ENTRANCE TABLE OPTIONS	
DIMENSION "A"	
1. 24"	STANDARD
2. 36"	
3. 48"	
4. 60"	
5. 72"	
EXIT TABLE OPTIONS	
DIMENSION "B"	
1. 24"	STANDARD
2. 36"	
3. 48"	
4. 60"	
5. 72"	

PURCHASER TO PROVIDE CIRCUIT BREAKER OR FUSED DISCONNECT SWITCH FOR:
480VOLTS 100AMPERES 3POLES 3WIRES
3 PHASES 69 KILOVOLT-AMPERES 50/60 HZ
FURNACE CASE MUST BE GROUNDED PER LOCAL CODES

MAXIMUM LOAD DATA

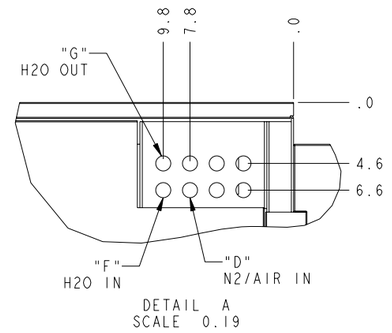
LINE CURRENT-AMPERES					
LINE VOLTAGE	BLACK	RED	BLUE	NEUTRAL	TOTAL KVA
440	68	75	74		58
460	71	78	77		63
480	74	81	81		69
AVERAGE HEATER LOAD 23 KW					
OVERHEAT T/C'S IN ZONES 1 THRU 7					

MAXIMUM TEMPERATURE 1050 DEGREES CELSIUS

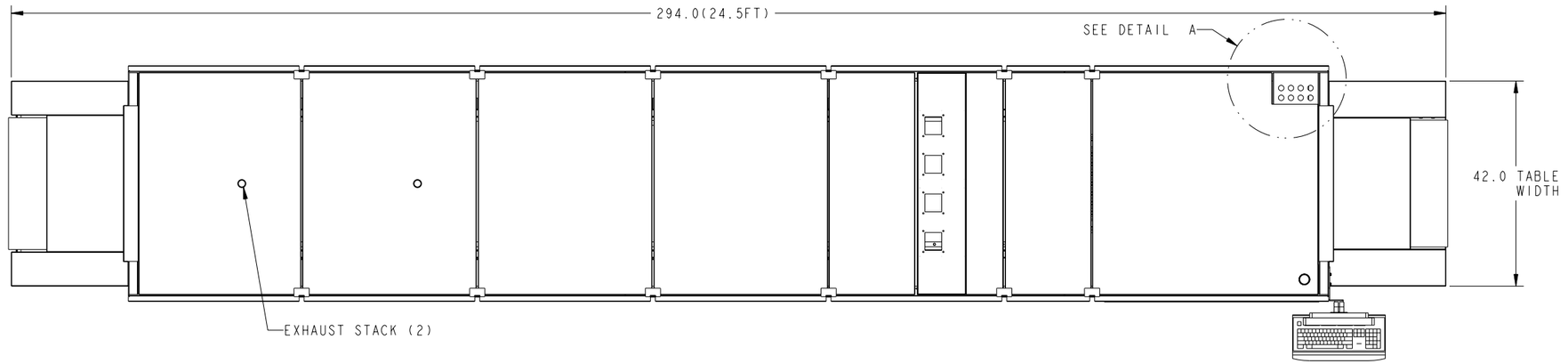
OPERATING TEMPERATURE 200-1000 DEGREES CELSIUS

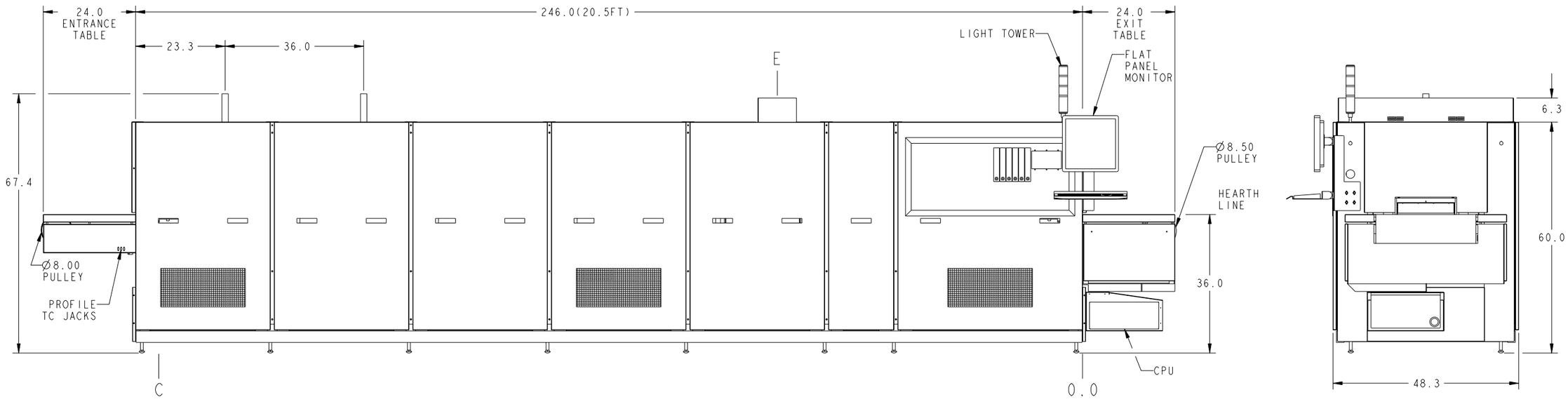
	UTILITIES	APPROX. CONNECT LOCATION	PRESSURE	CONN SIZE	REMARKS
C	ELECTRIC POWER	240.0"	N/A	N/A	
D	NITROGEN/AIR	DETAIL A	10-20 PSIG	0.5 NPT	500LPM MAX.
E	CASE COOL EXHAUST	79.5"	N/A	10"x45.5"	1000CFM
F	H2O IN	DETAIL A	40-80 PSIG	0.5 NPT	
G	H2O OUT	DETAIL A	OPEN DRAIN	0.5 NPT	

REVISIONS			
REV	DESCRIPTION	DATE	APPR.



DETAIL A
SCALE 0.19





APPLY TOLERANCE CLASS 3	TOLERANCES			
THIRD ANGLE PROJECTION	DECIMAL	CLASS 1	CLASS 2	CLASS 3
	.X	±.1	±.1	±.2
	.XX	±.01	±.03	±.06
	.XXX	±.005	±.010	±.030
	ANGLES	±0.5°	±1.0°	±1.0°
	DIMENSIONS ARE IN INCHES			

APPROVALS		DATE
DRAWN	F.BUBAR	17-Apr-09
CHECK	FAB	17-Apr-09
ENGR.	R.GUERRERO	17-Apr-09
PROD.	C.MORAN	Apr-09

TITLE:

INSTALLATION DRAWING
TFF142-7-126N48GT

BTU International, Inc.
N. BILLERICA, MASSACHUSETTS 01862

DWG SIZE	DWG NO.	REV
D	5179484	0
SCALE: 0.078	SHEET 1 OF 1	

BTU International

TFF Series
Gas Tight Fast Fire II Furnace

Furnace : **SPBC-2**
Specification :TFF142-7-126N48GT
Date : April 22, 2009

The **BTU TFF Series Fast Fire Furnace** is a continuous conveyor furnace used for Thick Film Firing and other processes requiring air or a **gas tight** nitrogen atmosphere in operation up to 1000°C.

A. FURNACE SPECIFICATION

Maximum temperature rating:	1050 °C
Operating temperature range:	200-1000 °C
Number of controlled heat zones:	7
Working Dimensions:	356 mm (14 in.) wide × 50mm (2in.) clearance above the belt.
Heated Length:	3.2 M (126 in.)
Belt Height Above the Floor:	0.9 M (36 in.)

FEC (Fully Enclosed Coil) heaters are manufactured by BTU utilizing resistance alloy heating coil embedded in ceramic fiber plates. Heaters are located top and bottom of the process chamber

Open Chamber design allows for rapid heat up and unlimited cycling.

B. FURNACE LAYOUT

	mm	in.
Entrance Table 1067 mm (42 in.) wide, length is	610	24
Entrance muffle, with Air/ N_2 curtain, baffle assembly.	381	15
Entrance vestibule with venturi exhaust	152	6
Zone 1	457	18
Zone 2 with Air/N_2 inlet and venturi exhaust stack	457	18
Zone 3	457	18
Zone 4	457	18
Zone 5	457	18
Zone 6	457	18
Zone 7	457	18
Exit vestibule	152	6
Total Case Length 3505 mm 138 inches		
Insulated Cooling	610	24
Active Cooling	1219	48
Exit with Air/N_2 curtain and baffle assembly	457	18
Frame allowance	76	3
Exit Table 1067 mm (42 in.) wide, length is	610	24

APPROXIMATE TOTAL FURNACE LENGTH **7.43 M** **24.5 FT.**

Overall width of furnace 1194 mm. 47 in.

Spent process exhaust gas may be removed from building via separate exhaust system connected directly to customer's exhaust ducts.

B. FURNACE LAYOUT (continued)

The product continues into the second stage which is the active cooling section where **water** cooling is employed to remove heat from the product. The active cooling section consists of a stainless steel muffle with aluminum heat fins fastened to the outside surface and used in conjunction with **water** cooling to remove heat from the system.

Load and unload table tops are of stainless steel construction.

Solid top panels with blowers used to remove heat from the furnace cabinet are provided.

Three thermocouple ports are located at the entrance table to connect an optional profiling thermocouple directly to the microprocessor. Software is provided within *WINCON*™ to capture, display, printout and store furnace profiles.

C. CONVEYOR SYSTEM

Belt Type, Material	:	Nichrome V
Width	:	356 mm (14 inches)
Mesh	:	B48-24-16/18
Belt Speed Range	:	51-305 mm/min. (2- 12 IPM)

Nichrome V is a high temperature, oxide resistant alloy composed of 80% Nickel and 20% Chromium.

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

Typical belt loading vs. belt speed process parameters

Process	Belt Loading	Belt Speed	Power consumption
	Kg/M^2 / lb/ft^2	mm/min. / IPM	kW / Hr
30 minute	10 / 2	173 / 6.8	15.9
60 minute	10 / 2	86 / 3.4	10.8

Belt material and mesh may vary depending on process requirements. Please consult with factory if your application is different from above.

Speed control is programmable in inches per minute with readout on the PC. Deviation from setpoint alarm is programmable. An alarm will sound when the belt stops.

D. TEMPERATURE CONTROLS

The temperature of each zone is controlled by:

1- Microprocessor control channel
1- Type **"N"** thermocouple
2- Solid State Relay.
2- Programmable Trims (Side – Center)

Controls are located on the right hand side as viewed from the entrance of the furnace. The Central Processing Unit (CPU) is mounted under the exit table.

The furnace is controlled by a microprocessor based controller running WINCON™, an advanced software system for controlling thermal processing equipment. WINCON™ is based on a Windows™ operating environment, a graphical interface that enhances performance and simplifies operation through pull-down menus and the use of a pointing device to make selections and initiate actions.

D. TEMPERATURE CONTROLS (continued)

A **flat panel** color graphic monitor, computer and WINCON™ software provide full temperature and conveyor speed monitoring of alarms, profiling and recipe storage. WINCON™ can be configured to communicate with a designated host computer. Communication links for a printer are also provided.

A 3 color (red/amber/green) status **Light Tower** is included and located at the exit, top of the furnace.

E. OVERTEMPERATURE PROTECTION

A separate and independent non-indicating factory set overheat protection is provided in each zone. When furnace temperature exceeds overheat condition, heater power is shut down.

F. ATMOSPHERE CONTROL SYSTEM

BTU Atmosphere Control System is included for operating in an inert atmosphere.
Flow meters are provided as follows:

1- Entrance Curtain
1- Entrance Venturi Exhaust
1- Burnout Section Atmosphere
1- Burnout Section Venturi Exhaust
1- Furnace Atmosphere
1- Exit Curtain
1- Low pressure alarms
1- Gas inlet for use with air or nitrogen

Furnace can be used with air, nitrogen or 4% hydrogen in nitrogen forming gas.
Additional gas inlet for forming gas is available as an option.

O2 levels better than 10 PPM above supply. Dew point better than 20^{o} C above supply.

G. ELECTRICAL SPECIFICATION

Connected Load	:	55.2 kW
Operating From	:	480 volts, 3 phase, 50/60 Hz

The connected load above is determined by the belt loading versus belt speed process parameters outlined in Section C of this specification. Typical furnace heater design provides for additional power capacity that may be accessed by simply resetting the power limiting settings in the CPU. Please consult the factory for additional information.

Actual heater power and connected load (kVA) is determined at time of engineering using specific customer product and throughput information. The purchaser is sent formal notification, along with other utility requirements, on the installation drawing for their equipment.

Emergency Off buttons are provided, one at each end of the furnace, connected to a 24V emergency off circuit.

H. PHYSICAL CHARACTERISTICS

Color:	Pillar White
Approximate Shipping Weight:	4,000 lbs.

I. INSTRUCTIONS

Included with each furnace are two books of instructions covering all phases of installation, operation and maintenance.

J. PROCESS PARMETERS

Process: Annealing For Backside Contact Processing.

Product: 30cm (12") x 21cm (8.4") Soda-Lime-Silica Float Glass plates.

Profile: Ramp to 400c at the rate of 45c per minute in zones 1 and 2. Once at 400c, hold for 15 minutes in zones 3 through 5. Controlled cooling begins in zone 6 and continues through zone 7. Exit temperature to be near ambient. Cross glass **uniformity** will be **+/-3c** at the end of the soak period.

Throughput: With a design belt speed of 3 ipm and loading the part with the 8.4" edge leading into the Furnace and allowing 6" between plates, this system will produce the required 10 plates per hour under constant loading.