

*“Degrees  
Ahead in  
Quality”*



**OXY-GON Hot Press Furnaces are “state of the art” design. They are constructed for ease of operation and will provide years of continuous service.**

Applications for this furnace include:

- \* Ceramic/metal matrix and intermetallic composites
- \* Diffusion Bonding studies
- \* Hot Compacting of oxides, nitrides, borides, carbides, sulfides and mixtures thereof to near theoretical densities
- \* Sintering

Generally, the basic furnace System includes the following components:

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



The hot press can be rated up to a maximum operating temperature of 2500°C (4532°F) and will operate in vacuum, inert atmospheres, Nitrogen and Hydrogen.

<b>Force:</b>	5, 10, 15, 25, 40, 50, 75, 100 and 150 Tons
<b>Heat Zone Sizes:</b>	To accept dies up to 14" diameter x 20" high
<b>Heating Elements:</b>	Tungsten, Molybdenum, or High Purity Graphite; all with appropriate heat shield/insulation
<b>Temperatures:</b>	500°C to 2500°C
<b>Atmospheres:</b>	Gas at 2 PSIG to 2500°C, vacuum from 10 <sup>-2</sup> Torr to 10 <sup>-5</sup> Torr at 2300°C

#### 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 two thirds 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 one third element is by nickel plated water cooled power feedthroughs located on the front surface of the door.

#### HEAT ZONE:

The split heat zone is designed to allow full access to the interior when the front door is opened which makes it easy to load and remove die and punch assemblies. The operator can easily access punch and die assemblies within arm's reach.

#### POWER SUPPLY:

Power supplies can be provided with any of these characteristics: single or three phase wired, 200 to 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.



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

#### **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.

#### **POST and PLATEN PRESS FRAME:**

A press frame of this design offers the most in adjustment accuracy. The top section of the vertical posts are threaded so the axis of the load train can be aligned. Lateral adjustment is limited but adequate to assure that the lower rod precisely “shadows” the upper rod.

#### **COMPRESSION RODS:**

Water cooled cold compression rods are made from hardened 17-4 PH stainless steel. The top cold rod is connected to the furnace chamber by a flexible stainless steel metal bellows. The bottom cold rod is stationary and connected to the chamber with a compression seal. Hot compression rods are made from ISO-63 high strength graphite and connected to the cold rods. A pyrolytic spacer is between the hot/cold compression rods to act as a thermal barrier thus decreasing heat loss and improving temperature uniformity.

#### **HYDRAULIC SYSTEM:**

The hydraulic system consists of a double-acting top mounted cylinder with servo valve control and free standing pump/reservoir. Pressure is sensed by an in line mounted load cell and controlled by a programmable controller. Travel is monitored by a digital LVDT indicator. Options include a second bottom mounted independently controlled hydraulic cylinder for hot ejection.

#### **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.

#### **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.



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