

*“Degrees  
Ahead in  
Quality”*



**The FR Series Universal Application Furnace is designed to provide years of continuous service while requiring a low investment cost.**

Applications for this furnace include:

- \* Annealing
- \* Brazing
- \* Diffusion Bonding
- \* Extensometry
- \* Hot Pressing
- \* Quenching
- \* Melting
- \* Sintering
- \* Tensile Testing
- \* Crystal Growing

Generally, the basic furnace System includes the following components:

- \* Furnace Assembly
- \* Power Supply
- \* Heat Zone
- \* Evacuation System
- \* Inert Gas System



The furnace can be rated up to a maximum operating temperature of 3000°C (5432°F) and will operate in vacuum, inert atmospheres, Nitrogen and wet or dry Hydrogen.

#### FURNACE ASSEMBLY:

The chamber and front door are double walled, 304L stainless steel. Each component is electropolished to attain highest vacuum quality. Ports are incorporated in the chamber and front door for a sight window, thermocouples or an optical pyrometer. Power to the rear half of the heating element is supplied by nickel plated water cooled power feedthroughs located on the rear surface of the main chamber. Power to the front element half is through silver plated copper knife switches. This eliminates the need for power cables to be mounted on the front door.

#### HEAT ZONE:

One half of the heating element and the side and top shield packs are mounted on the front door providing easy access to the work area. The element and shield packs can be supplied in Molybdenum, Tungsten or Tantalum depending on operating temperature. Work zone sizes range from 1 inch diameter x 2 inches high to 5 inches diameter x 10 inches high.

#### POWER SUPPLY:

Power supplies can be provided with any of these characteristics: single or three phase scott wired, 120, 208, 380 or 480 volts and 50 or 60 Hertz. A typical power supply incorporates a step down transformer, SCR, circuit breaker, contactor, amp and volt meters. Power supplies 25 kVA and above are housed in a free standing cabinet separate from temperature controls.

#### TEMPERATURE CONTROL:

Programmable process temperature controller and separate over temperature limiter are standard. Recorders and data logging devices specific to the Customer's requirements are available as options. Types of sensors include thermocouple, optical pyrometer or power transducer.

#### PUMPING SYSTEM:

Fully automatic PLC controlled pumping systems can be provided for the range of  $10^{-2}$  Torr (rough pump with mechanical pump only) through  $10^{-10}$  Torr (cryo and ion pumps). Our standard system is automatic and consists of a diffusion or turbomolecular high vacuum pump, a rotary vane or oil free scroll type mechanical pump, isolation valves and vacuum gauge controller. The system will consistently operate in the  $10^{-5}/10^{-6}$  Torr range.

#### INERT GAS/NITROGEN SYSTEM :

To allow operation using inert (Noble) gases or Nitrogen, a kit which includes inlet and outlet valves and a pressure/vacuum gauge is supplied.

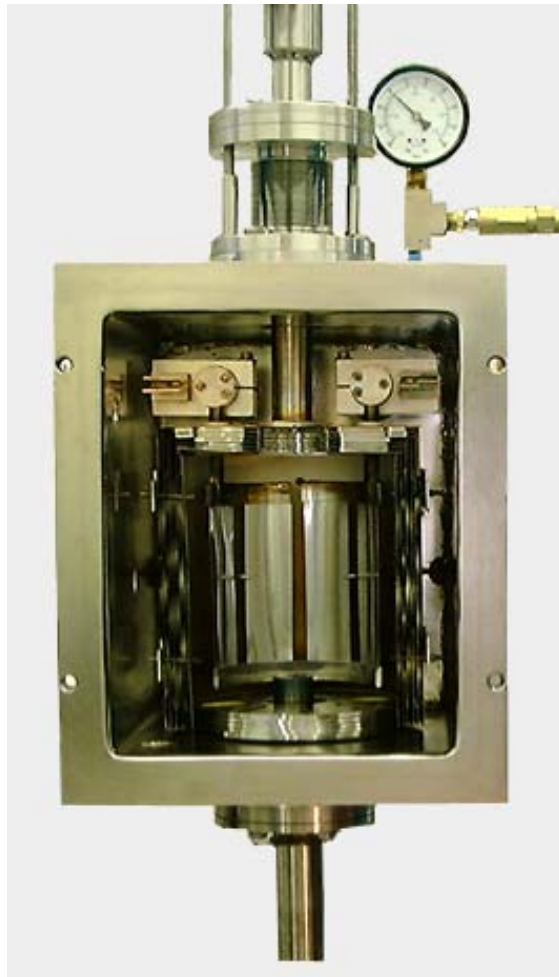
#### WET OR DRY HYDROGEN SYSTEM:

This is an optional system that can be manual or fully automatic using flow control and variable percent mixing of Hydrogen with other gases. All necessary safety interlocks and devices such as blow-off port, igniter, etc., are included with this system. The system conforms to NFPA 86 Standard for Ovens and Furnaces.

For a comprehensive review of your specific requirements, please contact OXY-GON'S technical sales personnel for a customized proposal with specifications.



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#### REFRACTORY METAL HEAT ZONE:

This photograph is the chamber portion of an FR Series Universal Application Furnace used for tensile testing. The top pull rod is movable while the bottom pull rod remains stationary. The chamber is mounted into a commercially available testing apparatus.

**OXY-GON**  
INDUSTRIES, INC.

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