

# Thermo Mechanical Analyzer TMA 7000



## The New World in TMA/SS

### High Sensitivity - Great Flexibility

- New Technology for measurement optimization
- Wide measurement range ( $\pm 5$  mm)
- Stress-Strain, Creep, Stress-Relaxation and DMA measurements

### Automatic Gas Control Unit\*

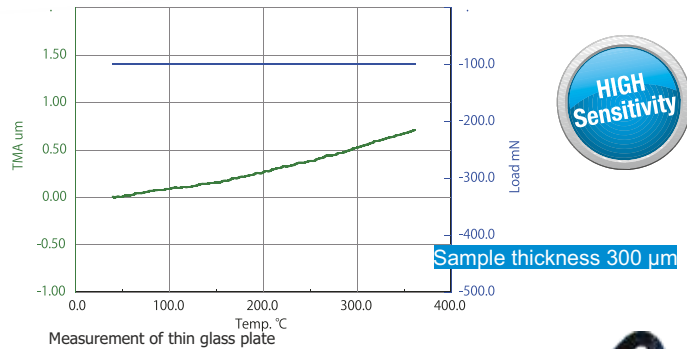
- Mass Flow controllers for precise flow control

### The New Cooling Systems

- The integrated LN<sub>2</sub> gas control unit guarantees cooling efficiency
- The electrical cooling unit helps to reduce running costs

### System Expandability\*

- The optional cooling systems, Swelling Measurement, Humidity Control and High Mass, High Volume TGA allow configurations for all application needs



### Dramatically improved basic performance

- Our newly developed optimization technology minimizes the noise level of the TMA signal and doubles sensitivity.
- Optimized to measure minor changes of low- expansion material and thin films.

### Designed to meet all Application needs

- Wide dynamic ranges: Measurement range  $\pm 5$  mm; Load range  $\pm 5.8$  N; Max sample size 10 mm diameter and 25 mm length.
- Stress-Strain, Creep, Stress-Relaxation, and DMA measurements increase the value of use above the conventional TMA measurements such as thermal expansion, glass transition and softening.
- The complete range of measurement probes covers all application needs.



### Complete Line of Cooling Units

- The Ln2 Dewar Vessel attached to the furnace can easily perform measurements from -170°C
- The powerful Auto Ln2 Gas Cooling Unit uses the cold nitrogen gas to allow heating and cooling measurements in the temperature range from -150 to 600°C automatically. The new furnace design and the improved electronics increase cooling efficiency by more than 30%.
- High performance, easy handling and minimal running costs are the key features of the unique Electrical Cooling Unit in the temperature range from -60 to 450°C.
- The Auto Air Cooling Unit uses compressed air to cool the furnace down to room temperature after measurement to improve sample throughput



Electrical Cooling Unit



Ln<sub>2</sub> Gas Cooling Unit

Model name	TMA7100	TMA7300
Temperature range	-170 to 600°C	Ambient to 1500°C
Sample cylinder	Quartz, Metal*	Alumina
Probe	<ul style="list-style-type: none"> <li>◦ Quartz Expansion Probe ◦ Quartz Penetration Probe*</li> <li>◦ Quartz Cone Probe ◦ Quartz Tension Probe*</li> <li>◦ Quartz Bending Probe ◦ Metal Tension Probe*</li> <li>◦ Volume Expansion Accessory*</li> </ul>	<ul style="list-style-type: none"> <li>◦ Alumina Expansion Probe</li> </ul>
Probe supporting method	Cantilever	
Measurement range	$\pm 5$ mm	
RMS noise / sensitivity	0.005 $\mu$ m / 0.01 $\mu$ m	
Load range / Resolution	$\pm 5.8$ N / 9.8 $\mu$ N	
Scanning rates	0.01 to 100°C/min	
Maximum sample dimensions	Expansion, Penetration: 10( $\Phi$ ) x 25 (L) mm Tension: 5 (W) x 1 (T) x 25 (L) mm	10 ( $\Phi$ ) x 25 (L) mm
Sample length	Automated measurement	
Atmosphere	<ul style="list-style-type: none"> <li>◦ Air, Inert gas ◦ Vacuum (to 1.3 Pa)*</li> <li>◦ Swelling measurement* ◦ Humidity control measurement*</li> </ul>	<ul style="list-style-type: none"> <li>◦ Air, Inert gas</li> <li>◦ Vacuum (to 1.3 Pa)*</li> </ul>
Stress control mode	Constant: $\pm 5.8$ N, Constant rate loading: $9.8 \times 10^{-2}$ to $9.8 \times 10^6$ mN/min, Sinusoidal loading: 0.001 to 1 Hz, Combination: maximum 40 steps	
Strain control mode	Constant: $\pm 5000$ $\mu$ N, Constant rate strain control: 0.01 to $10^6$ $\mu$ m/min, Sinusoidal strain control: 0.001 to 1 Hz, Combination: maximum 40 steps	
Gas purge control	◦ Gas Controller* ◦ Mass Flow Controller*	
Cooling unit	<ul style="list-style-type: none"> <li>◦ LN<sub>2</sub> Dewar Vessel* ◦ Auto LN<sub>2</sub> Gas Cooling Unit*</li> <li>◦ Electrical Cooling Unit* ◦ Auto Air Cooling Unit*</li> </ul>	◦ Auto Air Cooling Unit*
Dimensions	390 (W) x 550 (D) x 740 (H) mm	

\*Optional

**Hitachi High-Tech Science Corporation**

Head Office Sales Division  
24-14, Nishi-shimbashi, 1-chome, Minato-ku Tokyo 105-001, Japan  
Telephone: +81-3-6280-0062

<http://www.hitachi-hitec-science.com/>

**THASS**

Thermal Analysis & Surface Solutions  
Pfungstweide 21 61169 Friedberg Germany  
Telefon: +49-6031-1622-321  
Internet: [www.thass.net](http://www.thass.net)  
E-Mail: [info@thass.net](mailto:info@thass.net)