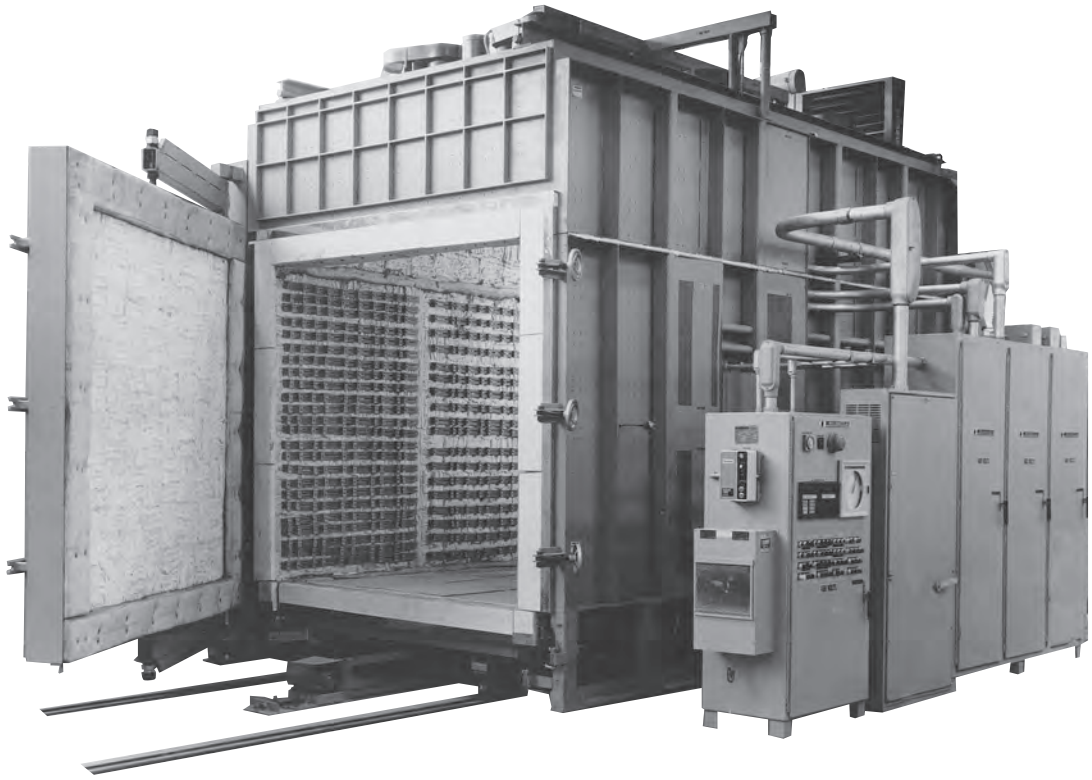
L&L Special
FURNACE CO, INC

FC Series

CERAMIC FIBER LINED ELECTRIC CAR BOTTOM FURNACES UP TO 2,200°F (1,200°C)



APPLICATIONS

The FC Series are ceramic fiber lined car bottom furnaces. They feature tight pneumatic car seals, electric car drives and a wide range of custom options such as electric vertical doors, fans, zoning, program controls and custom hearths. The car bottom makes these extremely easy furnaces to load. They achieve high precision by featuring highly accurate controls, solid-state contactors or SCR power controls, fans, multi-zoning, and very even spacing of elements for uniformity. They reach 2,200°F (1,200°C) with iron-aluminum-chrome elements, and up to 2,000°F (1,095°C) with the standard nickel-chrome elements. Insulation is all ceramic fiber except for the hearth and hearth support. These furnaces can be designed for extremely heavy loads. Gas fired units are also available.

FEATURES

EVEN ELEMENT PLACEMENT AND ZONE CONTROL FOR HIGH UNIFORMITY

The elements are normally divided into top and bottom zones. The control output is routed through two input switches, which allow adjustment of the total time onto each zone. If SCR power controls are used, these can be zoned using digital biasing switches. Coiled alloy elements are evenly spaced along the sides, back and door, creating an even wall of radiation. The standard furnace is uniform to within +/-25°F (+/-15°C) or better at 1,500°F (815°C). Optional fan systems and multiple control zones are available for uniformity of up to +/-10°F (+/-5°C).

CERAMIC ELEMENT HOLDERS

The elements are supported in proprietary ceramic element holders. These provide perfect support for the coiled elements as well as excellent radiating characteristics. The smooth surface prevents premature failure of the element as it expands and contracts. The holders are kept in place on the insulation walls, with specially designed ceramic clamps and screws that fasten to a stainless steel mesh screen, which is an integral component of the insulation module.

LOW DENSITY CERAMIC FIBER INSULATION

The furnace, except for the car, is insulated with low density, high "K" factor ceramic fiber and mineral wool for fast heat-up and cooldown. The total insulation thickness is 8". 2,600°F(1,425°C) fiber is used for 2,200°F (1,200°C) furnaces and 2,300°F (1,260°C) fiber is used for 2,000°F (1,095°C) or below. No asbestos is used.

HEAVY DUTY CASE

The case is made of strongly reinforced 3/16"-thick steel with an integrated base fabricated of heavy square tube and angle sections. The case is entirely primed with 800°F silicone paint and finished in machine enamel.

CAR BOTTOM FEATURES ELECTRIC DRIVE

The car bottom is made with heavy plate steel and structural members. The perimeter of the car is cast with a reinforced and anchored castable that is suitable for heat shock. Inside this perimeter, the car is insulated with insulating firebrick and surfaced with 2" cast slabs of castable for heavy-duty wear resistance. Alternately, cast piers for easy forklift loading can be provided. Low-mass cars are also available depending on the load configuration and weight. The car is driven in and out of the furnace with a car mounted AC brake motor drive. A cable reel feeds power to the car. Railroad-type rails are provided with mounting plates. These can be mounted in or on the floor. Flanged wheels on the car match rails.

TIGHT, TROUBLE-FREE PNEUMATIC CAR SEALS

The car seals feature a wide pad of ceramic fiber blanket. These are pushed by pneumatic cylinders against the castable edge of the car. They retract when the car is about to be moved. Limit switches prevent car movement unless the seals are fully retracted. This seal is extremely tight and features low wear because there is no rubbing.

DOOR AND SEAL

The door seal is also a wide pad of ceramic fiber, which seals against a rigid ceramic fiber board attached to the case front. The most common door is an electrically operated, counterbalanced vertical door with a torque limiter to guard against jams. Seal is by adjustment of gravity using the counterbalance. Car mounted doors and double pivoted horizontal doors are available.

DIGITAL PID CONTROL AND HIGH LIMIT SYSTEM

The standard control is a Honeywell UDC 2500 digital PID 3 mode tuning control. All fuses, transformers, contactors and controls are housed in a NEMA 12 panel with a panel mounted fused disconnect switch. Quiet, long life solid-state contactors are standard, although SCR power control is a common option. Thermocouples are inconel sheathed Type K. Thermocouple break protection is included. A Honeywell UDC 1200 digital high limit backup control with manual reset, backup contactors and separate thermocouple is provided. A limit switch shuts off element power if the door is opened. A lighted NEMA 13 On/Off switch is included. Control voltage is transformed to 120 volts. The control circuit and each power branch circuit are fully fused. Single-point power connection. Meets National Electrical Code.

TESTING AND INSTRUCTIONS

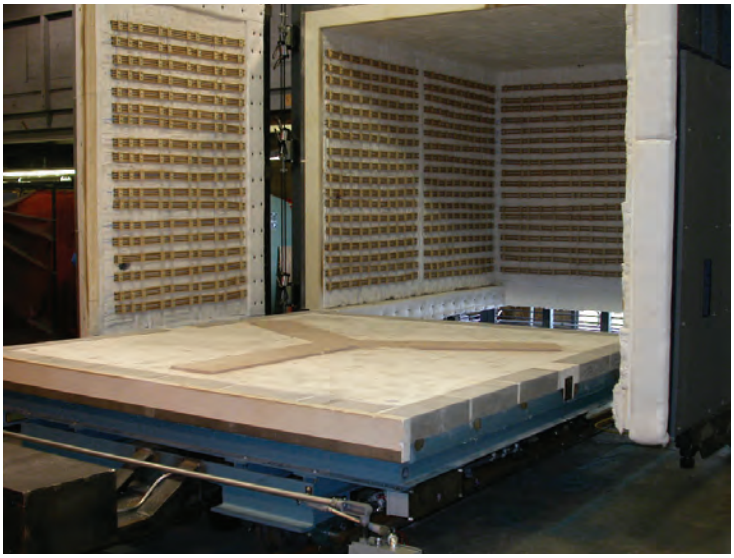
The furnace is power tested to ensure proper watt ratings. A complete instruction manual includes easy startup instructions, theory of operation, maintenance instructions, parts list, general dimension drawing, general assembly and subassembly drawings where required, and a detailed troubleshooting guide. 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 and thermocouples, which are warranted for six months.

OPTIONS

- **RAMP/SOAK PROGRAM CONTROLS**
- **TEMPERATURE RECORDERS:** Round or strip chart
- **SCR POWER CONTROL:** For greater precision. Can be multi-zoned with digital biasing.
- **HIGH TEMPERATURE FANS:** To 2,200°F (1,200°C).
- **VENTILATION:** A manual vent or powered programmable venturi can be provided for fast cooling or venting.



SPECIFICATIONS

Model Number	Working Dimensions			Inside Dimensions			Outside Dimensions			CU Feet	Work K.W.	Load Weight	Ship Weight
	W	H	D	W	H	D	W	H	D				
FC 444	48	48	48	54	60	55	90	108	82	76	114	2,400	10,500
FC 448	48	48	96	54	60	103	90	108	130	120	180	4,800	15,000
FC 556	60	60	72	66	72	79	102	120	106	125	188	4,500	15,000
FC 5512	60	60	144	66	72	151	102	120	178	205	307	9,000	21,000
FC 5524	60	60	288	66	72	295	102	120	322	364	546	18,000	35,000
FC 666	72	72	72	78	84	99	114	132	106	155	232	5,400	17,000
FC 6612	72	72	144	78	84	151	114	132	178	248	372	10,800	24,000
FC 6624	72	72	288	78	84	295	114	132	322	435	652	21,600	40,000
FC 8812	96	96	144	102	108	151	138	156	178	342	513	14,400	31,000
FC 8824	96	96	288	102	108	295	138	156	322	584	876	28,800	50,000

Dimensions are in inches. Weight is in pounds. Add another 30" to width for control panel. Hearth height is 28". OH dimension is with horizontal door. Add IH dimension to OH for approximate height with vertical door. Special load weights for extremely heavy loads can be designed. Special sizes are common. 240 or 480 volts is normal. 208, 380 and 575 volts are optional. Specifications are subject to change without notice.

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