



SPECIAL FURNACE CO INC

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TBU SERIES

This photograph shows a TBU 1224 with an Inconel retort tube and a hydrogen atmosphere flow and safety system.



APPLICATIONS

The TBU SERIES Bench Mounted Electric Three Zone Tube Furnaces utilize three separate heating zones to achieve $\pm 5^{\circ}\text{F}$ ($\pm 2.7^{\circ}\text{C}$) or better within the center zone over a wide temperature range. The two end zones compensate for end heat losses. They are ideally suited for laboratory and small production requirements where precision temperature gradients are necessary. They are limited to 2100°F (1150°C .) although special versions can reach 2200°F (1200°C).

**THREE ZONE HIGH UNIFORMITY
CERAMIC FIBER LINED SPLIT TUBE
FURNACES 2100°F (1150°C)**

FEATURES

LOW MASS INSULATION

The furnace is insulated with 6 inches of low "K" factor ceramic fiber and mineral wool insulation. Two inches of this insulation consists of a removable molded element/insulation module that lines the interior of the furnace. It is not brittle and so maintenance is minimal. The insulation has a very low thermal mass and hence heats up very quickly. Heat up to 1800°F (980°C) will take approximately 45 minutes. No asbestos is used.

CERAMIC FIBER MOLDED ELEMENTS

Elements are embedded in ceramic fiber and are made of coiled iron-aluminum-chrome alloy. There are three separately controlled zones of heating with separate elements, one on each end and one in the center. Special versions feature even more zones than the standard three for greater uniformity or for special applications. The elements are preoxidized (which is what protects this particular alloy from the high temperatures.) Elements are replaced easily. The elements are evenly spaced along the entire surface of the tube. The insulation is fitted with vestibules at both ends. These protect the elements and help hold the tube in place. They hold heat in around tubes that are inserted into the furnace. The vestibules split open with the furnace case.

BENCH MOUNTED CASE CONSTRUCTION

The furnace case is constructed of welded 10 and 14 gauge steel. The case is primed with 800°F silicone paint and finished in machine enamel. The hinged case splits open in the center from one side and latches on the other side.

DIGITAL PID CONTROL SYSTEM

The standard control system uses three separate Honeywell UDC 2300 digital PID 3 mode controls. One zero fired SCR for each zone is used for precise power control. Thermocouples are Type K with inconel sheathing. Thermocouples are typically located inside the tube and the controls are tuned to prevent overshoot. A Honeywell UDC 2300 digital high limit back up control with manual reset, back up contactors and separate thermocouple is included. The control voltage is transformed to 120 volts. All fuses, transformers, contactors, and controls are located in a detached bench mounted NEMA 1 panel. Control and power circuits are branch fused. A NEMA 13 lighted On/Off switch is included. Customer must connect fused power supply to single point on panel.

TESTING AND INSTRUCTIONS

The furnace is power tested to insure proper watt ratings. The controls are fully calibrated and the control system completely tested. A complete instruction manual includes start up instructions, theory of operation, maintenance instructions, parts list, and a detailed trouble shooting 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 (warranted for 6 months.)

OPTIONS

- **JIC CONTROL OPTION:** This includes a NEMA 12 control cabinet, all oil tight switches and a panel mounted fused disconnect switch.
- **ATMOSPHERE CONTROL:** The TBU furnaces are often fitted with an alloy tube for atmosphere operation. Alloy used depends on temperature needed. Inert atmosphere and combustible atmosphere systems are both available. See the H2 and MPH Bulletins which explain the various safety systems for hydrogen and forming gas.
- **CERAMIC TUBES:** Closed one end or two open ends.
- **RAMP/SOAK PROGRAM CONTROLS:** Honeywell UDC 3300 digital program control features 6 ramps and 6 soaks. This controls the center zone and sends a remote set point to the two end zone controls so that they ramp with it. Another excellent control for this application is the Barber Colman Cimac2.
- **TEMPERATURE RECORDERS:** Round and strip chart.
- **ANGLE IRON STAND:** Includes leveling bolts.

SPECIFICATIONS

MODEL NUMBER	INSIDE TUBE DIAMETER	HEATER DIAMETER	UNIFORM CENTER LENGTH	TOTAL INSIDE LENGTH	OUTSIDE DIMENSIONS			TOTAL K.W.	SHIP WGHT
					OW	OH	OD		
TBU 26	2	3 1/2	6	24	20	30	28	3.6	250
TBU 212	2	3 1/2	12	30	20	30	34	4.3	300
TBU 224	2	3 1/2	24	48	20	30	52	6.8	350
TBU 512	5	6 1/2	12	36	24	34	42	9.0	350
TBU 524	5	6 1/2	24	48	24	34	54	11.4	400
TBU 536	5	6 1/2	36	60	24	34	66	15.0	450
TBU 612	6	8	12	36	26	36	42	10.6	400
TBU 624	6	8	24	48	26	36	54	13.6	450
TBU 636	6	8	36	60	26	36	66	17.6	500
TBU 648	6	8	48	72	26	36	78	20.4	600
TBU 812	8	10	12	48	28	38	56	16.8	550
TBU 824	8	10	24	60	28	38	68	20.4	600
TBU 836	8	10	36	72	28	38	80	25.2	700
TBU 848	8	10	48	84	28	38	92	28.4	800
TBU 1224	12	14	24	72	32	42	82	36.0	800
TBU 1236	12	14	36	84	32	42	94	40.0	900
TBU 1248	12	14	48	96	32	42	106	45.6	1000

Dimensions are in inches. Weight is in pounds. Uniform inside diameter is 1" less than nominal Inside Tube Diameter. Control panel is approximately 24" wide by 42" high by 36" deep. 240 or 460 volts is normal. Other voltages are optional. Single phase is normal. Three phase is possible but some models will have unbalanced loads. Longer uniform heating zones are possible. Larger inside diameter furnaces are possible; however, uniformity may not be as tight. Specifications subject to change without notice.