

# Product Information

Vacuum Industries

50 LB. (22 Kg) SEMI-CONTINUOUS  
VACUUM CASTING FURNACE  
FOR CONTROLLED SOLIDIFICATION  
SERIES 4300 MODEL 5241-2 D/S



Photo 824

## CAPABILITY

Semi-continuous operation for melting and casting ferrous and non-ferrous metals and alloys in vacuum or controlled atmosphere. Used for controlled solidification, precision investment casting, charging by prealloyed billet. Mold preheating to 3000 °F (1650 °C).

## CAPACITY

Up to 50 lbs. with tilting coil. Pumping systems evacuate mold lock to 50 microns in less than 1 minute; melt chamber to 1 micron in 4 minutes. Mold size up to 22" diameter and 24" high.

## MELT CHAMBER

Cylindrical construction, 52" diameter × 41" deep. Type 304 stainless steel vacuum shell carbon steel jacketed. Hinged full opening door, two 5" clear vision sight ports, immersion thermocouple with probe, two radiation pyrometers, one each for mold and melt, 50 lb. billet charging mechanism, stainless steel induction power ports.

## CHAMBER INTERNALS

Induction melting furnace, 50 lb. trunnion mounted, box construction; internal illumination; mold preheating induction coil accepts 14" to 18" diameter × 20" high molds; mold cover.

**MOLD CHAMBER** Semicircular mild steel construction of approximately 36 cubic feet, copper tubing trace-cooled. Hinged, full opening aluminum door; 8" pumping port.

**MOLD CHAMBER INTERNALS** Dual speed electromechanical lift with water-cooled platen, shaft for water and thermocouples; speed ranges - 2" to 24" per hour for slow withdrawal using controlled solidification, 90" per minute for equiax casting; 24" swing-away water-cooled isolation valve.

**EXTERNALS** Operator platform; supports vacuum control cubicle, provides access to control on melt chamber. Manual furnace tilt, with variable speed electromechanical tilt option.

**PUMPING SYSTEMS** Melt chamber - 16" oil booster (8,500 CFM) or 20" oil diffusion (17,000 liters/sec), 300 CFM roughing and backing mechanical pump and 15 CFM hold pump; Mold chamber - 1300/300 CFM mechanical blower with manifolding. Vibration isolation joints on mechanical pumps, remotely operated vacuum valves.

**CONTROLS AND INSTRUMENTATION**

Vertical, free-standing, front access, NEMA-1 cubicle, contains self-sequencing pumping system control with graphic panel. Pilot lamps indicate pump operation and condition of valves. Vacuum thermocouple gauges (1-1000 microns) monitor pressure in melt chamber, mold lock, and booster pump foreline. Induction power supply controls and output instruments. Components are interlocked to prevent operating conditions which might damage them (such as oil migration in the pumping system and inadequate cooling water), to avoid electrical hazards for operating personnel and to prevent loss of vacuum.

<b>Component</b>	<b>Condition</b>	<b>Safety Interlock</b>
Diffusion Pump (or oil Booster Pump)	Insufficient cooling water— Vacuum on foreline—	Water pressure switch Mechanical pump must be running
Induction Melt Coil	Insufficient cooling water—	Water pressure switch
Mold Chamber Isolation Valve	To open valve: Mold chamber must be under vacuum—  Mold lift must be lowered	Vacuum sensor  Limit switches on lift ram
Mold Lift	To raise lift: Isolation valve must be open—	Valve position limit switches
Vacuum Valves	Loss of power—	Valves close

**INDUCTION POWER SUPPLIES**

Melting - recommended: 60 KW, 3000 Hz solid state frequency inverter, contains feedback circuits to maintain a regulated power output throughout a melting cycle without changing transformer taps or capacitor steps. Mold Preheat - recommended: 125 KW, 3000 Hz solid state frequency inverter.

**UTILITIES**

**Power** — 460 volt, 3 phase, 60 Hz, 350 amps total connected load.  
**Water** — 40 to 60 psig, 70° to 80°F, filtered, 35 gpm piped to an open drain.  
**Air** — 80 to 100 psig, filtered and lubricated.

**ACCESSORIES**

- (a) Bridgebreaker with replaceable tip.
- (b) Temperature and pressure indicating, control or recording.
- (c) Thermocouple probe with valved lock for tip changing.
- (d) Single cup, valved additions mechanism.
- (e) Air/oil or full electric furnace tilt.
- (f) Interchangeable furnace assemblies, 17, 30, 50 lb. steel rating.
- (g) Valved optical sight glasses.
- (h) Oil mist separators.

*Description and illustrative material may include accessories which are ordinarily considered optional.*