

# ***SIERRATHERM***

***PRODUCTION FURNACES INC.***

PROCUREMENT SPECIFICATION

*SIERRATHERM* SERIES 1500

MODEL 1K25-150C72-12A

FAST RESPONSE

THICK FILM FIRING CONVEYOR FURNACE

**1. General Description**

This specification describes a multiple zone, electrically heated, conveyor furnace capable of operating to 1050 degrees centigrade. The furnace includes a controlled air atmosphere system for the primary application of processing various thick film materials.

**2. General Specification Overview**

	<b>Inch</b>
A. Belt Width:	25
B. Heated Length:	150
C. Graduated Cooling Length:	72
D. Product Clearance Above Belt:	2.0
E. Dimensions:	
Entry/Exit Tables:	24
Overall Length:	292
Height:	57
Width:	56
Conveyor Height:	36
Leveling Range:	± 1
F. Belt Speed Range:	
Minimum	1.0/min
Maximum	15.0/min
G. Number Of Heated Zones:	12
H. Atmosphere:	Air
I. Input Power:	200/240 VAC 3 Phase, 3 Wire 50/60 Hz 110 KVA Max
J. Approximate Weight:	5,200 lbs

**3. Heated Section**

- A. **Nominal operating temperature:** Ambient to 1000 degrees centigrade.
- B. **Heating method:** Kanthal A-1 (or equivalent) wire coils embedded and fully enclosed in highly responsive, low mass ceramic fiber element modules located above and below the conveyor belt. High temperature glazing is applied to all interior chamber surfaces to ensure a clean, stable processing environment.
- C. **Insulation:** Multi-Layered, thermally optimized, graded, insulation provides efficient thermal stability, cool external panel surfaces and minimal heat loss. Low mass refractory materials are utilized throughout the heated chamber resulting in rapid heat-up and cool-down times and maximum thermal responsiveness.

**4. Furnace Layout**

	<b>Inch</b>
A. Entrance, including Air Curtain and baffle door assembly	18
B. Zone 1	12.5
Zone 2	12.5
Zone 3	12.5
Exhaust Burnout Extractor	2.0
Zone 4	12.5
Zone 5	12.5
Zone 6	12.5
Zone 7	12.5
Zone 8	12.5
Zone 9	12.5
Zone 10	12.5
Zone 11	12.5
Zone 12	12.5
C. Insulated Cooling	22
D. Graduated Cooling Module, including exit Air Curtain and baffle door assembly	50

**Note:**

Water cooling or Air cooling may be specified at no additional charge. Water cooling requires 1 gal/per minute minimum flow at 40 psi.

**5. Loading/Unloading Tables**

**Inch**

A.	Load/Unload Table	
	Width:	30
	Length:	24

**6. Conveyor System**

- A. Belt Type: Columbium Stabilized, Nichrome V, 25 inch wide
- B. Belt Mesh: Balanced Spiral 42-37-16-18
- C. Belt Loading: 1 pound per square foot
- D. Belt Speed: 1-15 inches/min
- E. Speed Control: Microprocessor controlled, closed loop, digital feedback,  $\pm$  0.1% accuracy

**7. Temperature Control System**

The furnace is controlled with a MicroTherm temperature control system. The MicroTherm is a high performance, single board computer with full PID and control for up to 16 furnace channels. Each furnace zone is monitored and controlled using a type 'K' thermocouple in the center of each heated zone. The MicroTherm incorporates closed loop conveyor speed control accurate to  $\pm$  0.1%.

(See separate MicroTherm specification for a comprehensive list of temperature control system features.)

**8. User Interface System**

A Pentium based, PC with a 15" Super VGA Color Monitor is provided for user interface. The User Interface Computer communicates with the Temperature Controller on a high speed serial link. A complete description of the User Interface features is described in a separate specification.

**Uniformity Control**

An adjustable left side to center to right side uniformity control system is provided in all 12 zones. Sectional heating elements in conjunction with the MicroTherm controller, will provide separate Three Way Power/Temperature adjustment across the width of the conveyor belt.

### 9. Over Temperature Safety Protection

The furnace is supplied with a redundant over temperature safety protection system which incorporates an additional type K thermocouple in the center of each controlled zone.

### 10. Atmosphere Control System

A. The following flowmeters supply air to the process chamber:

		<b>SCFH</b>
1.	Entry Gas Curtain	0-600
2.	Burnout Atmosphere Distributor (2 ea.)	0-600
5.	Firing Atmosphere Distributor (2 ea.)	0-600
6.	Exit Gas Curtain	0-600

B. Exhaust Extractor: 0-80 PSIG

**Note 1:**

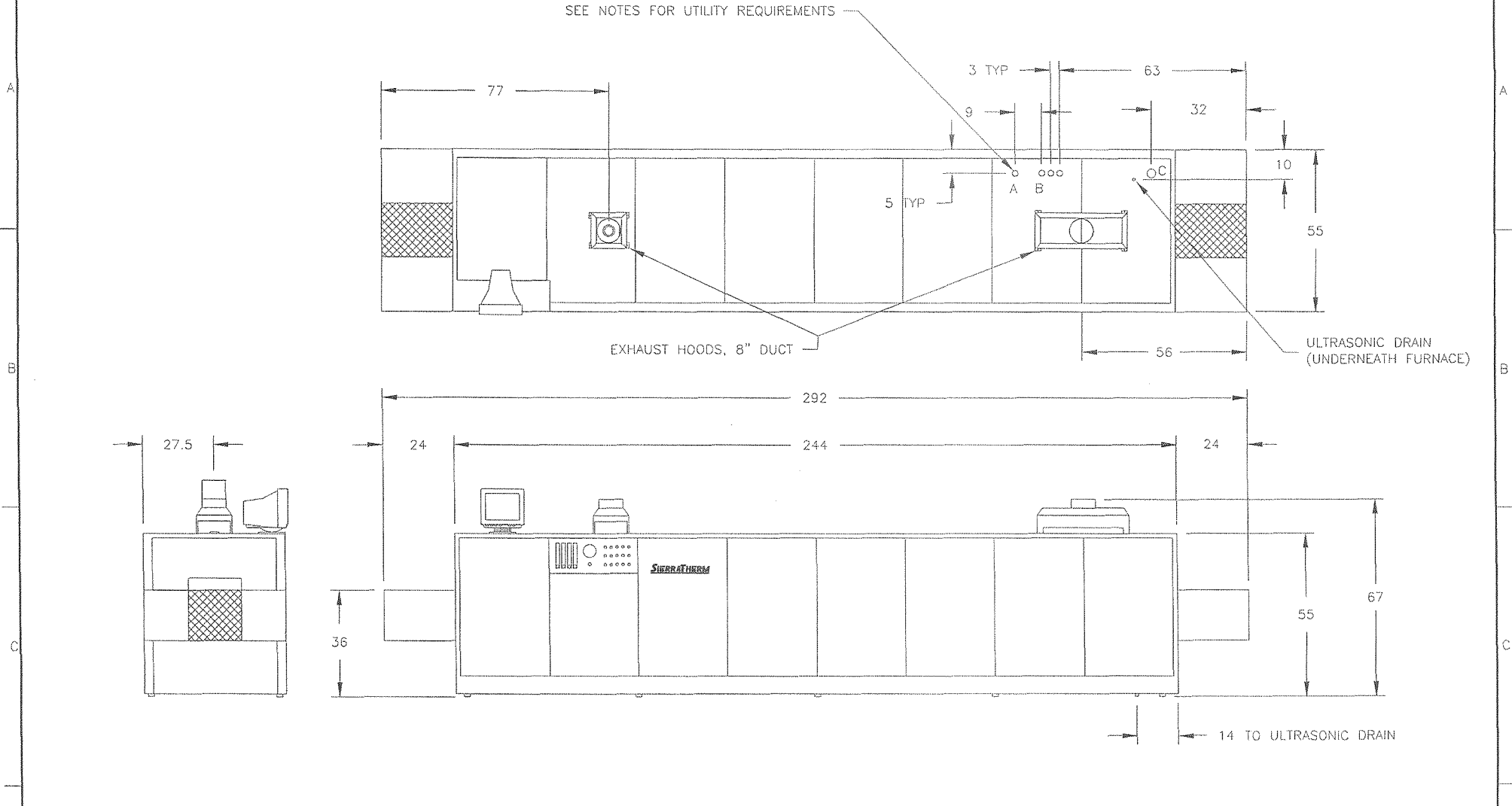
The furnace is supplied with a variable flow, air powered, exhaust burnout extractor located between Zone 3 and 4. An exhaust condition monitor is provided for the extractor.

**Note 2:**

An audible alarm, and visual indicator is provided and will activate in the event of low pressure in the air supply line.

### 11. Operating Instruction Manuals

A. The furnace is supplied with two copies of instruction manuals covering all phases of installation, operation, and maintenance procedures.

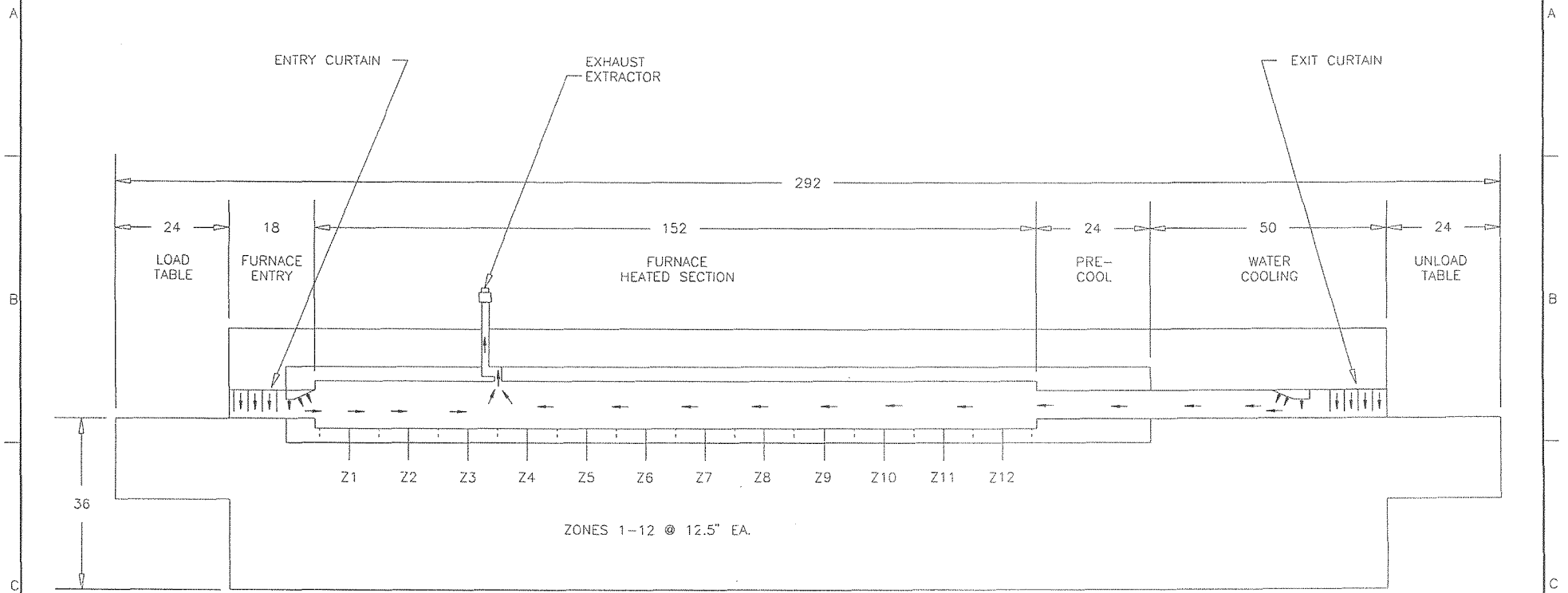


- NOTES:
1. RAISE FURNACE UP ON TO THE LEVELING LEGS BEFORE MAKING THE UTILITY CONNECTIONS. THE LEVELING LEGS ARE INSTALLED IN THE FULLY RAISED POSITION AT THE FACTORY - IT WILL BE NECESSARY TO REMOVE THE OUTER PANELS TO REACH THEM.
  2. UTILITY REQUIREMENTS:
    - A. AIR IN. 3600 SCFH MAX @ 80 PSI
    - B. DEIONIZED WATER, 1 GPM, 60 PSI
    - C. 200 VAC, 3 PHASE, 4 WIRE, 110 KVA MAX, 50 HZ.

		SIERRATHERM PRODUCTION FURNACES 200 WESTRIDGE DRIVE WATSONVILLE, CA 95076 (831)763-0117	
		DATE: 7/16/98	TITLE:
SCALE: NONE		1K25-150 OUTLINE & UTILITY CONNECTIONS	
DRAWN BY: TF			
APPR. BY: WTD			
SHEETS: 1 OF 1		DRW NO: 6-90-15197	
TOLERANCE:		REV A	
.XX = ± .02			
.XXX = ± .005			
ANGLE = .5°			

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DATE		REV	REVISION RECORD	DR	CK
1/17/94		A	PRODUCTION RELEASE	DGS	WTD
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		SIERRATHERM PRODUCTION FURNACES 7 HANGAR WAY WATSONVILLE, CA 95076 (408)763-0117	
		TITLE: <b>1K(BW)-150C72-12A</b> FURNACE LAYOUT	
DATE: 1/17/94		DRW NO: 6-90-15073	
SCALE: NONE		REV A	
DRAWN BY: DGS			
APPR. BY: WTD			
SHEETS: 1 OF 1			
TOLERANCE:			
.XX = +/- .06			
.XXX = +/- .005			

DISK NO. N006