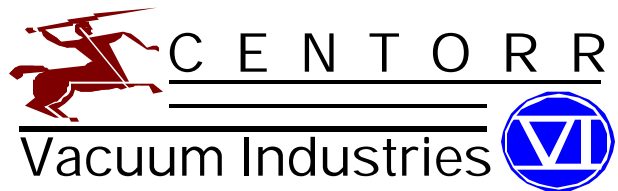
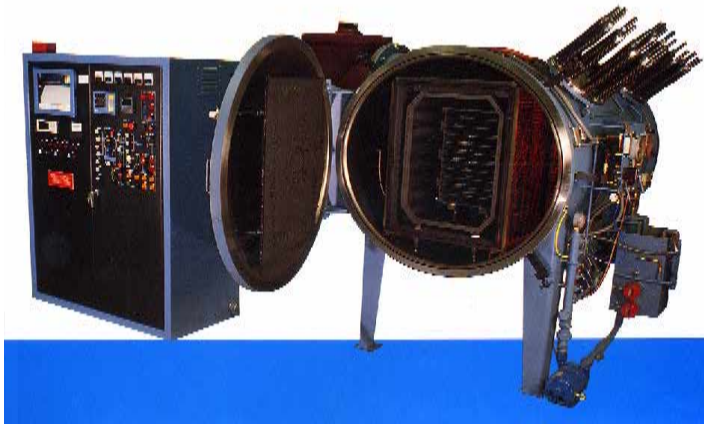


PRODUCT

INFORMATION



INJECTAVAC™ FURNACES SERIES 3700 - VACUUM / CONTROLLED ATMOSPHERE BATCH FURNACE



KEY FEATURES

- Cold Wall Vacuum furnace design with stainless steel inner and outer jackets with baffled water cooling.
- Industrial Programmable Controller with PLC or PC system with Intellution™ FIX32 HMI software customized by CVI for vacuum furnaces, with extensive data acquisition; and remote operation capabilities.
- CVI's patented Injectavac™ "BRS"™ Binder Removal System consisting of *large diameter* heat traced/insulated debind manifolding, and our self-purifying Once-through-oiling Mechanical pumps for 1st and 2nd stage binder removal
- CVI's Sweepgas™ process for subatmospheric wax removal using a mechanical pump and/or diffusion pumping system.
- Spent binder collection system and self-purifying pumps eliminate the disposal problems associated with disposal of toxic chemicals and gases.
- Heavy wall Graphite retort with staggered shelves and integrated gas plenum for consistent gas flow dynamics and efficient binder removal.
- Temperature uniformity of +/- 5°C.
- Operation from partial pressures of 10⁻² torr up to 1-3 psig positive pressures of Argon, Nitrogen, and Hydrogen.
- Our G-10503A positive pressure Hydrogen gas system with FM approval.
- Robust Once-through oiling Mechanical rotary vane pump and blower with the ability to hold vacuum levels of 1-20 torr during 2nd stage Polymer debinding.
- "Component setup" for full unobstructed access to chamber, vacuum pumps, and binder trap without cumbersome panels to remove.

The Injectavac™ furnace was pioneered by Centorr Vacuum Industries in the early 1980's for the debind and sinter of parts containing 1st and 2nd stage MIM binders. It has been updated for today's MIM technology to process injection molded parts from wax/polymer binder removal through sintering in one continuous cycle.

First stage wax binders are removed using a diffusion pump (subatmospheric evaporation) at dewax pressures less than 10⁻³ torr. A mechanical pump/blower combination is used at 1-20 torr pressures for 2nd stage Sweepgas™ Polymer removal, and final sintering is accomplished at partial pressures of 10⁻³ - 0.5 torr.

The heart of the system is our specially designed mechanical pump/blower combination for wax/polymer binder removal. It consists of a BRS™ Once-through oiling pump which continuously supplies fresh, clean oil to the compression chambers rather than recirculating oil from a sump. After passing through the pump, the oil is discharged to a collection container and binders/polymers that would normally contaminate the oil (or build up in the pump) pass through with the oil and are continuously discharged. In addition, the oiling technique enhances bearing and seal lubrication for long trouble-free pump operation.

Critical 2nd stage Polymeric binder removal is accomplished using CVI's patented Sweepgas™ technique where inert gas is bled into the furnace chamber and enters the work box, where it entrains polymers vaporized from the work pieces and carries them out towards the BRS pump. A chamber mounted binder pot collects small amounts of residue that collect on the chamber walls, while the balance continues on to the BRS system which pumps them directly through to the collection system while maintaining quality operations.

APPLICATION

The use of vacuum allows binder materials to be removed in about one-third the time required at atmospheric pressure, and also provides the best environment for sintering. Injectavac™ furnaces may also be used for one-step processing of hardmetals and ceramic injection molded parts through the use of optional larger power supplies and optical pyrometer controls.

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Injectavac™

Vacuum / Controlled Atmosphere Furnace.

- **Highest Product Consistency** is assured by the uniform binder removal, close temperature gradients, automatic control of each step in the process, and vacuum sintering.
- **Lowest Cost Operation** is provided by the rapid debind step, unattended operation, freedom from parts handling between steps, and the lack of expensive process gases.
- **Flexibility** is provided by the preprogrammed controls which allow different materials and part sizes to be successfully processed without time-consuming adjustment of furnace conditions.
- **Minimum Maintenance Cost** is assured by the heavy construction and ease of access to all components of the furnace.



STD MODEL *	USABLE CU. FT.	EFFECT HOT ZONE WxHxD (in / mm)	Load (Lbs / Kg)	TRAY SIZE (in / mm)
40	0.75 (21)	8 x 8 x 20 (203 x 203 x 508)	88 (40)	8 x 9 (203 x 229)
100	2 (57)	12 x 12 x 24 (305 x 305 x 610)	220 (100)	12 x 11 (305 x 279)
150	3 (85)	12 x 12 x 36 (305 x 305 x 914)	330 (150)	12 x 17 (305 x 432)
300	4.5 (127)	12 x 18 x 36 (305 x 457 x 914)	660 (300)	12 x 17 (305 x 432)
500	9.7 (275)	14 x 24 x 50 (356 x 610 x 1270)	1100 (500)	14 x 23 (356 x 584)

* Custom sizes available upon request.

MISC. / OPTIONAL FEATURES

- Optical Pyrometer with retractable thermocouple for operation above 1600°C.
- Integrated cooling fans with integral heat exchangers.
- Hot/Cold water system maintains chamber jacket above wax melting point for spent wax collection. Automatic changeover to cold water during sintering cycle.
- CE / VDE / TÜV / CSA approvals and other non-U.S. standards for compliance.
- Rigid or Flexible water cooled busswork for improved maintenance and best electrical efficiency.
- Integrated water flow indicators/flow switches with low water alarm setpoint, and optional type K thermocouples in major water circuits with overtemp alarm.
- Survey thermocouples ports (5 or 9 point test) included.
- Gas preheaters for warming incoming inert Sweepgas.

BINDERS PROCESSED

- Multi-component binder systems
- Natural and synthetic waxes
- Stearic Acid and Butvar
- Polypropylene and polyethylene
- Polyvinyl Alcohol and Polyethylene Glycol

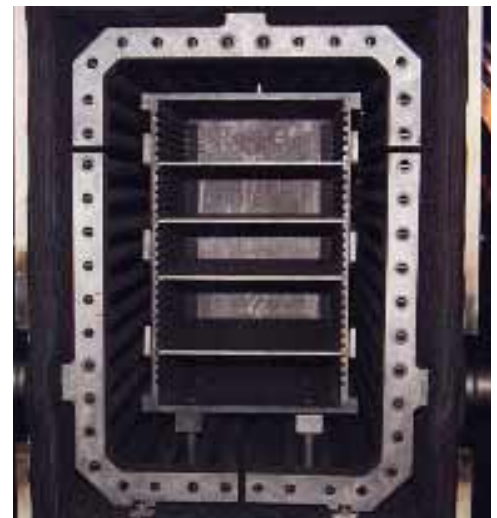
ALLOYS PROCESSED

- 316-L
- Tool Steels
- Tungsten Carbide
- High Speed Steels
- Ni, and Superalloys

FURNACE APPROVALS

CVI furnaces are designed to our own internal quality standards developed over our 45 year history, and are built to the following industry standards:

ASTM NFPA 86D FM (for G-10503A Hydrogen Systems)



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