CLEAN WITH HEAT

STRIPPING PAINT HANGERS AND JIGS WITH

CONTROLLED PYROLYSIS™

Introduction

Pollution Control Products Co. has been manufacturing burn-off furnaces for the paint, plastics, automotive, and electric rewind finishing industries since 1971. The furnaces remove coatings from the tooling (jigs, hooks, hangers, fixtures, body skids, paint booth grids, dies, nozzles, engines blocks, extrusion screws etc.) used by high technology process systems. These systems usually deposit the coating on the part thus requiring frequent cleaning of the item to maintain maximum transfer efficiency and to eliminate loss of production. Twenty-five years ago, paint stripping required a varying range of chemicals, all dangerous to use and be around, but even more difficult to dispose of in an acceptable manner. EPA regulations are becoming more stringent every day and other methods must now be considered.

Controlled Pyrolysis Cleaning Furnaces offer finishers a clean, safe, and cost-effective way to clean jigs, other equipment, and reject parts with a very quick pay-back due to greatly reduced labour costs, no chemical costs, and no disposal costs for those chemicals. Cleaning parts on a regular basis should also show a noticeable reduction in rejects and process failure due to the improved condition of the tooling.

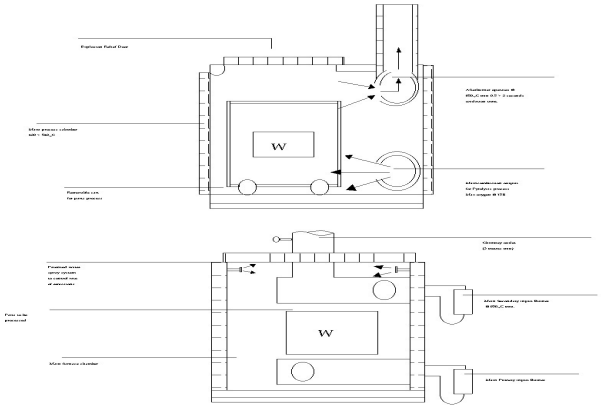
It is important for large firms, who are constantly in the public eye, to be 'environmentally conscious' in all aspects of their production. This applies not only to the primary manufacturer but also to any first, second third, or fourth-generation sub-contractors who are associated with them. In the past few years there has been a sharp increase in U.K. firms using Controlled Pyrolysis furnaces with those firms now reaping the benefits outlined in this report.

CONTROLLED PYROLYSIS™ FOR CLEANING

Controlled Pyrolysis™ Cleaning Furnaces are used for the cleaning of jigs, hangers, hooks, fixtures, reject parts, dies, nozzles, extrusion screws, engine blocks or any metal object which has become contaminated with paint, plastic, or resin coatings.

'Pyrolysis' means the degrading or breakdown of an organic substance by the application of heat, but without any flame. Applying heat in a controlled manner allows Pyrolysis without flames and forms the basic effectiveness of the cleaning system to remove coatings without any damage to the parts. The coating is turned to smoke and other gases leaving behind pigments and other inorganic material which forms an ash.

The Pyrolysis smoke and gases generated by the process is drawn into an integral afterburner where its temperature is raised and the smoke is completely burned at 850°C. The emissions then consist of primarily carbon dioxide and water vapour which are harmless products. The danger of ignition of the parts in the furnace is minimised by the reduced oxygen content, about 10%, inside the furnace thus controlling one element needed for ignition. The process of Controlled Pyrolysis should not be confused with incineration that is the use of fire and flames in an uncontrollable fashion causing damage and distortion to the parts involved.



HOW IS THE HEAT WITHIN THE FURNACE CONTROLLED?

A patented water spray method called CPS controls the temperature within the furnace afterburner in conjunction with the primary burner that cycles high and low controlled by the temperature within the furnace. The length of the cleaning cycles depends on the size, quantities, and amount of paint on the jigs and parts being cleaned. It can vary from two to twelve hours for a range of 5 kilograms upward per hour of paint on the jigs depending on the size and configuration of the furnace and the afterburner system.

With tightening of national and local environmental control policies, it is essential that all cleaning systems conform to legislative demands. The Controlled Pyrolysis™ Cleaning furnace does exactly that.

The furnace uses a cart that can be wheeled in and out of the furnace on removable tracks. The cart is loaded with jigs or parts and wheeled into the furnace and the outside tracks removed. The water spray nozzles are tested and then the left-hand door is closed and fastened whilst the other door stays open. The cleaning cycle-timer is set at the time required, the start button pressed and the cleaning cycle begins. The afterburner comes on after a 45-second purge and then 45 seconds later the primary burner is ignited. After checking that both burners are operating, the other door is closed and fastened. The furnace requires no further attention for the duration of the cleaning cycle. Upon completion of the cleaning cycle plus some cooling time, the doors can be opened, the cart wheeled out, the jigs can be removed, and the process be restarted.

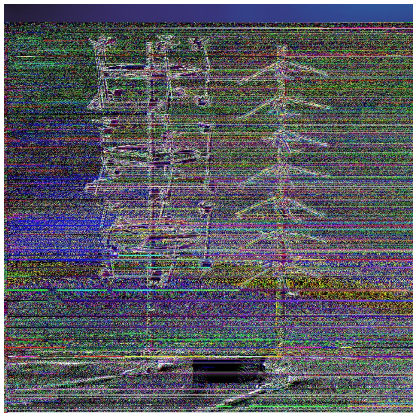
The operating cost of the cleaning furnace is approximately £2.50 per hour using natural gas. Add only a three-ampere single-phase electrical demand and the cleaning of parts by Controlled Pyrolysis is not only easy but also extremely cost effective!

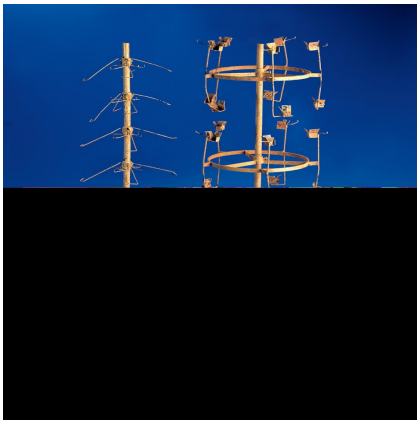
All our systems are specifically designed to offer the end-user the system that suits their requirements. Therefore, we offer a system that is either: -

- Dry Cleaner System for the removal of low volume paint levels.
- Controlled Pyrolysis™(CPS) Cleaning System for typical powder coatings.
- Rate Controlled™ Cleaning System for removal of wet paints from car grates, skids etc.

All our systems have been designed to help business keep up to date with the ever increasing environmental changes, and of course with many businesses currently adopting the new ISO14001 environmental program, our system and unique patented system can only help in achieving the latest standards

BEFORE ***AFTER***





CONTROLLED PYROLYSIS™ FOR CLEANER AIR

ENVIRONMENTAL EMISSIONS

Listed below is information that relates to the latest results of emission tests carried out by BSI (British Standards Institute) for environment requirements on Pollution Control Furnaces. Listed below are the results from 2004,2007 and 2010 against current European limits.

Emission Standards

Component	Test Results 2004	Test Results 2007	Test Results 2010	Limit Values mg/m³				
				UK	Germany	Netherlands	Belgium	Spain
Total Particulate mg/m³ note 1	1.38	0.5	4	20	20	25	30	10
VOC as C mg/m³ Organic compounds	5.5	5.0	1.2	20	20	50	30	10
CO Carbon Monoxide	0.0010%	0.0006%	0.0009%	100	100	100	100	100
H^2O % Water vapour	3	3	3					
CO^2 % Carbon Dioxide	5.7	7.6	7.4					9
O^2 % Oxygen	11	11	11	11	11	11	11	
HCI mg/m³ Hydrogen chloride	0.00	0.00	0.7	100	20	Unknown	Unknown	7
Afterburner Temperature	850°C	850°C	850ºC 2 second dwell period	850°C 2 second hold dwell time	850°C 2 second dwell period	850°C 2 second dwell period	850°C 2 second dwell period	850°C 2 second dwell period

Notes

1. **Values correspond to 2010 limits.**
2. **Results of emission concentrations expressed @ 11% oxygen, 273K, 101.0kPa dry gas per current EPA testing standards.**
3. **800ppm equals 100mg/m³**

ENERGY USAGE (Based on a PTR260 Medium Sized furnace)

GAS

The total gas energy consumption using a Pollution Control Furnace has been calculated at between 340,000 to 400,000 BTUs maximum per hour. This equates to some 3.4 to 4 therms per hour using a standard conversion of 1 therm equal to 100,000 BTUs (please note the primary burner goes into a high and low fire once the furnace has reached its main operating temperature). A standard cycle time can vary between 3 and 5 hours depending on the load in the furnace

WATER

The furnace control system works using at a water spray system which will consume a small quantity of up to a maximum of 60ltrs per cycle.

ELECTRICITY

Electricity usage is again very low using 220/240VAc single phase with a 3amp draw the furnace will consume approximately 5.2Kilowatts of power

INSTALLATION OF THE FURNACE

This is a very simple operation. In an ordinary factory, and after the furnace has been put in place, installation can be easily completed by two suitably qualified maintenance engineers in one working day.
The tasks required would be:

1) Connect 3/4R gas line, or 1R or larger if a long run.
2) Connect 15mm water line at 3 bars (7 bars max).
3) Connect electrical service 240/220VAC 3A single phase (standard domestic supply)
4) Run the chimney (three metres minimum through the roof).

Extra hours may be need if there is any variation required by the building regarding the chimney.

MAINTENANCE & SPARES

As there are very few moving parts to the furnace very little can go wrong. The most common faults that occur are the water solenoid valves failing especially in areas with hard water and the water spray nozzles becoming blocked. Both these faults can usually be easily rectified on site, however, should a client require a spare part this will be

dispatched from our stores the same day or the next day depending on the time of day the order is received at our factory.

SAFETY IN OPERATION

The furnace is designed to be unattended during its operation. The operator is only needed during loading, checking the setting of the controls and unloading. Built into the operation of the furnace are the following safety points.

1) If the water supply pressure is below 2.7bar under flow conditions i.e. with the water spray system on before start up, the primary burner will not light.
2) If, during the furnace cycle time the pressure falls below 2.1bar the primary burner will be switched off.
3) On reaching a temperature 50 degrees centigrade above the main operating temperature (430 degrees centigrade) in the furnace main chamber the water spray is activated to prevent overheating.
4) A manual reset thermostat set at 530 degrees centigrade is also situated in the main furnace chamber and is the second line of defence against overheating should the water spray fail.
5) Situated in the furnace stack is a thermostat set at a temperature 60 degrees centigrade above the maximum idle temperature of the stack, which can range between 850 and 950 degrees centigrade depending on the type of furnace supplied and the operating conditions at site. The thermostat will operate the water spray when this temperature is reached. This has the effect of limiting the production of Pyrolysis gas to a rate that the secondary burner system can handle with a wide safety margin.
6) An alarm function is built into the stack temperature controller which is activated when the temperature in the stack rises a further 50 degrees centigrade above the set point outlined in point 5. When activated water spray is sprayed into the furnace main chamber at a rate of 3.9 litres per minute. This spray system is independent to the ones mentioned previously and is designed to prevent overheating should the other water spray system fail or the furnace be overloaded and unable to control the rate of smoke emission even with the primary water spray operating.
7) If for any reason the secondary burner fails, power to the primary burner will be interrupted.
8) Door interlock is provided to prevent the doors of the furnace being opened during the operating cycle. This can be set to a temperature determined by the client, usually 260 degrees centigrade and will not allow the furnace doors to be opened when the temperature is above this point.
9) Gravity sealed explosion relief door(s) to protect the furnace main chamber from over pressure.

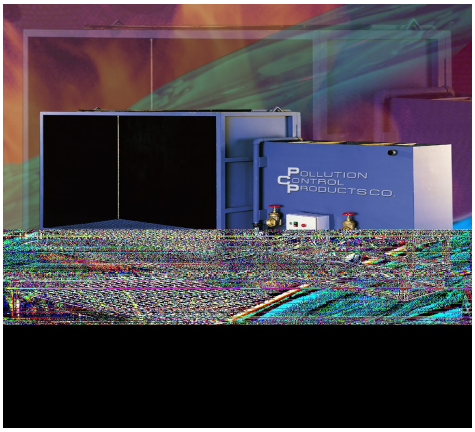
AFTER TREATMENT

Most users of a Pollution Control Furnace will not require any after treatment to their jigs and parts etc once they have been removed from the furnace. As each clients individual

needs are different there are several inexpensive and quick ways that can be applied to the screws and parts etc as an after treatment should the need arise to remove any residues that may be present. These range from wiping the parts down with a damp rag, dipping in a water bath (the water contains an inhibitor to prevent rusting), washing down with a high-pressure water hose (the water again contains an inhibitor), bead, shot, or sand blasting.

Pollution Control Products also provide Water-Wash System as part of an integral operation if the end user requires further post cleaning operations. These units can be custom built to meet the exacting requirements of the system.

WATERWASH SYSTEMS



QUALITY

All Pollution Control Products furnaces are designed and built to the highest standards, but being able to offer the customer the most affordable system available today.

Each unit is built in accordance to ISO9002, CE certified by BSI, as well as being tested by an independent body to over 16 times its safe working condition for explosions.

Major Users

Peugeot Motor Company, Toyota, Daewoo (Poland), Ford Motor Company, Borg Warner, Kenwood, Goodyear, General Electric, Kawasaki, Triumph Motorcycles, Siemens, Yale Security Locks, Hoechst, ICI Chemicals & Polymers, ABB, Hygena, Raleigh Cycles, Honda, Bayer, LNP, Volvo.

Current user worldwide exceeds nearly 7,000.

Pollution Control Products - Europe