

OWNER'S MANUAL

for

Equipment Serial Number 7306
Furnace Model 1K36-150C72-12A W/
4K36-60-4IA

4200 Bonita Place
Fullerton, CA 92635-1053

SPECIFICATIONS

SIERRA THERM

PRODUCTION FURNACES INC.

7 Hangar Way
Watsonville, CA 95076

TEL (408) 763-0113

FAX (408) 763-1509

PROCUREMENT SPECIFICATION

Sierra Therm SERIES 1500

MODEL 1K36-150C72-12A

FAST RESPONSE
THICK FILM FIRING CONVEYOR FURNACE

Procurement Specification
SierraTherm 1500 Series
Model 1K36-150C72-12A
Fast Response 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

	Inch
A. Belt Width:	36
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:	68
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 132 KVA Max
J. Approximate Weight:	8500 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

	Inch	KVA
A. Entrance, including Air Curtain and baffle door assembly	18	
B. Zone 1	12.5	14.5
Zone 2	12.5	14.5
Zone 3	12.5	14.5
Exhaust Burnout Extractor	2.0	
Zone 4	12.5	14.5
Zone 5	12.5	14.5
Zone 6	12.5	7.2
Zone 7	12.5	7.2
Zone 8	12.5	7.2
Zone 9	12.5	7.2
Zone 10	12.5	7.2
Zone 11	12.5	7.2
Zone 12	12.5	14.5
C. Insulated Cooling	22	
D. Graduated Water Cooling Module, including exit Air Curtain and baffle door assembly	50	

204" w. about dryer
 242"

Procurement Specification
SierraTherm 1500 Series
Model 1K36-150C72-12A
Fast Response Conveyor Furnace

Note:

The standard cooling method for the Graduated Cooling Module is facility water, @ 3 GPM/60 PSI. The water cooling system includes temperature readout and High/Low process alarms through the MicroTherm controller, and a flow switch which activates an audible and visual alarm in the event of low flow conditions.

5. Loading/Unloading Tables

	Inch
A. Load/Unload Table	
Width:	68
Length:	24

6. Conveyor System

- A. Belt Type: Columbium Stabilized, Nichrome V, 36 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 14" 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 Three-Way Power/Temperature adjustment across the width of the conveyor belt.

9. Overtemperature Safety Protection

The furnace is supplied with a redundant overtemperature 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:

	SCFH
1. Entry Gas Curtain	0-600
2. Burnout Atmosphere Distributor (3 ea)	0-600
5. Firing Atmosphere Distributor (3 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.

12 Code Compliance

SierraTherm production equipment is manufactured in compliance with the National Electric Code (NEC). Any requirements for compliance with local codes or customer specifications must be supplied to SierraTherm and agreed to by SierraTherm prior to order acceptance. Costs for third party inspections or certifications of the equipment shall be the responsibility of the customer unless specifically stated.

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PROCUREMENT SPECIFICATION

SierraTherm SERIES 4500

MODEL 4K36-60-4IA

IN-LINE THICK FILM CONVEYOR DRYER

Procurement Specification
SierraTherm Dryer Series
Model 4K36-60-4IA
In-Line Thick Film Conveyor Dryer

1. General Description

This specification describes a multiple zone, electrically heated, conveyor dryer capable of operating to 250 degrees centigrade. The dryer includes a controlled air atmosphere system for the primary application of drying thick film or other material on various substrates. The dryer is an In-Line configuration made for attachment to a *SierraTherm* Conveyor Furnace.

2. General Specification Overview

	Inch
A. Belt Width:	36
B. Heated Length:	60
C. Product Clearance Above Belt:	2.0
D. Dimensions:	
Entry Table:	(See Attached Furnace Entry Table)
Overall Length: (Added To Furnace Length)	94
Height:	50
Width:	68
Conveyor Height:	36
Leveling Range:	± 1
E. Number Of Heated Zones:	4
F. Atmosphere:	Air
G. Input Power:	208/230 VAC 3 Phase, 3 Wire 50/60 Hz 20 KVA Max (Added To Furnace)
H. Approximate Weight:	1700 lbs

3. Heated Section

- A. **Nominal operating temperature:** Ambient to 250 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 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. Dryer Layout	Inch
A. Entrance	2
B. Zone 1	12
Exhaust	3
Zone 2	12
Zone 3	24
Zone 4	12
C. Exit/Atmosphere Inlet	5
D. Exposed Belt/Transfer Section	24

5. Conveyor System

- A. See Attached Furnace Specification.

6. Temperature Control

The dryer is controlled with 4 Channels from the MicroTherm Temperature control system installed on the attached *SierraTherm* Conveyor Furnace.

7. Over Temperature Safety Protection

The dryer is supplied with redundant overtemperature safety protection in all 4 Zones from the attached *SierraTherm* Conveyor Furnace.

8. Atmosphere Control System

A. The following flowmeter supplies air to the process chamber:

	SCFH	LPM
1. Chamber Atmosphere Distributor	0-600	283

B. Exhaust Extractor 0-80 PSIG / 5.4 BAR

The dryer is supplied with a variable flow exhaust extractor located between zone 1 and 2.

10. Operating Instruction Manuals

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

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