Quintus®
Hot Isostatic Presses

Hot isostatic pressing (HIP) is a densification process for both containerized powder shapes and containerless metal, plastic or ceramic parts. Items are placed in a furnace inside a vessel, argon gas is introduced, and pressure and temperature are simultaneously increased. Rapid and uniform cooling reduces cycle time, and can allow for heat treatment of parts.

HIP Applications

The HIP process works effectively with a wide range of metals, ceramics, and composites. See reverse for details.

Process Benefits

- One hundred percent densification increases strength and fatigue resistance of processed parts.
- Scatter band and scrap loss are reduced.
- Large, complicated parts and near-net shapes can be produced, resulting in reduced material and machining costs.
- Precise temperature and atmospheric control improves metallurgy of parts.
- Presses are designed for the ultimate in safe operation, and for reliable, continuous production to maximize capital return.

Capacities: Quintus® HIPs are designed for high-volume production operations requiring large work zones and maximum cycle life. Furnace diameters range from 10 to 66 inches, with lengths over 8 feet. Operating pressures extend from 10,000 to 30,000 psi, and temperature limits are in the 2000°C area.

Operation: After the parts are loaded into the furnace inside the vessel, the automatic pressure cycle is initiated. A computer and PLC controls vessel closure, ramping of pressure and temperature to setpoint, hold time, depressurization, and opening of the vessel. Cycles range from 3 to 8 hours, depending on material.

Design: With its prestessed and wire-wound vessel and yoke frame, the Quintus press is widely acknowledged to be the safest and most reliable pressure containment system ever designed. The yoke frame holds the threadless vessel end closures in place, eliminating stress concentrations in the body. The vessel meets "leak-rather-than-break" criteria, and has a calculated fatigue value of more than 30,000 cycles.

Uniform Rapid Cooling: Avure's standard URC system offers decreased cycle time, higher productivity, and combined solution heat treating. It can easily cool a HIP furnace with workload from 1260 to 400°C in less than 30 minutes. The Quintus vessel is designed for efficient heat transfer during rapid cooling.

System components: Quintus pressure vessel, yoke and frame, electric furnace with patented Uniform Rapid Cooling, compressor, vacuum pump, cooling pump and heat exchanger, pressure valve system, and electronic control system with PLC.

Quintus Model QIH 21.6-59-30
Installed at Lake City Heat Treating Corporation, Warsaw, Indiana.
Furnace dimensions: 21.6" dia. x 59" long.
Operating pressure: 30,000 psi at 1400°C with 80°C/min. Uniform Rapid Cooling.

Options:
- Gas chromatograph for analysis
- High Temperature Measuring System (HTMS) for temperatures above 1850°C
- Super Uniform Rapid Cooling to 500°C/minute

Standard Models (Other pressures and sizes available on request)

Molybdenum Furnace – 1260°C			Graphite Furnace – 2000°C		
Model Number*	**Inside Dia.**	**Height**	**Model Number***	**Inside Dia.**	**Height**
QIH 12.2-35-*	12.2"	35.0"	QIH 11.8-41.7-*	11.8"	41.7"
QIH 15.1-47.2-*	15.1"	47.2"	QIH 14.7-45.2-*	14.7"	45.2"
QIH 18.2-55-*	18.2"	55.0"	QIH 17-50.2-*	17"	50.2"
QIH 20.7-59-*	20.7"	59.0"	QIH 19.7-59-*	19.7"	59.0"
QIH 25.6-70.8-*	25.6"	70.8"	QIH 24.4-66.9-*	24.4"	66.9"
QIH 33.5-78.7-*	33.5"	78.7"	QIH 32.8-74.8-*	32.8"	74.8"
QIH 42.0-100-*	42.0"	100.0"	QIH 39.4-98.4-*	39.4"	98.4"
QIH 47.6-100-*	47.6"	100.0"	QIH 44.1-98.4-*	44.1"	98.4"
QIH 63.9-100-*	63.9"	100.0"	QIH 57.0-98.4-*	57.0"	98.4"

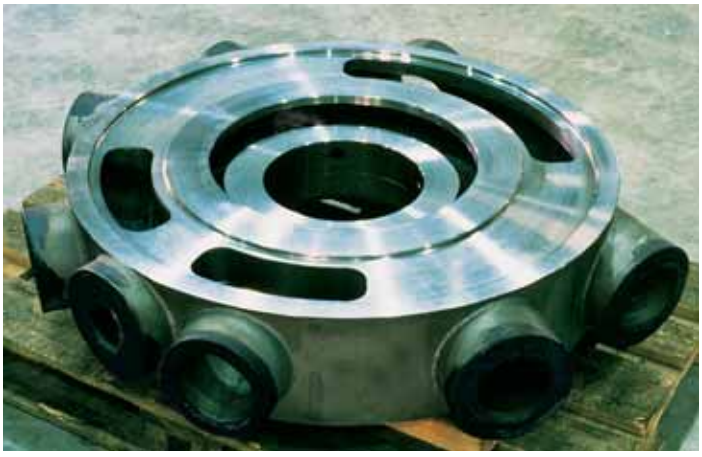
* Complete the Model Number by adding a suffix denoting one of the two standard max. operating pressures available: -15 (15,000 psi) or -30 (30,000 psi).

Contact factory for ASME code stamping, PED, CE mark, or other national code requirements.

HIP Applications

Hot isostatic pressing is applied to obtain 100% theoretical density of parts designed for high performance applications. Main HIP processes include defect healing of castings, consolidation of containerized powders to near-net shapes, post densification of containerless sintered parts, and diffusion bonding of dissimilar materials. Commonly HIPped materials are super alloys, titanium and aluminum alloys, high speed steels (HSS), stainless steels, cermets, refractory metals, carbides, engineered ceramics, metal and ceramic composites, and ferrites.

Silicon nitride parts produced to near-net shape. HIPping green bodies encapsulated in glass results in fully dense, intricately shaped ceramic parts.



Fully dense, near-net shaped powder metal parts can be produced in a single HIP cycle.

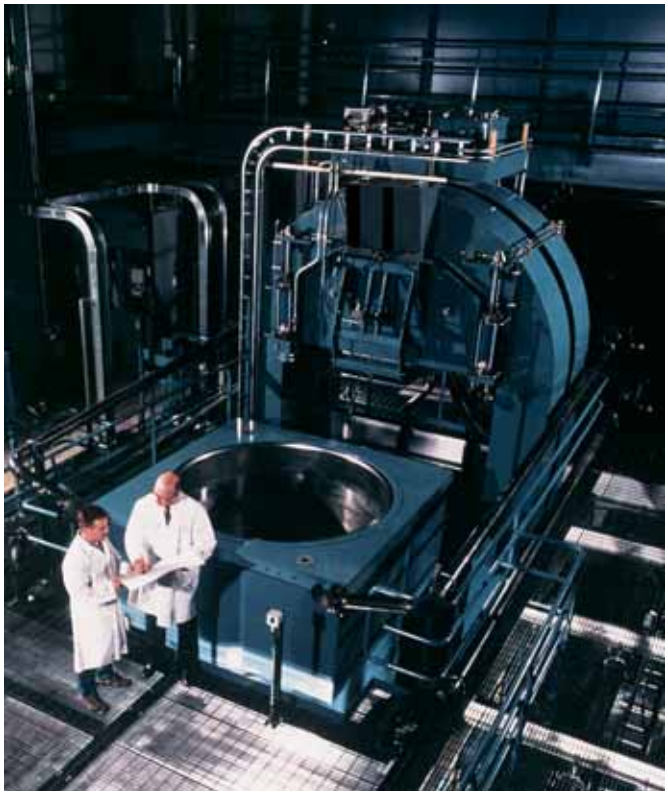
Cast prosthesis

Airfoil

Fan frame casting

Castings and sintered parts are commonly HIPped to eliminate internal voids and cracks. Design freedom is expanded because of improved mechanical properties and reduced scatter.

High-Volume Productivity



This Quintus Model QIH 66-100-15 is the largest hot isostatic press in the world. It was installed in 1998 at the Bodycote-IMT facility in Camas, Washington.

Furnace dimensions: 66" dia. x 100" long.
Operating pressure: 15,000 psi at 1260°C.
Two-fan base Uniform Rapid Cooling cools a full load from 1200 to 400°C in less than one hour.

AVURE

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Printed in U.S.A.