



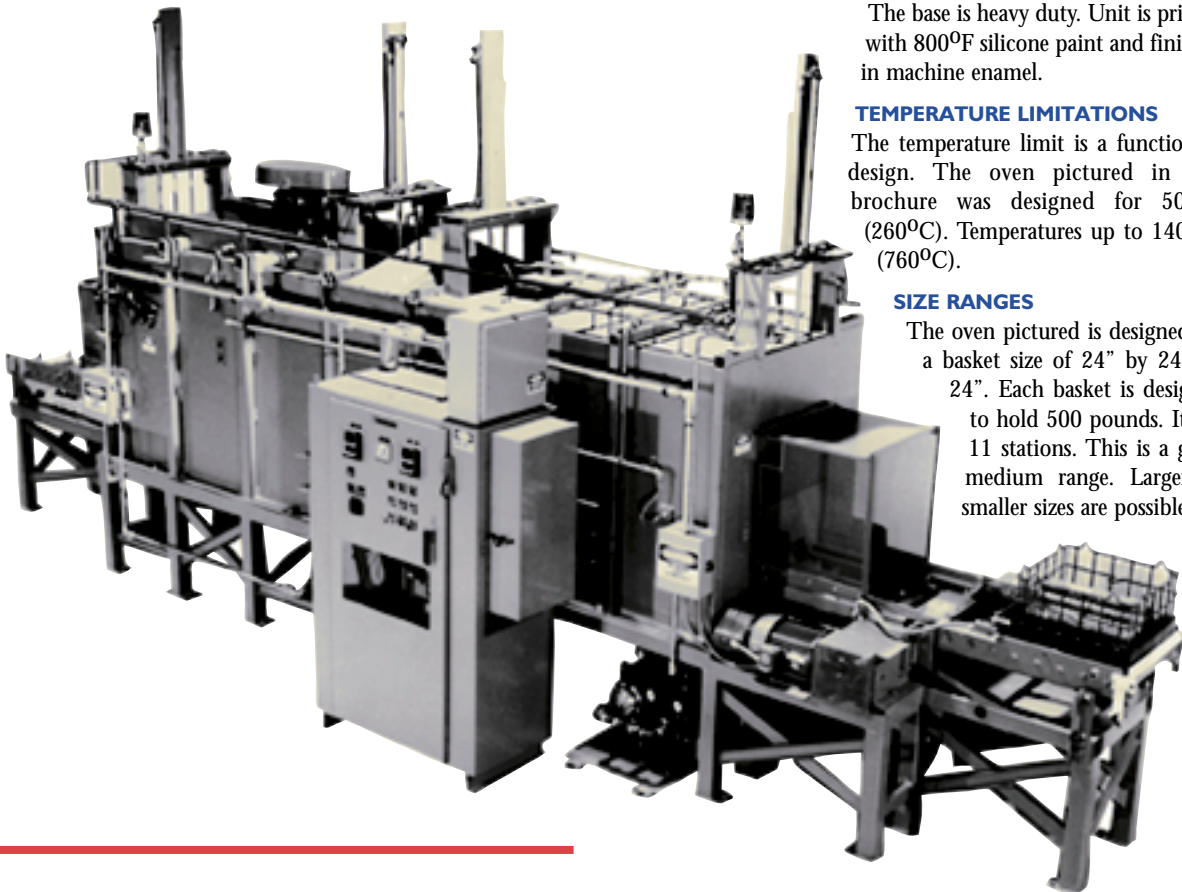
SPECIAL FURNACE CO INC

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CP SERIES

APPLICATIONS

The CP Series Automatic Pusher Ovens are custom designed and built for specific customer applications. The application of the pictured unit is for tempering after induction hardening. These can be designed for use to 1400°F (760°C). They can feature automatic cool down sections like the one pictured. Complete automatic operation is typical. These systems are designed for heavy duty continuous production with minimum downtime. All components are selected with care and all fabrications are carefully engineered for a production environment. They are ideal for Just-in-Time manufacturing methods. Specifications are per quotation.



FEATURES

ELECTRIC OR GAS OPERATION

The oven section can be gas fired or electrically heated. Electric units feature incoloy heating elements. Gas fired units feature packaged burners with complete IRI or FM gas trains with all necessary safety devices.

INSULATION

Typical insulation is 6" of mineral wool board encased between the case and a stainless steel liner. Thickness can vary with the application. No asbestos is used.

CASE CONSTRUCTION

A reinforced 3/16" outer case is normally employed. This is designed to allow maintenance access to the interior of the furnace.

The base is heavy duty. Unit is primed with 800°F silicone paint and finished in machine enamel.

TEMPERATURE LIMITATIONS

The temperature limit is a function of design. The oven pictured in this brochure was designed for 500°F (260°C). Temperatures up to 1400°F (760°C).

SIZE RANGES

The oven pictured is designed for a basket size of 24" by 24" by 24". Each basket is designed to hold 500 pounds. It has 11 stations. This is a good medium range. Larger or smaller sizes are possible.

**CONTINUOUS BATCH TEMPERING
AUTOMATIC PUSHER OVENS FOR
"JUST-IN-TIME" PRODUCTION**

FANS PROVIDE UNIFORMITY UP TO +/-10°F

Uniformity is mainly dependent on fan circulation. Typically 40 volume changes per minute of air circulation are employed through a recirculation baffle. The pictured oven features a plug type fan for easy removal and replacement.

MULTIPLE OR SINGLE HEAT ZONES

CP ovens may feature more than one heating zone. This allows control of the process temperature profile. Also, it allows more heat to be input to the cold work as it enters the oven. The length of each heating zone needs to be worked out with the customer based on known time/temperature ratios. The oven pictured has one heating zone with three stations of heating (all at the same temperature.)

AUTOMATIC PUSHER SYSTEM MOVES LOAD BASKETS INDEPENDENTLY

The pusher device featured on the pictured oven is a reversing jack screw. This moves a car back and forth on a track. On the car are one set of "dogs" for each basket. Each basket is pushed independently of each other so that the system could be used to heat treat as few as one basket if necessary. This is important for JIT manufacturing. In addition to the forward and reverse limit switches, there are also fail safe overtravel limit switches in case of misadjustment or limit switch failure.

COOL DOWN SECTIONS

The oven pictured features two independent cool down sections. The first cool down section blows air over the load. The second section features a recirculating water/oil coolant which sprays the load baskets from the sides and top. This cooling water/oil mixture is sent through a heat exchanger and recirculated through the system. Two filters with bypass valves, pressure gauges, pressure regulator, shut off valves, and all necessary solenoids are included. When the doors open, the spray stops and bypasses the pump flow directly to the tank reservoir. A sonar type tank level detector determines when to automatically fill the reservoir and when to shut down the pump in case of low level. A temperature control determines when to cool the heat exchanger. On this oven there are three water/oil cooling stations and one air cool station. Parts come out of the oven cool enough to handle by hand.

PNEUMATIC DOORS

Pneumatic doors are standard. Limit switches determine both up and down position of each door and act as an interlock for the loader.

AUTOMATIC PLC OPERATION

The CP Series features PLC programmed operation of all or most functions. All timing devices, limit switches, doors and loading devices are controlled by the PLC. Preferred manufacturer of PLC is Allen Bradley.

PID DIGITAL CONTROL SYSTEM

The typical controls used are Honeywell UDC 3300 digital PID 3 mode tuning controls. There is one control per heating zone. All fuses, transformers, contactors, and controls are located in a floor mounted NEMA 12 panel with a fused disconnect switch. SCRs are used for power control on electric ovens. Proportional controls are used on gas fired ovens. Thermocouples are normally Type K. There is normally one overtemperature control per zone. Single point power connection. Meets National Electrical Code.

TESTING , INSTRUCTIONS AND START UP SERVICE

The oven is completely tested in the factory and run off prior to shipment. 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, panel layout, pneumatic and process schematics, general dimension drawings, and general assembly and sub assembly drawings are provided. L&L will provide start up service and can also provide reassembly service.

QUESTIONNAIRE

The customer must answer a number of important questions before L&L can prepare a quotation.

- **What is the temperature profile or heating cycle you want the part to go through?**
- **How many heating and cooling zones?**
- **What is the maximum temperature in each zone?**
- **How big are the parts?**
- **How much do the parts and baskets weigh?**
- **What is the shape of the parts?**
- **What is the material of the parts?**
- **How many parts do you want to process in a week? Month? Year?**
- **How many hours will the furnace be used during the week? Better, describe your shift operations.**
- **How are you going to load and unload the furnace?**
- **Does there need to be a loading and unloading area? If so how long for each?**
- **What happens when the parts come out of the furnace? Are they unloaded by hand?**
- **What is voltage available? What other utilities such as atmosphere, natural gas, water are available?**
- **What is the floor area available?**



This is a special furnace designed for continuous ferritic carbonitriding.