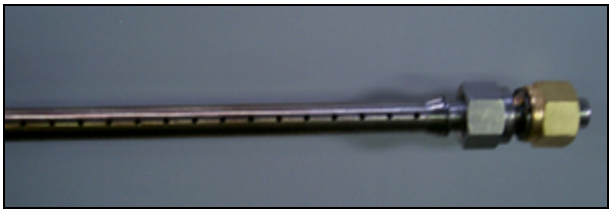
Glossary

Access Level — Permissions granted at time of log-on to perform certain menu operations.

Across-the-Belt — In reference to an area perpendicular to the direction of travel through the furnace; the width of the conveyor belt.

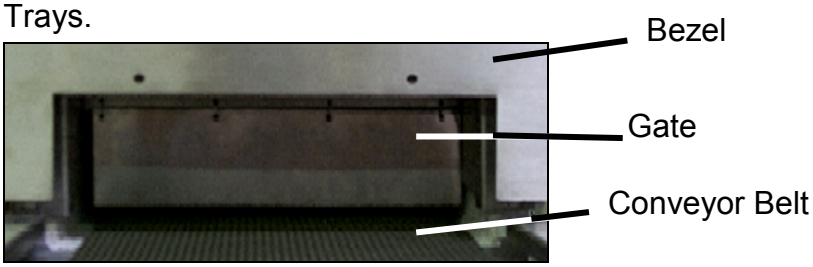
Actual Temperature — The instantaneous temperature in the furnace as reported by the thermocouple.

Air-Rake — Long tube set across-the-belt with proportionally spaced small holes.

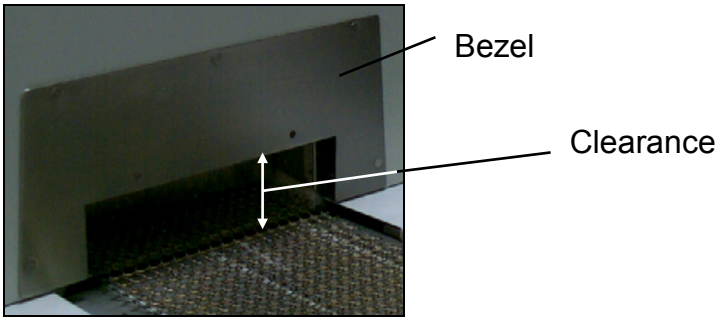


Air-Regulator Tubes — Air rakes charged with air or N2 installed in the entrance and exit baffles, used in establishing a controlled atmosphere.

Blade — Hinged flaps at entrance and exit of furnace that help prevent furnace atmosphere from escaping. See also figure under Drip Trays.



Bezel — Semi-permanent entrance guard at furnace entrance and exit. See also Gate.



CDA — Clean dry air – a process gas used in some furnaces

Chamber — See heating chamber.

Clearance — The distance at furnace entrance between the conveyor belt and the bezel. See diagram under bezel.

Contaminants — Anything present in the process section that could negatively impact product quality including but not limited to O_2, moisture or particulate matter.

Convection — The process of heating a product via indirect transmission of heat from adjacent high-temperature air.

Controller — Internal computer that stabilizes temperature, monitors belt speed, alarm conditions and other functions. See also PLC.

Controlled Atmosphere — The atmosphere generated from the process gas, and gas flow patterns within the process section.

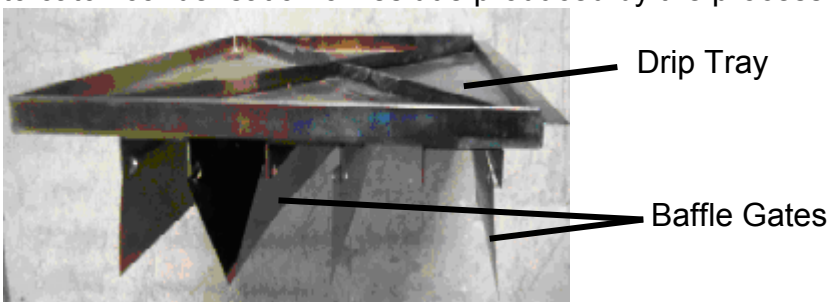
Cooling Section — The portion of the furnace that includes the transition tunnel, if any, exit baffle and any additional modules provided for the purpose of cooling the product.

Derivative — The calculated temperature rate of change; used in the PID equation.

Dilution Purge — The continuous process of adding clean gas while exhausting contaminated gas.

Dominant Wavelength — The wavelength of highest occurrence emitted by a radiating element at a specific temperature as described by Wein's Displacement Law.

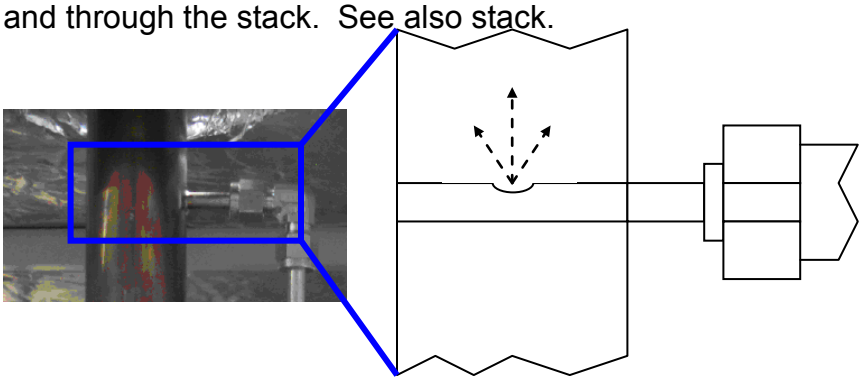
Drip Trays — Trays positioned beneath stacks with attached baffle gates; used to catch condensation or residue produced by the process.



Edge Heater — Heaters along edge of chamber used to maintain uniform temperature across-the-belt in a designated part of the heating chamber.

Eductor

Metered gas exit used to draw exhaust gas out of the chamber and through the stack. See also stack.



Effluents

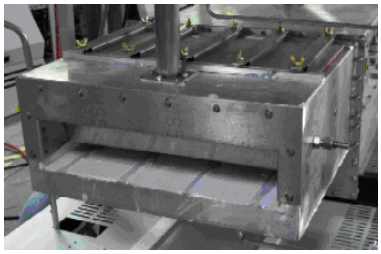
Contaminants expelled from a product during a thermal process. See also volatiles.

EMO

An Emergency off switch.

Entrance Baffle

The section at the entrance of the furnace incorporating an air-regulator tube, hanging gates and an exhaust stack; used to establish a controlled atmosphere inside the process section.



Ethernet Card

Network interface card. The PC communicates with the controller through the use of Ethernet protocol.

Exhaust Gas

Spent process gas.

Error

Difference between actual temperature and setpoint.

Flash

The point at which organic vapors have reached the temperature and concentration necessary for spontaneous combustion.

Flow Meter

A manually adjustable gauge used to control the flow of gas or liquid to the process section.

Forming Gas

A type of process gas that consists of any mixture of H_2 and N_2 gasses.

Furnace Length

The length of the entire furnace. The sum of the process section and any loading and unloading stations.

Gain

Term in PID equation to calculate how far temperature is from setpoint.

Gate

Plate that divides furnace into sections that can allow better control of the processing environment. See Blade and Drip Trays for picture.

H_2

Hydrogen gas.

Heat Lamp

Double ended metal sleeve clear quartz infrared (IR) heat lamp element or emitter.

Heated Length

See “Heating Chamber”, next.

Heating Chamber

Furnace area where heating takes place. Also referred to as the chamber, or heated length.

Heating Section

The portion of the furnace including the entrance baffle and the heating chamber.

Hydrogen Detector

Detect hydrogen escaping from furnace.

Integral

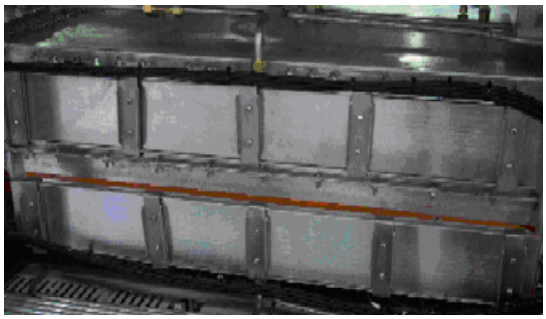
Mathematical operation that is one term in the PID equation.

Interlocks

Switches on some cabinet doors that stop furnace operation and removes power when doors are opened.

IR

Electromagnetic wave. Wavelengths between 0.78 and 1000 μm in the electromagnetic spectrum.

Micron	One millionth of a meter, 1.0 * 10^{-6} m, 1.0 μm
MMI	Man machine interface software development tool for creating user interface to PLC controller.
Module	A section of the furnace designed for a specific function; may be 15, 30, 45 or 60 inches in length.
N_2	Nitrogen gas.
O_2	Oxygen gas.
Oxygen Analyzer	Detects oxygen content at predetermined locations. Usually installed to read process gas source, and up to three locations in the heating chamber.
pcANYWHERE™	Software allowing access to host computer by remote computer.
Phase Angle Firing	Technique that activates AC power to be applied for only certain times during AC cycle.
PC	Personal computer. The PC provides the main operator interface for operating the furnace. The PC interfaces with the PLC.
PID	Proportional+Integral+Derivative: Three-term closed loop control equation that adjusts power sent to heat lamps. See also Gain, Integral and Derivative.
PLC	Programmable Logic Controller. An industrial computer which provides input and output control of the furnace.
Plenum	Cutout area of chamber insulation where process gas is injected.
Plenum Box	Pressurized region, enclosing ends of heat lamps, part of the hermetic seal option. 
PPM	Parts per million. Useful ratio for measuring small amounts of one gas in an area dominated by another.
Process Gas	The gas used in creating a controlled atmosphere. Some examples are CDA, N_2, H_2, forming gas or other N_2/H_2 mixtures.

Process Environment The description of the area inside the furnace at any time including the temperature, flow patterns, and the presence or absence of product, process gas, process effluents, or contaminants.

Process Section The physical area inside the furnace from the entrance bezel to the exit bezel. The sum of the heating section and cooling section.

Profile See Temperature Profile.

Proportional Band The temperature range used in the PID equation in applying a portion of the available power to the heat lamps based on the deviation of the actual temperature from the setpoint.

Recipe Instructions, including temperatures and belt speed that the furnace follows.

Resonant Frequency The frequency at which the atomic structure of a material is easily excited into physical vibration resulting in excellent heat transfer characteristics.

SCFH Standard Cubic Foot per Hour. Measurement for gas flow volume.

SCR Silicon Controlled Rectifier. The electronic device used to regulate power to the heat lamps through signals sent by the PLC controller.

Setpoint The target temperature for a zone.

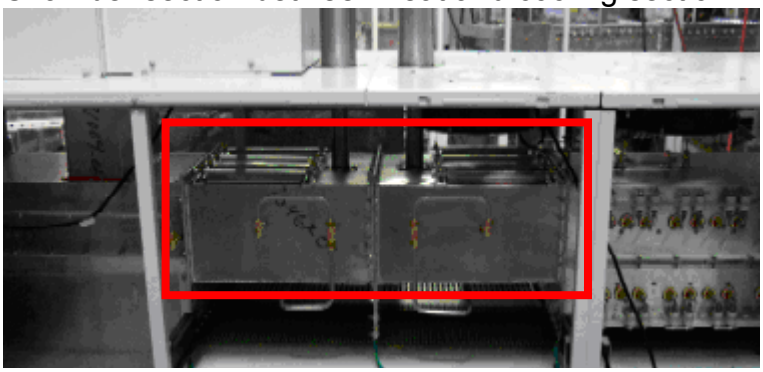
Sparger Tubes Highly porous, sintered metal tube charged with process gas; typically used in controlled atmosphere cooling modules.

Stack Exhaust stack containing eductor.

See also eductor.

Temperature Profile Temperature recorded over a period of time.

Thermal Process The idealized process description for a particular product as it passes through the process section, including the product temperature profile and process environment.

Thermal Process Profile	Empirical record of the thermal process
Thermocouple	An electronic device that measures temperature.
Throat	The throat of the furnace describes the maximum height of any product allowable through the process section.
Transition Tunnel	Chamber section between heat and cooling section. 
Volatiles	Hydrocarbon based product effluents.
With-the-belt	In reference to the area of the conveyor belt that extends through the process section.
Zone	Area within the chamber where temperature can be independently controlled.

Notes: