

## CERAMIC FIBER LINED LARGE BOX FURNACES TEMPERATURES TO 2,200°F (1,200°C)

### APPLICATIONS

The FB Series Electric Box Furnaces are general-purpose, ceramic fiber lined electric box kilns. They achieve high precision by featuring highly accurate controls, solid-state contactors for fast cycle times, two-zone control (top and bottom) and even spacing of elements. They reach temperatures of up to 2,200°F with iron-aluminum-chrome elements and up to 2,000°F with the standard nickel-chrome elements. Insulation is all ceramic fiber except for hearth and hearth support.

### FEATURES

#### HIGH TEMPERATURE UNIFORMITY

The furnace is uniform to within +/- 25°F above 1,500°F (800°C). Optional top mounted recirculating fans and multi-zone power controls are available for uniformity of up to +/-10°F.

#### TWO ZONE CONTROL FOR CLOSE GRADIENTS

The elements are divided into top and bottom zones. The control output is routed through two input switches, which allow adjustment of the total time on to each zone.

#### EVEN ELEMENT PLACEMENT

Coiled alloy elements are evenly spaced along the sides, back and door, creating an even wall of radiation.



## PROPRIETARY CERAMIC ELEMENT HOLDERS

The elements are supported in proprietary high temperature 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 that is an integral component of the insulation system.

## CERAMIC FIBER INSULATION FEATURES FAST HEAT-UP AND COOLDOWN

The sides of the furnace are insulated with 8" of low density ceramic fiber and mineral wool board. The hearth is typically insulated with ceramic fiber, firebrick sections or lightweight but tough insulating castable refractory. The top is insulated with 10 pound density 8" ceramic fiber modules.

## DOOR AND SEAL

The door seal is a folded pad of ceramic fiber blanket, which seals against a rigid ceramic fiber board attached to the case front. The standard furnace door is horizontally opening with a double-pivoted hinge that allows parallelogram opening of the door. This keeps the hot face of the door away from the operator and allows tight sealing of the door. Four hand wheels clamp the door tightly against the front seal. Pneumatic or electrically operated vertical doors are optional (these are particularly useful when loading and unloading the furnace when it is hot).

## VARIOUS HEARTHES AND LOADING SYSTEMS

The standard hearth is a flat castable pad. Castable piers on centers for forklift loading are optional. Another option for a convenient loading system is a serpentine alloy hearth tray that is loaded into the furnace with a hydraulically operated lifting cart. Other types such as alloy rollers are available.

## DIGITAL PID CONTROL SYSTEM

The standard control is a Honeywell UDC 2500 digital PID three-mode tuning control. All fuses, transformers, contactors and controls are housed in a NEMA 1 panel. (NEMA 12 panels with fused disconnects are optional). Quiet, long life solid-state contactors are standard. Thermocouples are inconel sheathed Type K. Thermocouple break protection is included. Also included is a Honeywell UDC 1200 digital high limit backup control with manual reset, backup contactors and a separate thermocouple. A limit switch shuts off furnace power when the door is opened. Control voltage is transformed to 120 volts. The control circuit and each power branch circuit are fully fused. Single-point power connection.

## 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				
FB 333	36	36	36	42	42	42	84	88	69	27	64	675	4,200
FB 334	36	36	48	42	42	54	84	88	81	36	76	900	4,900
FB 336	36	36	72	42	42	78	84	88	105	54	100	1,350	6,300
FB 444	48	48	48	54	54	54	96	100	81	64	105	1,200	5,900
FB 446	48	48	72	54	54	78	104	92	102	96	136	1,800	7,300
FB 555	60	60	60	66	66	66	116	104	90	125	157	1,875	7,700
FB 666	72	72	72	78	78	78	128	116	102	216	219	2,700	10,000
FB 888	96	96	96	102	102	102	152	140	126	512	375	4,800	15,800

Dimension are in inches (except for Working Cubic Feet). Weight is in pounds. Standard voltage is 460/3/60; most other voltages are optional. Special sizes are available. Heavier load weights are possible. Outside dimensions are for a horizontal door and include the side mounted control panel. Fans reduce inside working height by 12". Specifications are subject to change without notice.

## 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 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

- **JIC CONTROL OPTION:** This includes a NEMA 12 control cabinet, all oil tight switches and a panel mounted fused disconnect switch. Zone switches are percentage timers.
- **RAMP/SOAK PROGRAM CONTROLS**
- **TEMPERATURE RECORDERS:** Round or strip chart
- **SCR POWER CONTROL:** For greater precision. Multi-zoning (up to eight zones) is available for high uniformity.
- **HIGH TEMPERATURE FANS:** Temperatures to 1,800°F, 2,000°F or 2,200°F.
- **ATMOSPHERE BLANKETING:** Case can be sealed for controlled atmosphere operation.
- **MANUAL OR POWERED VENTURI VENT:** A manual or powered venturi can be provided for fast cooling or venting. This can be programmable.
- **PNEUMATIC OR ELECTRIC VERTICAL DOORS:** The door is counterbalanced with either a pneumatic actuator or an electric gear motor drive with torque limit safety in case of jams. Floor switch is optional.
- **HEAT SHIELD:** For very low case temperatures.

