

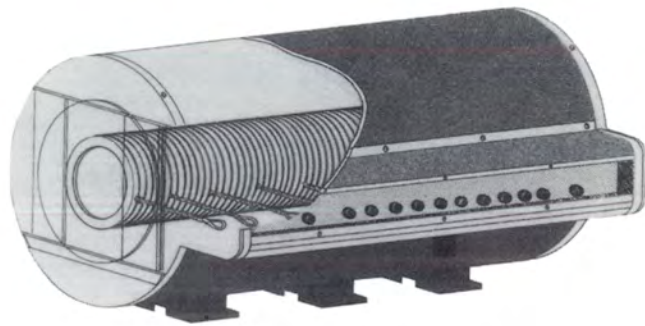


Thermcraft
incorporated

CRYSTAL GROWING SYSTEMS



**VERTICAL BRIDGEMAN
GROWING SYSTEM**

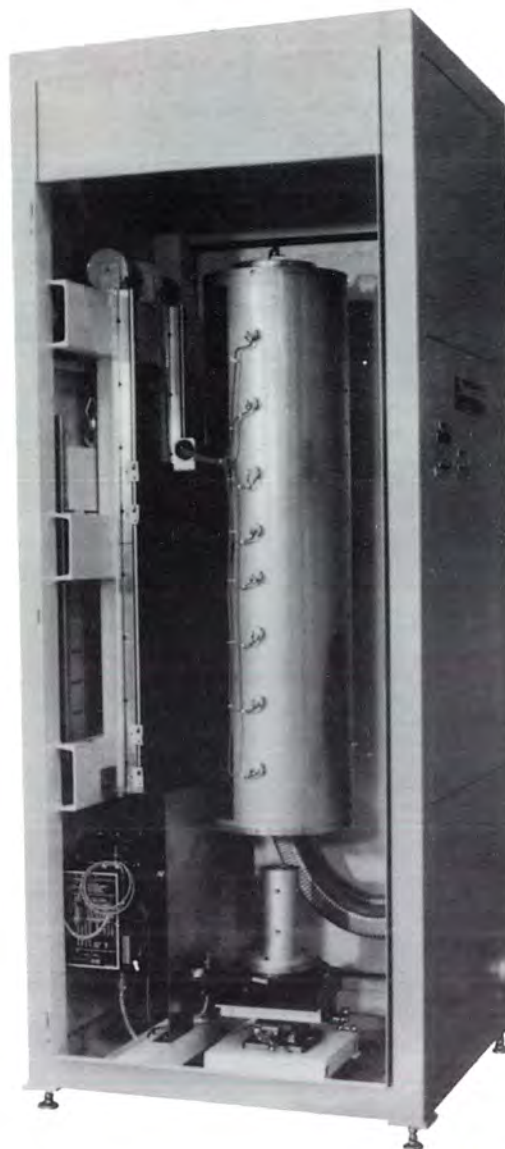


**SHUNT TAP WINDINGS
FOR R&D SYSTEM**



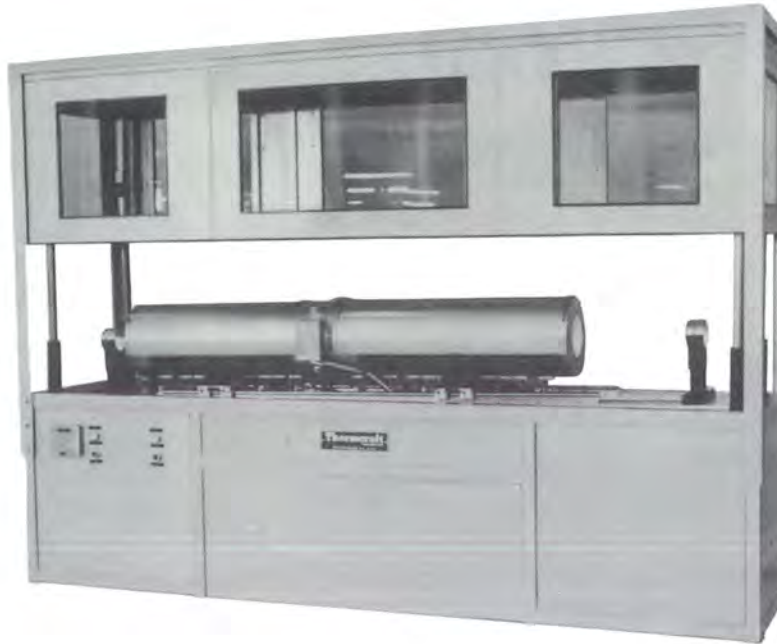
**GRADIENT FREEZE FURNACE ALSO DESIGNED FOR
HORIZONTAL BRIDGEMAN GROWTH**

**THERMCRAFT VERTICAL
BRIDGEMAN CRYSTAL
GROWING SYSTEM**



- Heavy gauge spiral winding for temperature up to 1300 degrees Celsius.
- Furnace constructed with light weight, low mass ceramic fiber insulation for maximum thermal efficiency.
- Furnace chamber inside diameter, length and number of zones designed to customer specifications.
- Furnace element can be supplied with auxiliary taps. This allows for changing of zone lengths.
- Heavy gauge steel enclosure.
- Enclosure includes heavy duty translation drive.
- Furnace mounted on linear bearings and uses counter weights for minimizing vibration.
- Furnace speed variable by using a ball type lead screw, stepper motor and gear reducer.
- Enclosure contains windows for viewing heater operation.
- Optional accessories:
 - Furnace liners (quartz, ceramic or silicon carbide)
 - Ampule rotation drive system.
 - Complete temperature control system.
 - Additional thermocouple ports.

THERMCRAFT HORIZONTAL BRIDGEMAN CRYSTAL GROWING SYSTEM



- Heavy gauge spiral winding for temperature up to 1300 degrees celsius.
- Furnace chamber inside diameter, length and number of zones designed to customer specifications.
- Center zone designed in Four-90 degree segments for quadrant control of the melt zone. Uses platinum/rodium resistance windings for continuous operation at 1300 degrees celsius.
- Furnace constructed with light weight, low mass ceramic fiber insulation for maximum thermal efficiency.
- Furnace can be supplied with auxiliary taps. This allows for changing of zone lengths.
- Heavy gauge steel enclosure.
- Enclosure includes heavy duty translation drive.
- Furnace mounted on linear bearings for minimizing vibration.
- Furnace speed variable by using a ball type lead screw, stepper motor and gear reducer.
- Entire furnace mounted on tilting platform for tilting up to 5 degree incline. Tilt is controlled by electrically driven actuator.
- Enclosure contains windows for viewing heater operation.
- Protective top enclosure raised and lowered via electric actuator.
- Optional accessories:
 - Furnace liner (quartz, ceramic or silicon carbide)
 - Complete temperature control system.
 - Furnace view ports.
 - Additional thermocouple ports.

CUSTOMIZED CONTROL SYSTEMS

FOR CRYSTAL GROWING

OPERATION



- Multiple zone control configured to match furnace.
- Available with dedicated temperature controller for each zone with communication ports. This allows furnace operation in conjunction with or independent of computer control.
- Auxiliary IBM compatible computer access to entire system functions. Printer available for hard copy.
- Customized supervisory software control temperature ramps and soaks, data logging of entire cycle, power output, travel speeds, furnace tilt, alarm status, PID values, heater position etc.
- System includes SCR power controllers, step-down furnace power transformers, platinum/rhodium (type "R" or "S") thermocouples, 110 volt instrument transformer, 15 meter interconnecting cables between control system and furnace enclosure.
- Power and instrumentation in separate enclosure from the furnace to minimize vibration or movement of furnace during growing cycle.
- Control system available designed to customer specifications and can include controller preference (by brand name) and any accessories such as chart recorders, timers, alarms, etc.



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