# Key Technical Data

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| DIL 402 *Expedis Supreme* and *Select* | |
|---|---|
| Design | Pushrod dilatometer, single or dual system |
| Furnaces | Different types, interchangeable: steel, copper, $SiO_2$, SiC (optional furnace for fast cooling available) ; Rh, graphite (only for *Supreme* version) |
| Heating rates | Depending on furnace type:<br>▪ Steel, copper, fused silica, silicon carbide: 0.001 … 50 K/min<br>▪ Graphite: 0.001 … 100 K/min |
| Cooling systems | Depending on furnace: Vortex, $LN_2$-device, air compressor |
| Sample holder systems | $SiO_2$, $Al_2O_3$, graphite (*Supreme* version), user interchangeable<br>All sample holders are available as<br>▪ Single system (one pushrod)<br>▪ System with two pushrods usable in dual or differential mode<br>▪ $Al_2O_3$ tension sample holder*<br>$SiO_2$ and $Al_2O_3$ sample holders can be purchased as tube or rod design |
| Sample dimensions | Max. length: 52 mm (graphite furnace: 25 mm)<br>Diameter (single): standard 12 mm, optional 19 mm<br>Diameter (dual): 8 mm |
| Automatic sample length determination | Yes, in expansion mode |
| Displacement system | *NanoEye* |
| Temperature accuracy / precision / resolution | 1 K / 0.1 K / 0.001 K |
| Thermal stability (isothermal) | ± 0.02 K |
| Temperature calibration | Displacement method (by using metal references and protective disks) or via c-*DTA*® (optional for *Select* version; incl. endo/exothermal effects) |
| Measuring range | ± 25000 µm (*Supreme* version)<br>± 10000 µm (*Select* version) |
| ΔL Resolution | 0.1 nm (*Supreme* version)<br>1 nm (*Select* version) |
| $\Delta L/L_0$ Repeatability | 0.001 % |
| $\Delta L/L_0$ Accuracy | 0.002 % |
| Force range (load at the sample) | 10 mN … 3 N |
| Change of force | *Supreme* version: various options, incl. modulated forces<br>*Select* version: changeable per segment (constant & ramp) |
| Force resolution | 0.001 mN |
| Gas atmosphere | Inert, oxidizing, reducing, vacuum |
| Gas control | MFC<br>▪ Standard: 1 x protective gas<br>▪ Optional: 1 x protective gas, 2 x purge gas |
| Oxygen Trap System (OTS®) | Optional, for single and for dual sample holder systems |
| Software | Windows 7 32/64 bit Professional®, Windows 7 32/64 bit Enterprise®, Windows 7 32/64 bit Ultimate®, Windows 8.1 Pro® and Enterprise® Windows 10 Pro® and Enterprise® |

* Please note, using the tension sample holder has an influence on the noise behavior.

# Configurations

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| Feature | *Supreme* | *Select* | *Supreme* HT |
|---|---|---|---|
| Temperature range | -180°C … 2000°C | -180°C … 1600°C | (-180°C)* … RT … 2800°C |
| Measuring range | 50 mm (± 25 000 µm) | 20 mm (± 10 000 µm) | 50 mm (± 25 000 µm) |
| Δl Resolution (over entire measuring range) | 0.1 nm | 1 nm | 0.1 nm |
| Double furnace sliding carrier | ■ | ■ | N/A |
| Motorized furnace operation | □ | □ | ■ |
| Vacuum-tight design | ■ | ■ | ■ |
| Automatic Evacuation System – *AutoVac* | □ | □ | □ |
| Mass Flow Controller (MFC) – single/triple | ■ / □ | ■ / □ | ■ / □ |
| Available Cooling Devices | Vortex, $LN_2$ | Vortex, $LN_2$ | Vortex, $LN_2$ |
| Electrical temperature control of the measuring cell | ■ | ■ | ■ |
| Force change (ramp, step at each new segment) | ■ | ■ | ■ |
| Force modulation | ■ | □ | ■ |
| Single/double DIL | ■ / □ | ■ / □ | ■ / □ |
| Automatic sample length detection | ■ | ■ | ■ |
| Softening Point detection | ■ | ■ | ■ |
| *Density Determination* | ■ | □ | ■ |
| c-*DTA*® | ■ | □ | ■ ** |
| RCS (Rate-Controlled Sintering) | ■ | □ | ■ |
| *Identify* | ■ | □ | ■ |
| Evolved gas analysis (coupling with GC-MS/QMS and/or FT-IR) – for SiC furnace | □ | □ | □ |

* DIL 402 *Expedis Supreme* HT with adapter for standard furnaces
** Not above 2000°C, only by thermocouple operation

Both instrument models work on the basis of DIN 51045, ASTM E228, ASTM D696 or DIN EN 821.

■ Included in standard configuration
□ Optional
N/A Not applicable