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OWNER'S MANUAL

for

Equipment Serial Number 7289
Furnace Model 1K14-150C72-12A

Manufactured for

Be H Longth

113
013

Micro-Optics
1070
Plasma, GA

Equipment Ship Date: February 4, 1997

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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 noble metal thick film materials.

2. General Specification Overview

	Inch
A. Belt Width:	14
B. Heated Length:	150
C. Insulated Free Cooling Length:	22
D. Water Cooling Module Length	50
E. Product Clearance Above Belt:	2.0
F. Dimensions:	
Entry/Exit Tables:	24
Overall Length:	292
Height:	57
Width:	44
Conveyor Height:	36
Leveling Range:	± 1
G. Belt Speed Range:	
Minimum	1.0/min
Maximum	15.0/min
H. Number Of Heated Zones:	12
I. Atmosphere:	Air
J. Input Power:	208/240 VAC 3 Phase, 3 Wire 50/60Hz 56 KVA Max
K. Approximate Weight:	4,400 lbs

Procurement Specification
 SierraTherm 1500 Series
 Model 1K14-150C72-12A
 Fast Response
 Thick Film Conveyor Furnace

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
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 Free Cooling	22
D. Water Cooling Module, including exit Air Curtain and baffle door assembly	50

Note 1:

The Water Cooling Module requires facility water, @ 1 GPM/60 PSI. The water cooling system includes temperature readout, high/low process alarms through the MicroTherm controller, and a flow switch which activates visual and audible alarms in the event of low flow conditions.

Note 2:

The Cooling Module may be specified as an Air Cooling Module at no additional charge.

5. Loading / Unloading Tables Inch

A.	Loading Table	
	Width:	43
	Length:	24
B.	Unloading Table	
	Width:	43
	Length:	24

6. Conveyor System

- A. Belt Type: Columbium Stabilized, Nichrome V, 14 inch
- B. Belt Mesh: Balanced Spiral 42-37-16¹⁸
- C. Belt Loading: 2 pound per square foot
- D. Belt Speed: 1-15 inches/min
- E. Speed Control: Microprocessor controlled, closed loop, digital feedback, $\pm 0.1\%$ accuracy

*spiral/foot contact wire gage of wire
top gage across*

Note :

The belt speed range specified above refers to adjustability of belt speed only and does not imply compliance with load and temperature requirements over the entire range of the belt speed.

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.)

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8. User Interface System

A Pentium 75 Mhz 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.

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:

	SCFH
1. Entry Gas Curtain	0-600
2. Burnout Atmosphere Distributor	0-600
3. Firing Atmosphere Distributor	0-600
4. Exit Gas Curtain	0-600

B. Exhaust Extractor: 0-80 PSI

Note 1:

The furnace is supplied with a variable flow, air powered, exhaust burnout extractor between zones 3 and 4. A gauge which monitors exhaust conditions is provided for the extractor. In addition a condensate collection trap is provided with an easy clean tray.

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.