



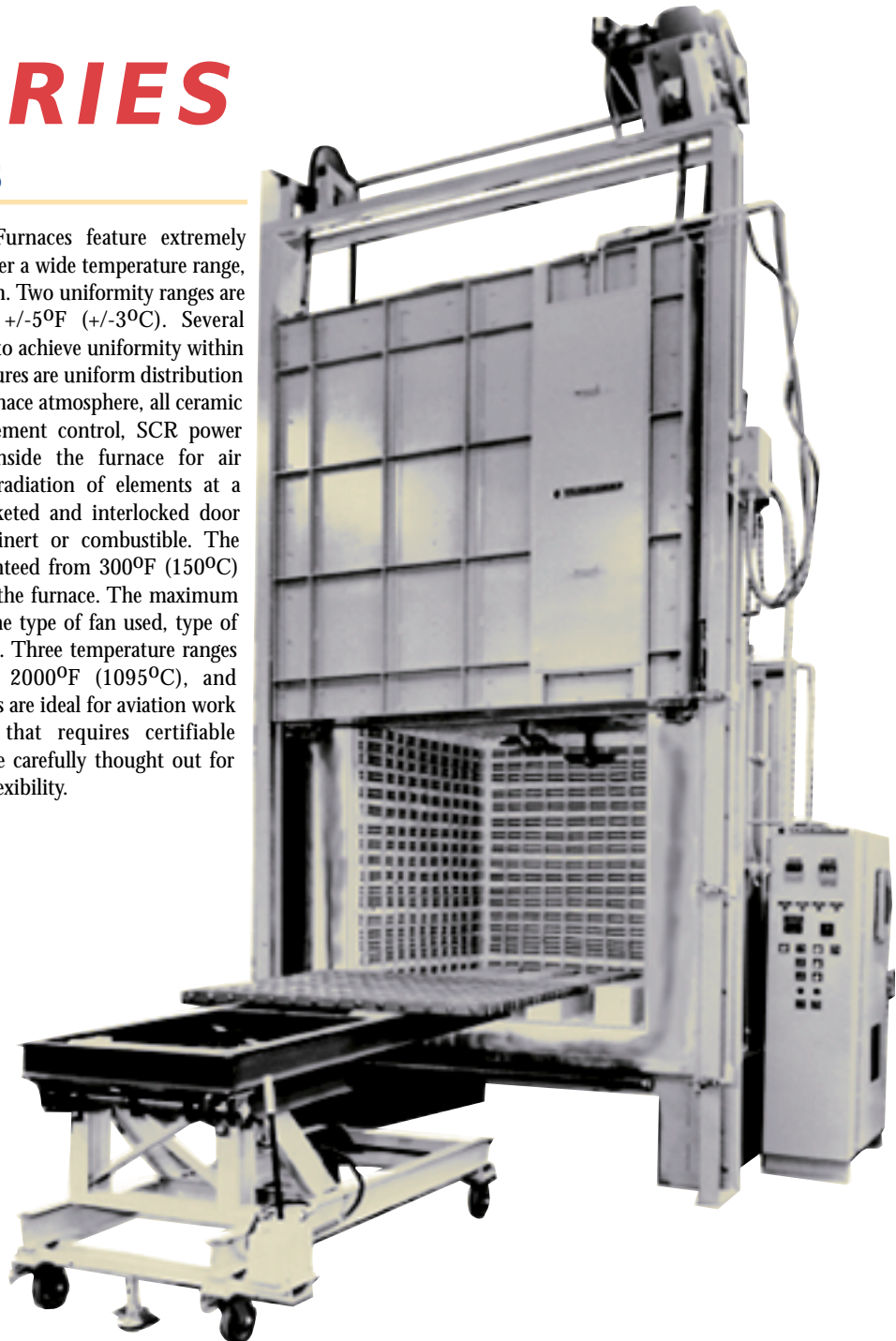
# SPECIAL FURNACE CO INC

20 Kent Road • PO Box 2129 • Aston, PA 19014 • 610.459.9216 • Fax: 610.459.3689 • Web: hotfurnace.com

## FN SERIES

### 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. These features are 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  $300^{\circ}\text{F}$  ( $150^{\circ}\text{C}$ ) 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:  $1800^{\circ}\text{F}$  ( $980^{\circ}\text{C}$ ),  $2000^{\circ}\text{F}$  ( $1095^{\circ}\text{C}$ ), and  $2200^{\circ}\text{F}$  ( $1200^{\circ}\text{C}$ ). 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.



**ATMOSPHERE BOX FURNACE  
WITH CERTIFIABLE UNIFORMITY  
OF  $\pm 5^{\circ}\text{F}$  FROM  $300^{\circ}\text{F}$  ( $150^{\circ}\text{C}$ ) TO  
 $2200^{\circ}\text{F}$  ( $1200^{\circ}\text{C}$ )**

## FEATURES

### HEAVY DUTY ATMOSPHERE TIGHT CASE

The case is 3/16" steel with a reinforced 3/8" base plate. Case is welded gas tight. Element connection boxes are fully gasketed. 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. 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 COOL DOWN

The entire furnace is insulated with 8" of ceramic fiber and mineral wool back up. 2600°F (1425°C) fiber is used for the 2200°F rated furnaces and 2300°F (1260°C) fiber is used on all others. Standard K.W. will heat the maximum load to 1800°F (980°C) in 2 hours. High K.W. will do the same job in approximately 1-1/4 hours. Cool down from 1800°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 2000°F and 2200°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 the door closed tightly against the two independent seals and into the heat interlock. The main gasket is a wide pad of ceramic fiber which is compressed by the pneumatic clamps. This is augmented by a tadpole gasket which 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 HEARTHS AND LOADING SYSTEMS

A convenient loading system is shown in this brochure. It features an alloy serpentine hearth tray which 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 3300 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 2300 digital high limit control with manual reset, back up contactors and separate thermocouple is standard. Single point power connection. Meets National Electrical Code.

### TESTING AND INSTRUCTIONS

The furnace is tested to insure 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 start up instructions, theory of operation, maintenance instructions, parts list, and a detailed trouble shooting guide. An 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 (warranted for 6 months.)

SEE THE FN OPTIONS BROCHURE FOR OPTIONS.

## SPECIFICATIONS

MODEL NUMBER	WORKING DIMENSIONS			INSIDE DIMENSIONS			OUTSIDE DIMENSIONS			STAND K.W.	HIGH K.W.	MAX LOAD LBS	SHIP WGHT
	W	H	D	IW	IH	ID	OW	OH	OD				
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	1200	7,500
FN 326	36	24	72	48	48	84	84	185	113	125	175	1800	9,000
FN 434	48	36	48	60	60	60	96	226	89	120	165	1600	9,000
FN 436	48	36	72	60	60	84	96	226	113	150	225	2400	10,000
FN 545	60	48	60	72	72	72	108	238	101	155	225	2500	10,000
FN 546	60	48	72	72	72	84	108	238	113	180	265	3000	11,000
FN 555	60	60	60	72	84	72	108	240	101	160	225	2500	11,000
FN 646	72	48	72	84	72	84	120	240	113	225	300	3600	13,000
FN 666	72	72	72	84	96	84	120	240	113	240	315	3600	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.