

## **Dilatometers**



### **Orton Dilatometer Features**

- **Reliable operation and rugged construction**
- **Models for -170°C and 1700°C**
- **Shunt-tapped, wire-wound elements for precise temperature uniformity**
- **Operate with atmosphere or in vacuum**
- **Microprocessor-based temperature programming and control**
- **Silicon carbide or molybdenum disilicide heating elements available**
- **Custom designed units available**

Orton Dilatometers offer an important analytical technique for scientists concerned with dimensional properties of materials as a function of temperature.

Dilatometer applications include expansion coefficient, softening point, glass transition temperature, curie point, crystalline transformation, phase transition, shrinkage, sintering, creep and relaxation properties.

| SPECIFICATIONS              |                      | DIL 2010 B   | DIL 2010 C   | DIL 2010 STD     | DIL 2012 STD      | DIL 2016 STD      |
|-----------------------------|----------------------|--|--|------------------|-------------------|-------------------|
| <b>Temperature Range</b>    |                      | RT to 1000°C   | RT to 1000°C or<br>-170 to 300°C                       | RT to 1000°C     | RT to 1200°C      | RT to 1600°C      |
| <b>Accuracy</b>             | quartz               | ±0.35%   | ±0.25%   | ±0.50%           | ±0.50%            | ±0.50%            |
|                             | alumina              |  |  | ±0.75%           | ±0.75%            | ±0.75%            |
|                             |                      | -----% of chemically pure platinum at maximum operating temperature-----   |  |                  |                   |                   |
| <b>Repeatability</b>        |                      | -----within ±1/2 of accuracy specification (typically 0.0006mm)-----   |  |                  |                   |                   |
| <b>LVDT</b>                 | linear range         | ±2.54mm  | ±2.54mm  | ±2.54mm          | ±2.54mm           | ±2.54mm           |
|                             | linearity            | -----0.25% full range -----  |  |                  |                   |                   |
|                             | contact pressure     | 113 gram (fixed)   | ----- 4 gram or more (adjustable) -----                |                  |                   |                   |
| <b>Sample Size (max)</b>    | length               | 50mm   | 100mm  | 100mm            | 50mm              | 50mm              |
|                             | diameter             | 20mm   | 10mm   | 20mm             | 20mm              | 20mm              |
| <b>Sample Holder/Rod</b>    | quartz               | standard   | standard   | standard         | optional standard | optional standard |
|                             | alumina              |  |  |                  |                   |                   |
| <b>Thermocouple</b>         |                      | Type N   | Type N   | Type S           | Type S            | Type S            |
| <b>Furnace</b>              |                      | Kanthal-tube   | nichrome-split shell<br>liquid reservoir<br>& cryostat | Kanthal-tube     | Kanthal-tube      | Silicon Carbide   |
| <b>Heating Rates</b>        |                      | up to 20°C/min   | up to 30°C/min   | up to 30°C/min   | up to 30°C/min    | up to 15°C/min    |
| <b>Electrical</b>           | 50/60 Hz<br>grounded | 120V/15A   | 120V/15A   | 120V/15A         | 120V/15A          | 200-240V/20A      |
|                             |                      | ----- 200-240V available -----   |  |                  |                   |                   |
| <b>Reference Standard</b>   |                      | ----- 2.5mm high purity alumina (Oxygen Free High Conductivity Copper for cryogenic) -----   |  |                  |                   |                   |
| <b>Safety Shut-off</b>      |                      | <ul style="list-style-type: none"> <li>• in software - based on deviations from standard programming</li> <li>• adjustable shrinkage limits (for rapid deformation materials - glass)</li> <li>• optional overtemp protection using separate thermocouple</li> </ul>   |  |                  |                   |                   |
| <b>Control</b>              |                      | -----PID Control - 9 heat or cool rates/limit temps/hold times - delay start-----  |  |                  |                   |                   |
| <b>Electronics</b>          |                      | <ul style="list-style-type: none"> <li>• microprocessor based control in dilatometer cabinet</li> <li>• filters on electrical input line, thermocouple, LVDT</li> <li>• software filter processing of signals from LVDT</li> <li>• thermocouple resolution - 0.1°C</li> <li>• power supply output - +5VDC, +12VDC, -12VDC</li> <li>• short circuit protected - watchdog circuit for electronics malfunction - self-test diagnostics</li> </ul> |  |                  |                   |                   |
| <b>Software</b>             |                      | Operating and Analysis Software with many features for use with Windows® 95 or higher. Provides graphical or tabular reporting.  |  |                  |                   |                   |
| <b>Output</b>               | computer             | Yes  | Yes  | Yes              | Yes               | Yes               |
| <b>Atmosphere control</b>   |                      | not available  | option   | option           | option            | option            |
| <b>Water cooling – head</b> |                      | not available  | option   | option           | option            | option            |
| <b>Exchangeable furnace</b> |                      | option   | option   | option           | option            | option            |
| <b>Installation</b>         |                      | -----installation and training can be arranged-----  |  |                  |                   |                   |
| <b>Dimensions</b>           | <b>Cabinet</b>       | <b>Inch (cm)</b>   | <b>Inch (cm)</b>                                       | <b>Inch (cm)</b> | <b>Inch (cm)</b>  |                   |
|                             | length               | 28 (71)  | 49 (125)   | 49 (125)         | 49 (125)          | 49 (125)          |
|                             | width                | 14 (36)  | 14 (36)  | 14 (36)          | 14 (36)           | 14 (36)           |
| <b>Furnace</b>              | height               | 15 (38)  | 24 (60)  | 17 (43)          | 17 (43)           | 17 (43)           |
| <b>Approx. shipping wt.</b> |                      | 68 kg.   | 72 kg.   | 68 kg.           | 68 kg.            | 141 kg.           |

