

1.0.1

SYSTEM DESIGN PARAMETERS

We are quoting to the following job characteristics:

PRODUCT TO BE COATED	:	Rectangular tubes
MATERIAL	:	Steel
MAXIMUM PART HEIGHT	:	6'-0"
MAXIMUM PART WIDTH	:	6'-0"
MAXIMUM PART LENGTH	:	30'-0" (Parallel to conveyor)
CONVEYOR	:	4" I-Beam (By others)
CONVEYOR DESIGN SPEED	:	6 FPM
MAXIMUM PRODUCT THROUGHPUT	:	20,200 lbs./hr.
PAINT DATA	:	Powder
FILM REQUIREMENT	:	1-3 mils average

1.0.2

UTILITY DATA

ELECTRICAL POWER	:	460 volts, 3 phase, 60 cycle (Power)
		120 volts, 1 phase, 60 cycle (Control)
FUEL	:	Natural gas at 1 PSI

1.0.3

BUILDING DATA

SITE LOCATION	:	Kalida, Ohio
BUILDING CLEAR HEIGHT	:	Unknown
INSURANCE UNDERWRITER	:	Factory Mutual (FM)

1.1.1 RADIANT CONVECTION CURE OVEN

TECHNICAL DATA

WORK OPENINGS	:	Width - 7'-0" Height - 7'-0"
TOTAL OVEN TIME	:	5 minutes
PROCESS AIR TEMPERATURE	:	400 deg. F. max.
TEMPERATURE CONTROL RANGE	:	250-500 deg. F. max.
OVERALL HOUSING LENGTH	:	41'-0"
OVERALL HOUSING HEIGHT	:	11'-6"
OVERALL HOUSING WIDTH	:	11'-0"
OVEN VOLUME	:	5,200 cu. ft.
MAXIMUM LOADING	:	20,200 lbs. /hour max.
INSTALLATION AREA	:	Indoor, floor mounted
INSTALLED HEAT CAPACITY BURNER QUANTITY	:	2,500,000 BTU 100 X-Trad burners
APPROX. OPERATING CAPACITY	:	1,500,000 BTU
RECIRCULATION AIR CAPACITY MOTOR	:	26,000 CFM 25 HP
TOTAL AIR CHANGES	:	5 per min.
EXHAUST CAPACITY OPERATIONAL MOTOR	:	1,200 CFM 1 HP
OPENINGS	:	Exhaust hood at entrance, Power air seal at exit.
OVEN CONSTRUCTION	:	6" insulated panels

DESIGN DESCRIPTION

This is a gas fired "Radiant- Convection" oven. This oven provides:

- High efficiency X-Trad Radiant burners, 96% combustion
- Burner output variable from 6,000 BTU to 25,000 BTU
- Faster curing times
- Smaller oven
- Reduced operating cost for gas
- Reduced operating cost for electric

The cure oven is complete with gas fired "X-trad Radiant" burners as the heat source. The radiant burner provides medium wavelength infrared curing but also curing with convection heat. This combination provides excellent paint and powder curing.

The radiant burner manifolds will be installed along both cure zones in a high / low configuration. This will provide even heat infrared distribution through the oven. Air recirculation will be of such volume to provide even air flow through the oven.

The combustion system is designed to allow for single zone automatic temperature control and to maintain oven temperature at selected control point within specified range. Heating equipment will include burners with necessary air/gas mixture equipment, control valves, air pressure switch, automatically opening and closing valves, normally open vent valve, gas pressure regulator, electric gas ignitor, transformer and flame head. Equipment will be shop piped and prewired to recirculation box enclosure.

Temperature control and safety devices will include a proportioning indicating temperature control, electronic flame safety devices, purge timer, air and gas pressure switches and high temperature limit switch. Arrangement of combustion equipment and controls will automatically shut off gas supply to the burners in the event of the following:

Supply, exhaust or combustion blower failure

Electric power failure

Excessive temperature in oven

Failure of gas pressure (high or low)

With the safety equipment provided it will be impossible to light the burners until the exhaust blower has run for a predetermined period of time in order to ventilate the oven.

SCOPE OF DELIVERY

- 1 - Oven enclosure as described above. Oven walls are constructed from 6" thick tongue and groove insulated panels. Insulated panels are a sandwich construction utilizing mineral wool insulation with 20 gauge aluminized sheet metal internal and external skins. Floor panels will be of the same construction, 2" thick. Shipped knocked down.
- 1 - Oven personnel access door with ladder and platform.
- 1 - Plug type recirculating type fan complete with v-belt drive, guard, TEFC motor, and insulated plug.
- 1 - Prepiped and prewired gas valve train assembly, meets insurance requirements for FM approval.
- 1 - Honeywell UDC 2000 temperature controller, panel mounted with T/C lead wire from thermocouple mounted in oven interior.
- 1 - High limit temperature control, oven wall mounted.
- 1 - Set of air flow switches & pressure switches for interlocking with heating system.
- 1 - Set of aluminized sheet metal ductwork with cones to evenly distribute the recirculating air through oven.
- 1 - Exhaust air fan of centrifugal design, complete with adjustable v-belt drive, guard, TEFC motor and manually adjustable damper.
- 100- X-Trad radiant burners complete with (2) burner manifolds (double), combustion blower, and all necessary controls.
- 1 - Set of miscellaneous parts for field installation.

1.1.2 ELECTRICAL CONTROL SYSTEM

This section is a description of controls for the entire system.

TECHNICAL DATA

Power Supply	:	460 volts, 3 phase, 60 cycle
Control	:	120 volts, 1 phase, 60 cycle

DESIGN DESCRIPTION

The motors, starters, and control system is provided in NEMA-12 control enclosures, all prewired.

All controls for equipment will be self-contained with pilot lights, start/stop push buttons, and selector switches. Interlocks for the process equipment will be included in the system controls. The control panel will control the functions for the following:

- Powder Cure Oven

The control panel will be fully integrated containing all necessary controls for fans, pumps, safety interlocks, etc., for controlling the equipment. Monitoring instruments, indicating lights, push buttons, and selector switches will be door mounted and identified with name plates. The cabinets will include numbered terminal strips for the interconnection of field mounted devices.

Wiring within the control panels will be to NEC electrical specifications and color coded according to the following schedule:

- Red wire for 120 VAC control voltage
- White wire for grounded 120 VAC neutral
- Green wire for earth ground
- Black wire for 3 phase, 460 VAC
- Multi-conductor shielded cable for low level signals that require noise immunity

Documentation will consist of electrical schematic diagrams with bill of materials.

The control panel will contain the following:

- 1 - System disconnect switch with lock-out handle mechanism.
- 1 - Step-down control transformer to supply the 120 VAC control voltage required.
- 1 - Set of components for each 3 phase motor will be supplied as follows:
 - (3) Fuses
 - (1) Starter with overloads
 - (2) Push buttons - (1) start, (1) stop
- 1 - Panel cooling system via forced air fan and filter assembly.
- 1 - Radiant convection curing oven control system:
 - (1) Temperature controller
 - (1) Flame monitoring control
 - (1) High temperature limit controller

NOTE: ABB components will be used wherever feasible.