

Discover the Power of
Pyro-Clean[®]
Thermal Cleaning Systems

**SOLVENT-FREE Cleaning of
Laboratory Glassware and Metal Tooling for:**

Analytical
Environmental
Research
Organic
Polymer
Medical
Testing
Industrial
Asphalt
Plastics
Petroleum
Chemical





Pyro-Clean®

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.

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....

- 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.

Clean all sizes and shapes of laboratory glassware, extrusion dies, breaker plates, screen packs, injection molding r

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.

Before & after cleaning of a 1 liter, 4-neck flask with heavy residues of resin



Before



After

Pyro-Clean has the power to clean metal parts, yet delicate enough to clean laboratory glassware without distortion or damage!



Before



After

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.**
 Torching 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)

A metal part with residues of H.D. Polyethylene and the same part after it was cleaned in a *Pyro-Clean* system.



Before



After

Breaker Plate with residues of high impact polystyrene and the same breaker plate after it was cleaned in a *Pyro-Clean* system.



Before



After

nozzles, static mixers, screws and other metal tooling without solvents



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.

Historically, most small thermal cleaning systems have been sold without pollution control of the smoke created during the cleaning process. Smoke control options such as after burners and scrubbers are very expensive, often costing more than the basic cleaning unit itself. To offer pollution control for small thermal cleaning systems at reasonable price, a novel, hybrid design of electric, catalytic, and gas technologies was designed resulting in an Oxidizer for smoke control with a small size of about 12 inches by 24 inches, the ELECTRI-CAT™ Oxidizer.

ELECTRI-CAT™ Oxidizer

The ELECTRI-CAT™ Oxidizer is compact enough to sit on top of all basic *Pyro-Clean*® models, and destroys the pyrolysis smoke and gases produced during the cleaning cycle. The ELECTRI-CAT™ Oxidizer is coupled to the *Pyro-Clean* unit temperature control system such that the rate of smoke emission fed from the unit to the Oxidizer is closely controlled. This prevents overloading the Oxidizer, helping to maintain maximum destruction efficiency.

Operating cost for the ELECTRI-CAT™ is about 20 cents per hour (based on 10 cent/kwh). Pollution control for literally pennies per hour!

Temperature Controllers

Pyro-Clean TRACE models 3, 5, and 7 cu. ft. units use one digital indicating controller. The controller displays setpoint and process temperature. It also provides a safety lock-out feature which prevents unauthorized changes or tampering.

Models equipped with the ELECTRI-CAT™ Oxidizer are equipped with a second controller for Oxidizer temperature display and control. Types OV134200, OV134300 and OV134400 are equipped with the ELECTRI-CAT™ Oxidizer for full pollution control of the smoke created during the cleaning process.

Other Products From Barnstead International



Barnstead|Thermolyne LC 18 and LC8 Heavy Duty Ovens
Designed with Horizontal air flow for excellent temperature uniformity and stability.



Barnstead NANOpure® Diamond™ Ultrapure Water Systems
The Premier Ultrapure Water System on the Market.



Barnstead|Lab-Line MaxQ 2000 Open-Air Platform Shaker
Triple eccentric drive enables 24/7 operation, handles heavier loads and provides smooth uniform agitation.



Barnstead|Thermolyne Explosion-Proof SAFE-T SHP9 Hot Plate Stirrer
Explosion-proof for Class I, Group C and D atmospheres. Large aluminum top plate provides efficient heat transfer and excellent temperature uniformity. Stir solutions up to 400 rpm.



Pyro-Clean Trace®
A better way to remove organic contamination without hazardous chemicals or expensive consumables.

***Call Barnstead International
800-553-0039 for more
information!***