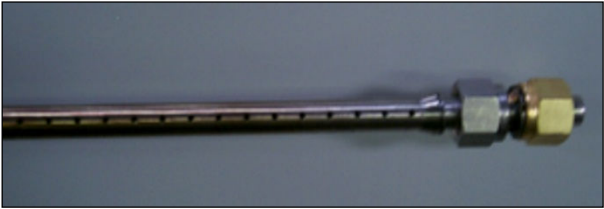

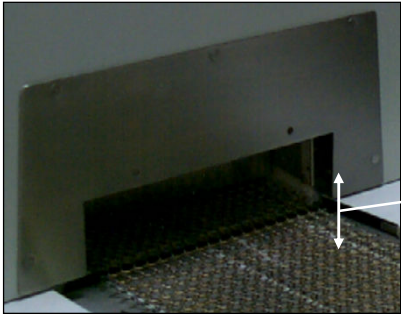
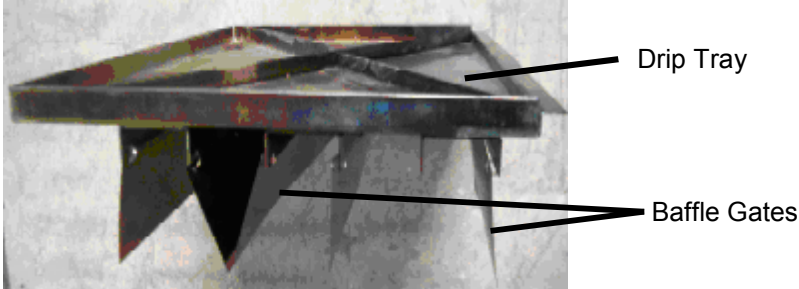
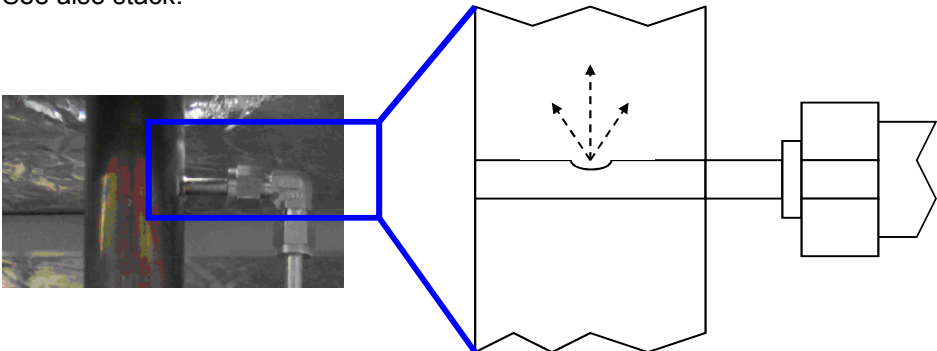

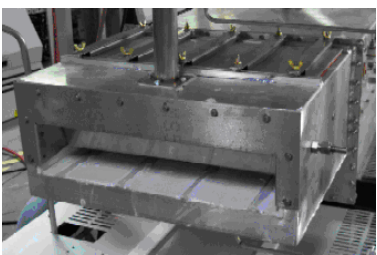



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| Across-the-Belt | In reference to an area perpendicular to the direction of travel through the furnace; the width of the conveyor belt. |
| Actual Temperature | The instantaneous temperature in the furnace as reported by the thermocouple. |
| Air-Rake | 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.  <ul style="list-style-type: none">BezelGateConveyor Belt |
| Bezel | Semi-permanent entrance guard at furnace entrance and exit. See also Gate.  <ul style="list-style-type: none">BezelClearance |
| CDA | Clean dry air – filtered, dry compressed air used as process gas. |
| Chamber | See heating chamber. |

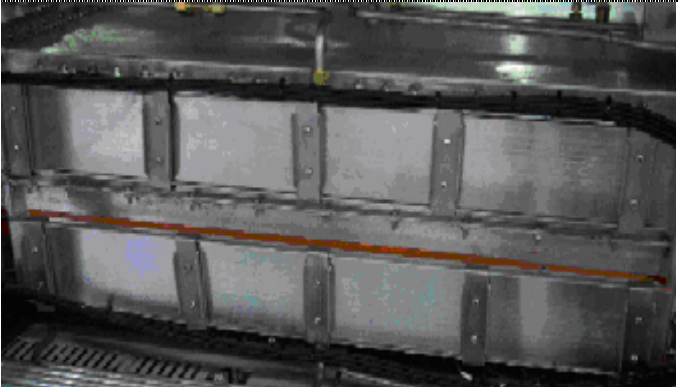
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| Clearance | The distance at furnace entrance between the conveyor belt and the bezel. See diagram under bezel. |
| Contaminants | Anything present in the process section that could negatively impact product quality including but not limited to O ₂ , moisture or particulate matter. |
| Convection | The process of heating a product via indirect transmission of heat from adjacent high-temperature air. |
| Controller | Control system that stabilizes temperature, monitors belt speed, alarm conditions and other functions. |
| 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. |


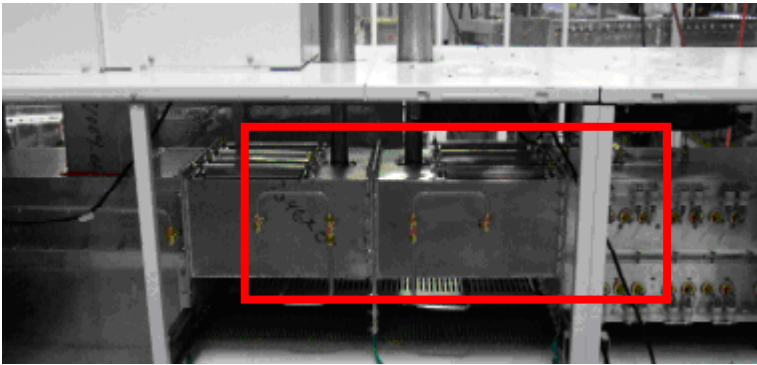
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| <p>Eductor</p> | <p>Metered gas exit used to draw exhaust gas out of the chamber and through the stack. See also stack.</p>  |
| <p>Effluents</p> | <p>Contaminants expelled from a product during a thermal process. See also volatiles.</p> |
| <p>EMO</p> | <p>An Emergency off switch.</p>  |
| <p>Entrance Baffle</p> | <p>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.</p>  |
| <p>Exhaust Gas</p> | <p>Spent process gas.</p> |
| <p>Error</p> | <p>Difference between actual temperature and setpoint.</p> |
| <p>Flash</p> | <p>The point at which organic vapors have reached the temperature and concentration necessary for spontaneous combustion.</p> |

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| Flow Meter | A manually adjustable gauge used to control the flow of gas or liquid to the process section. |  |
| FG or 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. | |
| H₂ | 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. | |

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| Lamp Strings | <p>A single lamp circuit which may include one lamp, or two or more lamps in series.</p> <p>LA-309 Standard Power furnaces are wired with two lamps per string in zones 1 and 3. Zone 2 is wired with 3 lamps per string at all voltages above 240 Vac*.</p> <p>LA-309 High Power furnaces are wired with two lamps per string in all zones at all voltages above 240 Vac*.</p> <p>*208-240 Vac LA-309 furnaces are wired with one lamp per string in all zones.</p> |
| LPM | Liters per minute. Units of flow equivalent to 2.119 CFH. |
| Micron | One millionth of a meter, $1.0 * 10^{-6}$ m, 1.0 μ m |
| 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. |
| N₂ | Nitrogen gas. |
| O₂ | 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. |
| 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. |

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| 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. Equivalent to 0.472 standard liters per minute. | |
| 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. | |

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| 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. |
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| STP | Standard temperature and pressure: 21.1 C (70 F) 1 Atm, 1.013 Bar (14.7 psig) |
| 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. |
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| 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.



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