

# Testorr™

## Materials Testing Furnace System

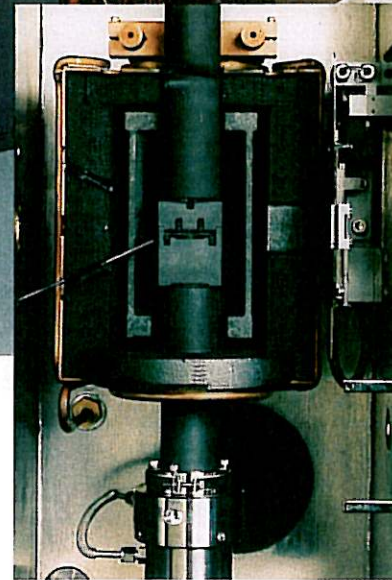
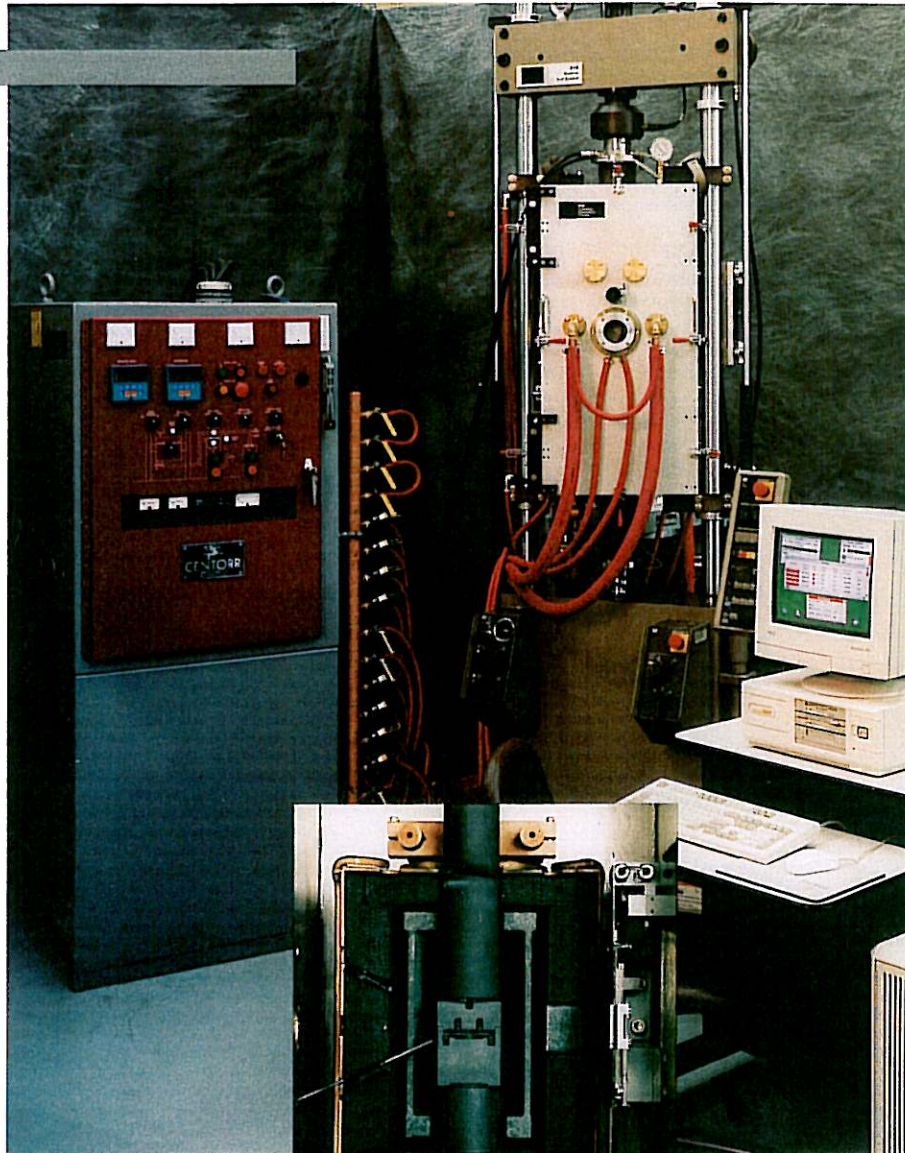
The Centorr Vacuum Industries Testorr Furnace System provides a variety of tightly controlled, elevated-temperature environments for materials testing within the confines of a standard testing frame.

A choice of five interchangeable hot zones, each with its own thermal and atmosphere capabilities, are available for use with the standard vacuum chamber. Collectively, the heating systems provide for uniform specimen temperatures of 300° C to 2300° C in a wide range of atmospheres. In the high-temperature region (1200° to 2300° C), a temperature uniformity of better than  $\pm 5^\circ$  C is typical.

In addition to providing temperatures up to 2500° C, the Testorr Furnace System has been designed to interface with optical and contact extensometers, hydraulic grips, internal load cells and fixtures (3- and 4-point bend, compression, etc.) used for high-temperature materials testing. Appropriately sized ports are provided for water cooling, hydraulic and electrical connections to each of the devices listed above.

### Features:

- Five interchangeable, resistance-heated hot zones
- Temperatures of 300° C to 2500° C
- Pressure range of  $10^{-6}$  torr to 2 psig
- Tensile testing hot zone has a 3.25" grip-to-grip distance
- Hot zones are designed for use in Argon, Helium, Hydrogen, Nitrogen, Oxygen, or vacuum atmospheres
- Chamber is designed for use with optical and contact extensometry
- Temperature control accuracy of  $\pm 0.01\%$  full scale
- Chamber is designed to accommodate various testing requirements



 **CENTORR**  
Vacuum Industries 

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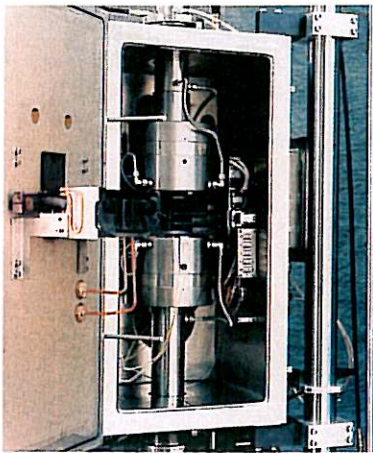
HOT ZONE MODEL	MAXIMUM ELEMENT TEMP.	HEATING ELEMENT	TEMPERATURE UNIFORMITY	ATMOSPHERE COMPATIBILITY*	VACUUM COMPATIBILITY**
2 x 2-G-G-20 2 x 2-G-G-25	2000° C 2500° C	Graphite 2" (51 mm) D 2" (51 mm) H	±5° C over .5" (13 mm) gauge length	Ar, N <sub>2</sub> , He	RT-1800° C to 1 x 10 <sup>-6</sup> Torr above 1800° C****
4 x 8-G-G-20 4 x 8-G-G-25	2000° C 2500° C	Graphite 4" (102 mm) D 8" (203 mm) H	±10° C within 3.5" (89 mm) D 6" (152 mm) H	Ar, N <sub>2</sub> , He	RT-1800° C to 1 x 10 <sup>-6</sup> Torr above 1800° C****
4 x 8-W-D-20 4 x 8-W-A-25	2000° C 2500° C	Tungsten Mesh 4" (102 mm) D 8" (203 mm) H	±10° C within 3.5" (89 mm) D 6" (152 mm) H	Ar, N <sub>2</sub> , He, H <sub>2</sub> ***	RT-2000° C to 1 x 10 <sup>-6</sup> Torr 2000-2500° C****
6 x 8-W-D-20 6 x 8-W-A-25	2000° C 2500° C	Tungsten Mesh 6" (152 mm) D 8" (203 mm) H	±10° C within 5" (127 mm) D 6" (152 mm) H	Ar, N <sub>2</sub> , He, H <sub>2</sub> ***	RT-2000° C to 1 x 10 <sup>-6</sup> Torr 2000-25000° C****
3 x 8-K-I-11	1100° C	Kanthal 3" (76 mm) D 8" (203 mm) H	±10° C within 2.5" (64 mm) D 6" (152 mm) H	Air, Ar, N <sub>2</sub> , O <sub>2</sub>	RT-1100° C to 1 x 10 <sup>-3</sup> Torr

\* Custom designed systems are available for corrosive gases.

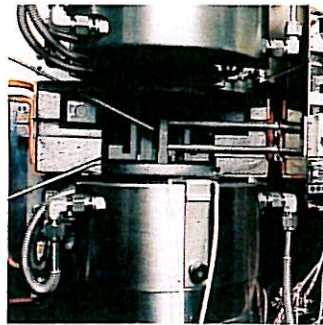
\*\* Operation from 10<sup>-2</sup> torr to 10<sup>-6</sup> torr requires selection of Model 06A6 diffusion pumping, turbomolecular or cryogenic pumping systems.

\*\*\* Flammable gas safety systems are added to the Testorr furnace if the option is exercised.

\*\*\*\* Consult vapor pressure chart.



Testorr furnace system configured for tensile testing of composites at 1500° to 2300° C.



Hydraulic wedge grips and high-temperature contact extensometers (MTS Systems Corp.) are in position for testing in conjunction with the low-profile (3.25" grip-to-grip distance) hot zone. The gaps in the heating element are precisely engineered to accommodate optical extensometry.



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