop your research or control capabilities.
- Reduce your financial risk by outsourcing your tests until you are sure you are making the right investment in analytical equipment.



*Can't find a technique in the catalog?  
Or just want to know more?*

**Email us at**  
**[setaram@kep-technologies.com](mailto:setaram@kep-technologies.com)**  
*We will get back to you within 72 hours*



EMEA (Europe, Middle East, Africa)

**KEP TECHNOLOGIES EMEA**

Applications Laboratory

28 avenue Barthélémy Thimonnier, 69300 Caluire, France

**+33 4 72 10 25 25**

**[setaram@kep-technologies.com](mailto:setaram@kep-technologies.com)**







## CHARACTERIZATION OF THE COMPOSITION



- Pyrolysis study (*TGA/DSC/EGA*)
- Combustion study (*TGA/DSC/EGA*)
- Qualification of evolved compounds (*TGA-GC/MS*)
- Proximate analysis (*TGA*)



### Partners

- Composition of organic materials (*FTIR*)
- Composition of inorganic materials (*ICP-EOS*)
- Quantification of volatile compounds (*TGA-μGC*)
- Dry extract determination (*Oven*)
- Water titration (*Karl Fisher*)
- Protein quantification (*UV-Vis*)

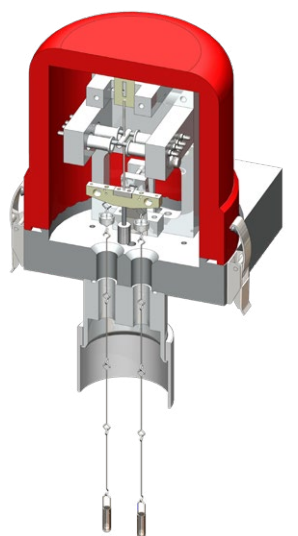


### Mass variation

Thermogravimetry (TGA) measures mass variation in a material (subjected to temperature change in a controlled atmosphere).

All SETARAM balances satisfy the highest accuracy and stability criteria.

Properties measured by thermogravimetry (TGA) include corrosion, pyrolysis, adsorption / desorption, loss of solvent, oxidation / reduction, hydration / dehydration, decomposition, carbon black, etc.







## CRYSTALLOGRAPHIC CHARACTERIZATION



### Our services

- Temperature and heat of crystallization (*DTA/DSC*)
- Crystallinity ratio (*DSC*)
- Temperature and heat of phase transition (*DTA/DSC*)
- Temperature and heat of melting (*DTA/DSC*)



### Partners

- Structure of crystalline materials (*DRX*)
- Morphological characterization (*MEB*)



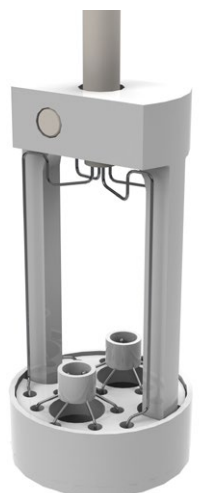
### Temperature measurement

DTA – Differential Thermal Analysis measures the temperature difference between a sample and a reference material (subjected to the same temperature variation in a controlled atmosphere).

DTA measures the transformation temperature in all categories of materials.

SETARAM offers the widest temperature range of all DTA systems (from  $-150^{\circ}\text{C}$  to  $2400^{\circ}\text{C}$ ) using high-precision tri-couple probes.

Properties measured by DTA include phase changes, glass transition, melting, evaporation, sublimation, crystallization, pyrolysis, etc.







## MECHANICAL CHARACTERIZATION



### Our services

- Coefficient of thermal expansion (TMA)
- Sintering study (TMA)
- Softening temperature (TMA)



### Partners

- Vicker hardness test
- Shore hardness test
- Stiffness determination (DMA)
- Fatigue testing (DMA)
- Young modulus determination (DMA)
- Shear modulus determination (DMA)

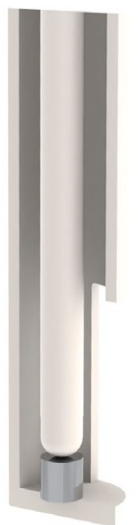


### Dimension variation

Thermomechanical analysis (TMA) measures the deformation of a sample under constant stress against time or temperature, with a programmed temperature.

The vertical design of SETARAM's TMA systems enables working with very low loads, applying only negligible force to the sample.

Properties measured by thermomechanical analysis (TMA) include thermal expansion coefficients, softening, sintering, glass transition, etc.





## PHYSICAL CHARACTERIZATION



### Our services

- Heat Capacity (*DSC*)
- Solid Fat Index (SFI) (*DSC*)
- Wax appearance temperature (WAT) (*DSC*)
- Induction time to oxydation (*DSC*)
- Glass transition temperature (*DSC/TMA*)
- Curie point temperature (*DTA*)



### Partners

- Density and volumic mass determination
- Porosity determination (Mercury porosimetry)
- Newtoniens fluids viscosity determination
- Pour point determination
- Interfacial tension determination
- Liquid-solid contact angle determination
- Refractive index determination (Refractometry)
- Saturated vapor pressure determination
- Sample color determination (Colorimetry)



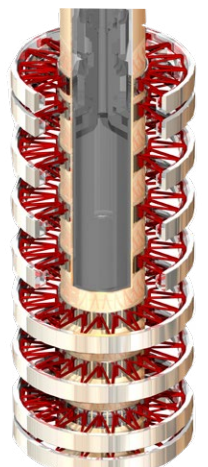
### Heat flow measurement

DSC – Differential Scanning Calorimetry – measures the heat flow difference between a sample and a reference material (subjected to the same temperature variation in a controlled atmosphere).

DSC determines the temperature and heat of transformation.

SETARAM offers the most complete choice of DSCs (from QC systems to the highest sensitivity DSC, and 3D DSC Sensor inside)

Properties measured by DSC include phase changes, glass transition, melting, purity, evaporation, sublimation, crystallization, pyrolysis, heat capacity, polymerization, denaturation / aggregation, compatibility, mixtures, reactions, etc.





## THERMAL CHARACTERIZATION



### Our services

- Thermal stability (*TGA/DSC/EGA*)
- Temperature and heat of evaporation (*DSC/TGA/EGA*)
- Temperature and heat of hydration/dehydration (*DSC/TGA/EGA*)
- Heat of adsorption/desorption (*TGA/DSC/EGA*)
- Temperature and heat of gelatinisation (*DSC*)
- Temperature and heat of aggregation (*DSC*)
- Temperature and heat of denaturation (*DSC*)
- Temperature and heat of reaction (*Calorimetry*)
- Temperature and heat of polymerisation (*DSC*)
- Oxydo/reduction study (*TGA/DSC*)



### Partners

- Inferior or superior calorific value (*Calorimetric bomb*)
- Flammable point
- Flash point



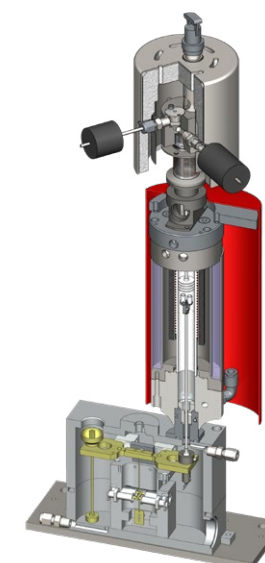
### Simultaneous thermal analysis

Thermogravimetric Analysis (TGA) measures the mass loss or gain of a sample of material as a function of time or temperature when it is heated or cooled under a certain temperature profile in a controlled atmosphere.

Simultaneous thermal analysis (TG-DTA or TG-DSC) additionally allows the corresponding heat effects to be qualified or quantified.

Hyphenated techniques, also known as Evolved Gas Analysis (EGA) have proved particularly interesting for the investigation of the chemistry of a reaction or thermal decomposition owing to the identification of the evolved species.

SETARAM instruments can be coupled with any FTIR, MS and GCMS instruments



CONTRACT TESTING SUMMARY

Our resources and experience allow us to characterize all the thermal properties of your materials. We can also combine the techniques for an optimal analysis.

Contact us for pricing whilst providing the following information:

- Temperature and speed range
- Isothermal time
- Atmosphere
- Sample type / Nb / Quantity

PROPERTIES	THERMAL EVENT T°	THERMAL EVENT T° & HEAT	MASS CHANGE	DIMENSION CHANGE	GAS ANALYSIS
Activation energy / Pre-exponential factor	•	✓	✓	•	•
Adsorption	✓	✓	✓	•	•
Aggregation	•	✓	•	•	•
Carbon black content	•	•	✓	•	✓
Combustion	✓	✓	✓	•	✓
Compatibility	•	✓	•	•	•
Corrosion	•	✓	✓	•	•
Crystallization	✓	✓	•	•	•
Crystallinity rate	✓	✓	•	•	•
Curie point	✓	✓	•	•	•
Decomposition	✓	✓	✓	•	✓
Denaturation	•	✓	•	•	•
Desorption	•	✓	✓	•	✓
Evaporation	✓	✓	✓	•	✓
Gelatinization	•	✓	•	•	•
Glass transition	✓	✓	•	✓	•
Hazard evaluation	✓	✓	✓	•	✓
Heat Capacity	•	✓	•	•	•
Heat of mixing	•	✓	•	•	•
Hydration / dehydration	✓	✓	✓	•	•
Loss of solvent	•	✓	✓	•	✓
Melting	✓	✓	•	✓	•
Oxidation Induction Time (O.I.T.)	•	✓	✓	•	•
Oxidation	✓	✓	✓	•	•
Phase transition	✓	✓	•	•	•
Polymerization	•	✓	•	•	•
Purity	•	✓	•	•	•
Pyrolysis	✓	✓	✓	•	✓
Reduction	✓	✓	✓	•	✓
Sintering	•	•	•	✓	•
Softening	•	•	•	✓	•
Solid Fat Index (SFI)	•	✓	•	•	•
Sublimation	✓	✓	✓	•	•
Thermal expansion coefficient	•	•	•	✓	•
Thermal stability	✓	✓	✓	✓	•
Wax Appearance Temperature (WAT)	•	✓	•	•	•
Young's modulus	•	•	•	✓	•
TECHNIQUES	DTA	DSC OR CALVET TYPE CALORIMETRY	TGA	TMA	EGA MS FTIR OR GC/MS

The table is not exhaustive, please contact us to discuss your needs.



Switzerland – France – China – United States – India – Hong Kong  
For contact details: [www.setaramsolutions.com](http://www.setaramsolutions.com) or [setaram@kep-technologies.com](mailto:setaram@kep-technologies.com)

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