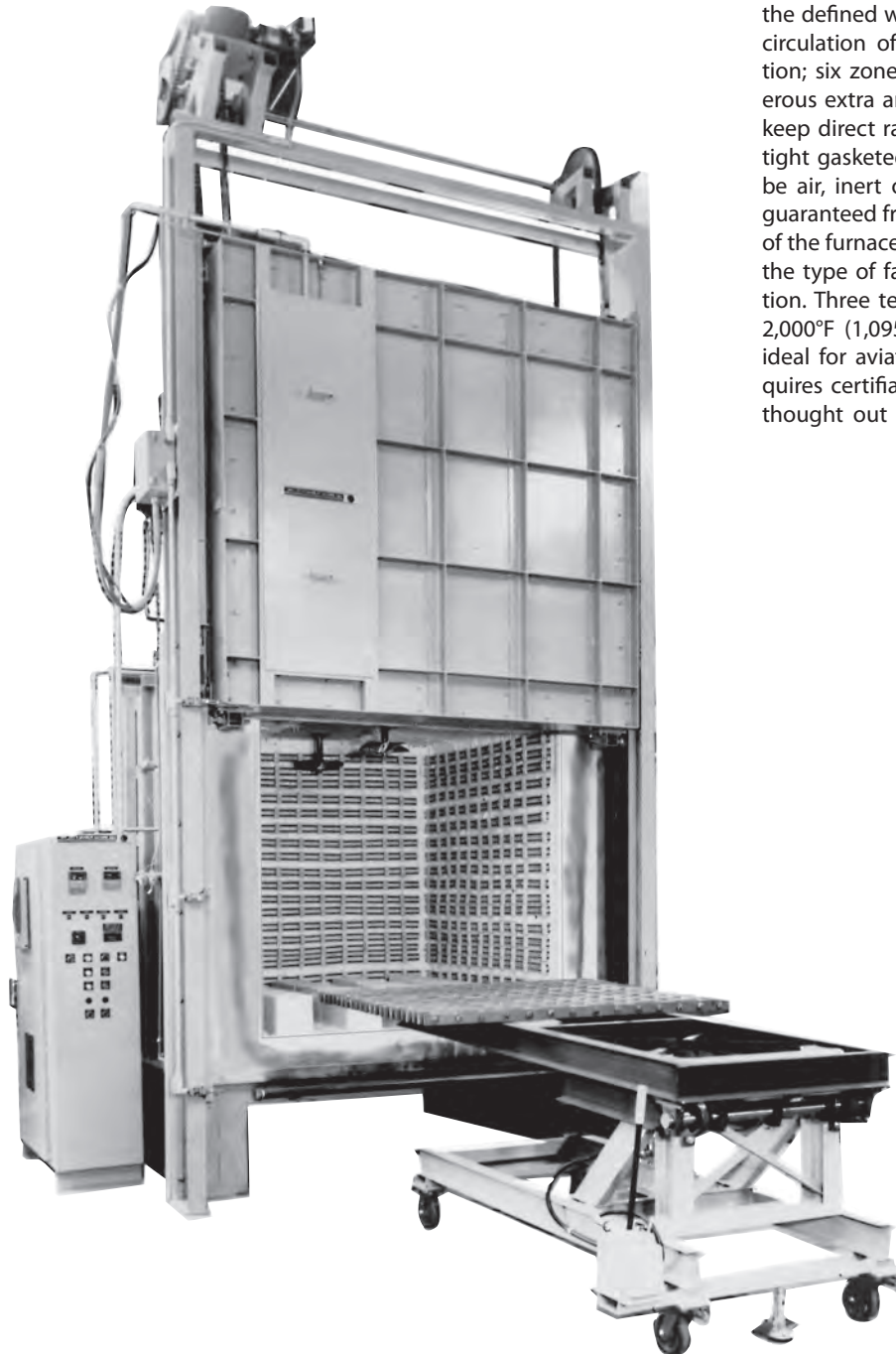


ATMOSPHERE BOX FURNACE WITH CERTIFIABLE UNIFORMITY OF $\pm 5^{\circ}\text{F}$ FROM 300°F (150°C) TO $2,200^{\circ}\text{F}$ ($1,200^{\circ}\text{C}$)

APPLICATIONS

The FN Series Electric Box Furnaces feature extremely uniform temperature gradients over a wide temperature range and atmosphere-tight construction. Two uniformity ranges are offered: $\pm 10^{\circ}\text{F}$ ($\pm 5^{\circ}\text{C}$) and $\pm 5^{\circ}\text{F}$ ($\pm 3^{\circ}\text{C}$). Several important features are combined to achieve uniformity within the defined work zone: uniform distribution of elements; fan circulation of furnace atmosphere; all-ceramic fiber insulation; six zones of element control; SCR power control; generous extra area inside the furnace for air circulation and to keep direct radiation of elements at a minimum; and a very tight gasketed and interlocked door seal. Atmospheres may be air, inert or combustible. The uniformity specification is guaranteed from 300°F (150°C) to the maximum temperature of the furnace. The maximum temperature rating depends on the type of fan used, type of elements and grade of insulation. Three temperature ranges are offered: $1,800^{\circ}\text{F}$ (980°C), $2,000^{\circ}\text{F}$ ($1,095^{\circ}\text{C}$) and $2,200^{\circ}\text{F}$ ($1,200^{\circ}\text{C}$). These furnaces are ideal for aviation work or any critical heat treating that requires certifiable uniformity. The design details are carefully thought out for convenience of use, service and flexibility.



FEATURES

HEAVY-DUTY ATMOSPHERE-TIGHT CASE

The case is 3/16" steel with a reinforced 3/8" base plate. It is welded gas-tight. The element connection boxes are fully gasketed. The entire case is primed with 800°F silicone paint and finished in machine enamel.

EVENLY DISTRIBUTED ALLOY ELEMENTS

Coiled alloy elements are evenly distributed along the sides, back and door, creating an even wall of radiation. The alloy used depends on application and temperature.

SIX ZONES OF CONTROL

The element circuits are broken into six separate zones. One power control is used for +/-10°F furnaces, although there is space in the panel to add six SCRs in the future for closer uniformity. +/-5°F models are controlled with six separate SCR power controls, with digital biasing for easy and repeatable adjustment of gradients. A multi-channel control can be used to put each of these zones on an independent loop of control.

CERAMIC FIBER INSULATION FEATURES FAST HEAT-UP AND COOLDOWN

The entire furnace is insulated with 8" of ceramic fiber and mineral wool backup. 2,600°F (1,425°C) fiber is used for the 2,200°F-rated furnaces and 2,300°F (1,260°C) fiber is used on all others. Standard K.W. will heat the maximum load to 1,800°F (980°C) in two hours. High K.W. will do the same job in approximately 75 minutes. Cooldown from 1,800°F to 500°F (260°C) takes about 18 hours with an empty furnace. No asbestos is used.

CIRCULATING FANS

One or more fans circulate the furnace atmosphere and promote uniformity. Water-cooled fans are used for 2,000°F and 2,200°F models.

ELECTRIC VERTICAL DOOR WITH FOUR POWERFUL PNEUMATIC CLAMPS

The standard door is a counterbalanced vertical door driven by an electric brake motor with a torque limit safety. When the door is in the full down position, four powerful pneumatic clamps pull it closed tightly against the two independent seals and into the heat interlock. The main gasket is a wide pad of ceramic fiber that is compressed by the pneumatic clamps. This is augmented by a tadpole gasket that surrounds the outside of the door. A precision interlock between a fiber plug protruding from the door and a matching notch in the furnace case seal helps the atmosphere seal and

greatly helps the heat seal. Atmosphere and heat leakage is minimal with this system.

ATMOSPHERE CONTROL

The FN furnaces are designed for controlled atmosphere use. Flow controls for inert or combustible atmosphere are available. Combustible atmosphere systems meet NFPA 86C safety standards. Mixing panels for inert gas with hydrogen or natural gas are available.

SURVEY PORT, SAMPLE PORT, PRESSURE GAUGE

There is a 1" NPT port for uniformity surveys. In addition, a separate port with a valve allows easy sampling of the atmosphere. A 0"- 1"W.C. pressure gauge reads furnace pressure.

VARIOUS HEARTH AND LOADING SYSTEMS

A convenient loading system is shown in this brochure. It features an alloy serpentine hearth tray that is loaded into the furnace with a hydraulically operated lifting cart (also shown). Other hearths are simple castable piers for forklift loading and roller hearths. Hearth height is 42".

DIGITAL PID CONTROL WITH SCR POWER CONTROL

The standard control is a Honeywell UDC 3200 digital PID 3 mode tuning control. All fuses, transformers, SCRs, contactors and controls are located in a NEMA 12 floor standing panel with a panel mounted fused disconnect switch. Thermocouples are inconel sheathed Type K. The control voltage is 120 volts. A Honeywell UDC 1200 digital high limit control with manual reset, backup contactors and separate thermocouple is standard. Single-point power connection. Meets National Electrical Code.

TESTING AND INSTRUCTIONS

The furnace is tested to ensure proper watt ratings. Complete in-house testing including full load test, uniformity test and certification to NIST standard is available. A complete instruction manual includes easy startup instructions, theory of operation, maintenance instructions, parts list and a detailed troubleshooting guide. Ladder logic diagram, panel layout, interconnection diagram, atmosphere and pneumatic schematics, general dimension drawings, assembly and subassembly drawings are provided.

WARRANTY

The furnace is warranted for one year except for elements and thermocouples, which are warranted for six months.

SEE THE FN OPTIONS BROCHURE FOR OPTIONS.

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				
FN 222	24	24	24	36	48	36	72	185	65	40	60	400	5,500
FN 223	24	24	36	36	48	48	72	185	77	55	80	600	6,000
FN 324	36	24	48	48	48	60	84	185	89	90	125	1,200	7,500
FN 326	36	24	72	48	48	84	84	185	113	125	175	1,800	9,000
FN 434	48	36	48	60	60	60	96	226	89	120	165	1,600	9,000
FN 436	48	36	72	60	60	84	96	226	113	150	225	2,400	10,000
FN 545	60	48	60	72	72	72	108	238	101	155	225	2,500	10,000
FN 546	60	48	72	72	72	84	108	238	113	180	265	3,000	11,000
FN 555	60	60	60	72	84	72	108	240	101	160	225	2,500	11,000
FN 646	72	48	72	84	72	84	120	240	113	225	300	3,600	13,000
FN 666	72	72	72	84	96	84	120	240	113	240	315	3,600	15,000

Dimensions are in inches. Weight is in pounds. Add another 30" to width for control panel and 30" for atmosphere panel. Hearth height is 42". Special sizes are available. 480 or 240 is normal. 208, 380 and 575 are optional. Specifications are subject to change without notice.

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