

Pyro-Clean®

SOLVENT-FREE Cleaning of Laboratory
Glassware and Metal Tooling



Solvent-free cleaning technology eliminates high labor costs and safety hazards common in solvent method laboratory glassware cleaning.

Using organic solvents to clean laboratory glassware and metal parts can be difficult and costly. Cleaning with solvents often does not work when the residue is a relatively inert material such as polymers or can be too slow when large amounts of organic residues are present. Even if effective, solvent or chemical cleaning techniques are usually messy and often are unsafe because of flammability, toxicity, and the possibility of chemical burns. In addition, these cleaning methods are so labor-intensive that it often is more economical to discard the dirty glassware than to attempt to clean it.

Pyro-Clean ovens and their solvent-free cleaning technology eliminate high labor costs and safety hazards often associated with common solvent methods for cleaning laboratory glassware and metal parts. The technique, uses an automated three-stage process to safely clean while saving valuable labor hours for more important projects. The oven can be loaded with all types, sizes and shapes of glassware and metal parts and then be left unattended as contaminants are removed. Only a final rinsing with water is necessary to remove any residual traces of inorganic ash.



The Pyro-Clean Oven

Here's How It Works....

Stage 1 – The oven chamber is purged to remove air.

Stage 2 – Oven temperature is raised to about 900°F to pyrolyze the organic contaminants. Pyrolysis is carried out safely under an oxygen depleted atmosphere, leaving only carbonized residues on the glassware and parts. (Nitrogen purge is also an option for volatile organic residue.)

Stage 3 – Carbon residues are removed by introducing air into the 900°F chamber. At this temperature, the carbon residues are oxidized rapidly. After a preset time, the oven heaters shut off, the oven cools to room temperature and you can safely unload.

Additional Pyro-Clean benefits....

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Additional Pyro-Clean benefits....

- Electrical door interlocks prevent doors from being accidentally opened until the cleaning cycle is finished.
- Over-temperature protection shuts down heaters should the oven overheat.
- A special high temperature oxidation chamber reduces the gasses generated during the cleaning process to safe levels.
- The Pyro-Clean system can be ordered with a nitrogen purge option that allows the cleaning chamber to be saturated with nitrogen gas and rendered entirely inert. This is a necessary option for volatile cleaning loads that may ignite below 400°F. The Barnstead technical sales group can assist you in this decision.
- The stainless steel chamber is fully insulated to maintain cool wall temperatures.
- All-welded interior, dual high temperature gaskets and top-mounted pressure relief door ensure high quality and safe-cleaning environment.

Advantages of the Pyro-Clean Thermal Cleaning System for Heavy Chemistry

- **Eliminate Chemicals and Solvents.** Reduce or eliminate cleaning solvents such as xylene, toluene, naphtha, chlorinated solvents; chemicals such as sulfuric or nitric acids, and alcoholic caustic cleaners.
- **Eliminate Costly Hazardous Wastes.** Reduce or eliminate costs of disposal of hazardous wastes created by cleaning with chemicals or solvents.
- **Improve Safety in the Laboratory.** Reduce or eliminate worker exposure to toxic, flammable, dangerous cleaning solvents or chemicals.
- **Trace Contaminant Removal.** Pyro-Clean units destroy trace residues of organic contaminants, leaving the glassware ultra clean for critical analytical or environmental tests.
- **Remove Heavy Amounts of Organic Residues.** Pyro-Clean units can safely remove large amounts of resins, waxes, polymers, asphalts, tars, and other organics from glassware.
- **Reduce Labor Costs of Manual Hand Cleaning.** Eliminate Breakage. Do away with laborious, manual hand cleaning and scrubbing of difficult-to-remove residues. Eliminate breakage by reducing handling.
- **Sterilizes the Glassware.** The Thermal cleaning process used by Pyro-Clean Systems sterilizes the glassware by completely destroying organic contaminants.

Advantages of the Pyro-Clean Thermal Cleaning System for Plastics

- **Eliminate Tedious, Manual-Cleaning.** No hand scrapping, wire brushing, or drilling. Free your workers for more productive tasks. Let the Pyro-Clean unit do the work.
- **Eliminate Messy Hand-Torching.** Torchng of parts produces fumes which can be hazardous to the worker and is generally a messy dangerous procedure.
- **Prevent Part Damage from Over-Heating and Distortion.** Hand-torching leads to uneven temperatures which can cause distortion and damage the parts. Pyro-Clean units are basically pyrolysis chambers which are self-inerting with no burning in the cleaning chamber itself.
- **No Messy Alumina or Salt Media.** No housekeeping problems. No media replacement costs. Preheat or energy consuming "always on" operation is eliminated.
- **Automated Cleaning Process.** Pyro-Clean units are fully automatic. Load the parts, close the door, push the "start" button, and walk away. No operator attention needed. Unit shuts down and cools automatically.
- **Low Operating Costs.** Model 3 costs about 35 cents per hour to operate, while the larger Model 5 costs about 45 cents per hour. Optional thermal oxidizer gives you full pollution control for only about 20 cents per hour. (Costs based on 10 cents per kwh) No housekeeping problems. No media replacement costs. Preheat or energy consuming "always on" operation is eliminated.

Pollution Control for Pennies!

Thermal cleaning creates pyrolysis gases and smoke during the cleaning process proportional to the amount of plastic or polymer residues on the metal parts. Where the amount of the polymer residue is small enough to generate insignificant amounts of smoke, no special control method may be necessary. However, where larger amounts of organic residues are to be removed, pollution control of the smoke is strongly recommended.