



# SPECIAL FURNACE CO INC

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## JSC SERIES

### APPLICATIONS

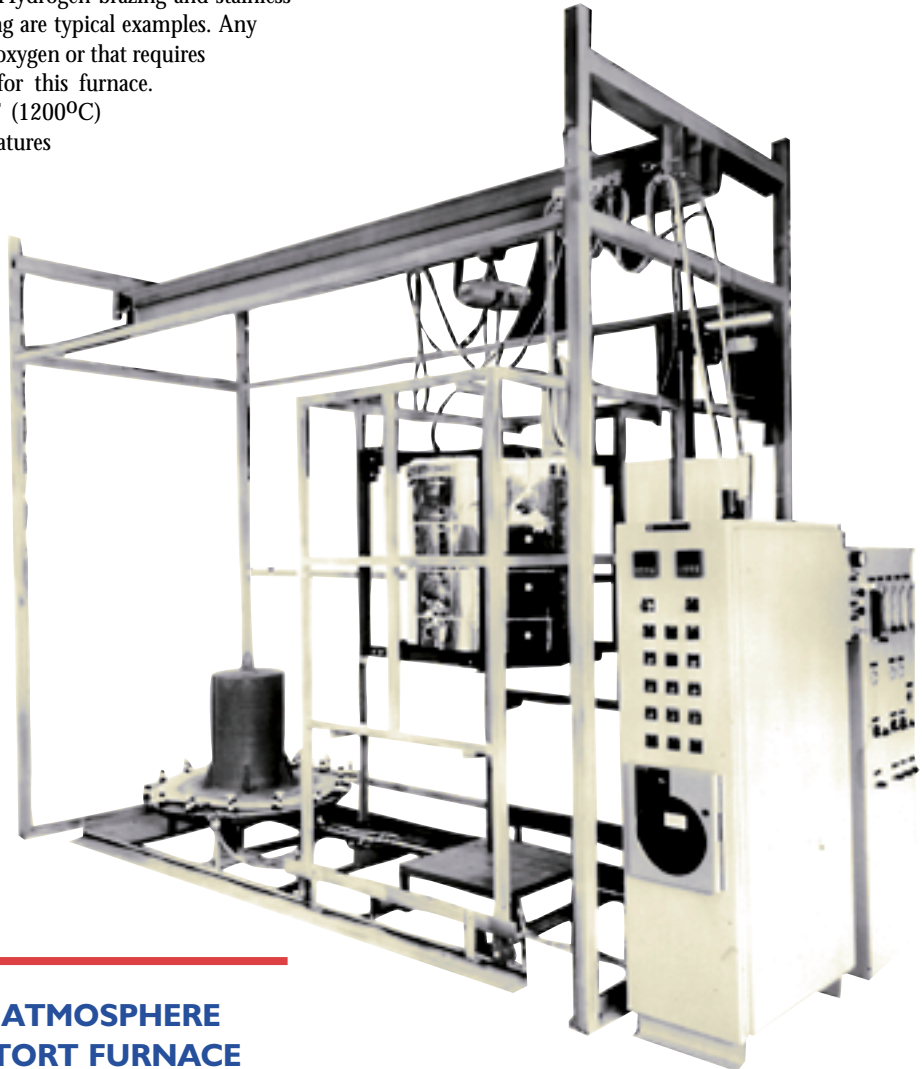
The JSC SERIES is an electric Bell/Shuttle Lift furnace with a bell type "top hat" alloy low dew point retort. The system normally includes one plug insulated base, one retort, one furnace, one separate insulated "parking" base, and an overhead hoist and shuttle system. The control system, alloy muffle and flow system are completely integrated as one unified system. Any application requiring 100% hydrogen or a mix of hydrogen, or any other combustible atmosphere (as well as any purely inert atmospheres) may be used in the JSC SERIES. Hydrogen brazing and stainless steel annealing and solution treating are typical examples. Any batch process that can not tolerate oxygen or that requires a low dew point is a candidate for this furnace.

Maximum temperature is 2200°F (1200°C)

although lower maximum temperatures are recommended for long muffle life. The system is ideal for quick cool down under controlled atmosphere conditions. The round retort holds up well to the stress of heating and cooling and is never moved while hot (unlike horizontal retorts taken in and out of a furnace.)

### OPERATION

After the retort base is loaded the "top hat" retort is lowered onto the base and clamped. That retort is then purged. The shuttle device with the furnace is moved over the loaded retort and lowered down. The furnace then heats up the retort. When the load is done the furnace is lifted up and moved over to resting base. After cooling and purging the retort is lifted up off the base and the base is unloaded.



**BELL / SHUTTLE ATMOSPHERE  
CONTROLLED RETORT FURNACE**

## FEATURES

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### FURNACE CONSTRUCTION

The furnace is made of polygonal heater sections with a stainless steel wrap around casing. These are supported in heavy metal frame that completely supports and protects these heaters.

### BELL/SHUTTLE LIFT DESIGN

The furnace is lifted up by an integral electric hoist which is mounted on a shuttle device. This shuttle device, made of structural steel, shuttles between two separate bases. The movement of the shuttle device is by hand operation. Clamps hold the furnace shuttle in place.

### FURNACE/RETORT BASE

One base assembly has an insulated retort plug bottom. The retort bell jar cover goes over this plug bottom and gets bolted down to the bottom with swing away quick release clamps. The bottom has all the water cooling channels, thermowells and gas atmosphere connections so that these do not need to move.

### “PARKING” BASE

A separate base is provided to “park” the heated furnace.

### INSULATION SYSTEM

The furnace is insulated with 2-1/2” of low K factor refractory firebrick with 2” of backup mineral wool. No asbestos or asbestos products are used.

### IRON-ALUMINUM-CHROME ELEMENTS

These are excellent for high temperature applications. An oxide coating protects the element. The elements are supported in proprietary ceramic element holders. These provide perfect support for the coiled element as well as excellent radiating characteristics. The smooth surface prevents premature failure of the element as it expands and contracts. Elements are evenly spaced around the perimeter of the furnace and are zoned.

### HEARTH

The top of the insulated plug is designed to take up to the rated load. If a fan is used there is a grid above fan.

### BELL ATMOSPHERE “TOP HAT” RETORT

There is an alloy round atmosphere tight retort designed for combustible or inert low dew point atmospheres. The type of alloy used is dependent on the temperature and application. Inlet and outlet are mounted through the bottom base assembly. The base features an insulation plug which is completely covered with alloy so that no water vapor can get trapped in the insulation and outgas to the chamber. There is a silicone rubber “O” ring seal around the perimeter of the retort. This is cooled by water which runs in an enclosed channel around the perimeter of the base. The retort is secured with quick release bolt down latches. This forms an extremely tight seal and allows very low dew point operation.

### ATMOSPHERE SAMPLE PORT

A sample port is provided. There is a valve to close this off when not in use. This is used to sample the atmosphere for oxygen, hydrogen, dew point, etc.

### ATMOSPHERE CONTROL

A variety of atmosphere control systems can be provided. See Bulletin H2 which describes the hydrogen flow control system or Bulletin MPH for information on a mixing panel for forming gas. In addition, simple regulators/flowmeters can be provided for inert gas use.

### DIGITAL PID CONTROL SYSTEM

The standard control is a Honeywell UDC 2000 digital PID 3 mode tuning control. All fuses, transformers, contactors, and controls are housed in a floor mounted NEMA 1 panel. If hydrogen is used then a purged NEMA 12 control panel is standard. Quiet, long life mercury power contactors are standard, but the SCR power control option is recommended (preferably with zoned control for high uniformity.) The thermocouple is Type K and is located inside the retort for accurate control of process temperature. Thermocouple break protection is included. Control voltage is transformed to 120 volts. A NEMA 13 lighted On/Off switch is included. The control circuit and each power branch circuit are fully fused. Honeywell UDC 2000 digital high limit back up control with manual reset, back up contactors and separate thermocouple included. NEMA 1 panels must be connected to a fused power supply. NEMA 12 panels have a fused disconnect switch.

### TESTING AND INSTRUCTIONS

Furnace is completely tested at the factory. A complete instruction manual includes easy start up instructions, theory of operation, maintenance instructions, parts list, and a detailed trouble shooting guide. A ladder logic diagram and panel layout are prepared on CAD for easy readability.

### WARRANTY

The furnace is warranted for one year except for elements, retort and thermocouples (warranted for 6 months.)

## OPTIONS

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- **RAMP/SOAK PROGRAM CONTROLS**
- **TEMPERATURE RECORDERS:** Round and strip
- **SCR POWER CONTROL**
- **WATER COOLED FAN:** Industrial Gas Engineering AMX water cooled fan. This is located in the base of the unit. Can provide up to +/-10°F uniformity.
- **ON SITE START UP AND TRAINING**