

Low Oxygen Cleaning Ovens type Pyrox

General Information



PYROX bv
Steenbakkersdam 7a
2340 Beerse
Belgium

E-mail: Info@pyroxovens.com
Internet: www.pyroxovens.com
Tel: +32 14 762377

Preface

Pyrox BV is a developer, manufacturer and seller of Low Oxygen Cleaning Ovens, Pyrolysis Ovens and Burn-off Ovens. These are used for cleaning metal parts (removal of paint), cleaning metal parts from the plastics industry and pyrolysing the binders, insulation materials and varnishes / resins of electric motors and transformers.

Organic material is thermally removed from non-organic material (steel) in our ovens.



Result of cleaning hooks, hangers etc. after the pyrolysis process



Treatment of electric motors

Introduction

The Low Oxygen Cleaning Oven

Our Low Oxygen Cleaning Oven type Pyrox is the improved version of a standard “burn-out oven”, and guarantees a more qualitative thermal treatment of the materials.

During traditional treatment in a burn-out oven, the organic materials (varnishes, resins, paints, plastics, etc.) can ignite during heating due to a too high oxygen level. As a result, the materials do not heat up evenly. This uneven heating (hot spots) can lead to damage of the load (internal cracks, structure changes, etc.), which can lead to loss of quality of the material to be treated. By thermally treating the materials with our “Pyrox oven”, the materials are heated in a controlled manner (in an environment with a low oxygen level), so that no ignition of organic materials can occur, and therefore the quality remains optimal !

This process guarantees you a long lifespan for your materials.

Applications

Our Cleaning ovens are used in:

- Painting industry (paint stripping of different metal parts)



- Plastics industry (cleaning of molds, extruder screws, filters...)



- Electric motors, transformers and (re)winding industry
- Recycling companies for the treatment of motors and transformers

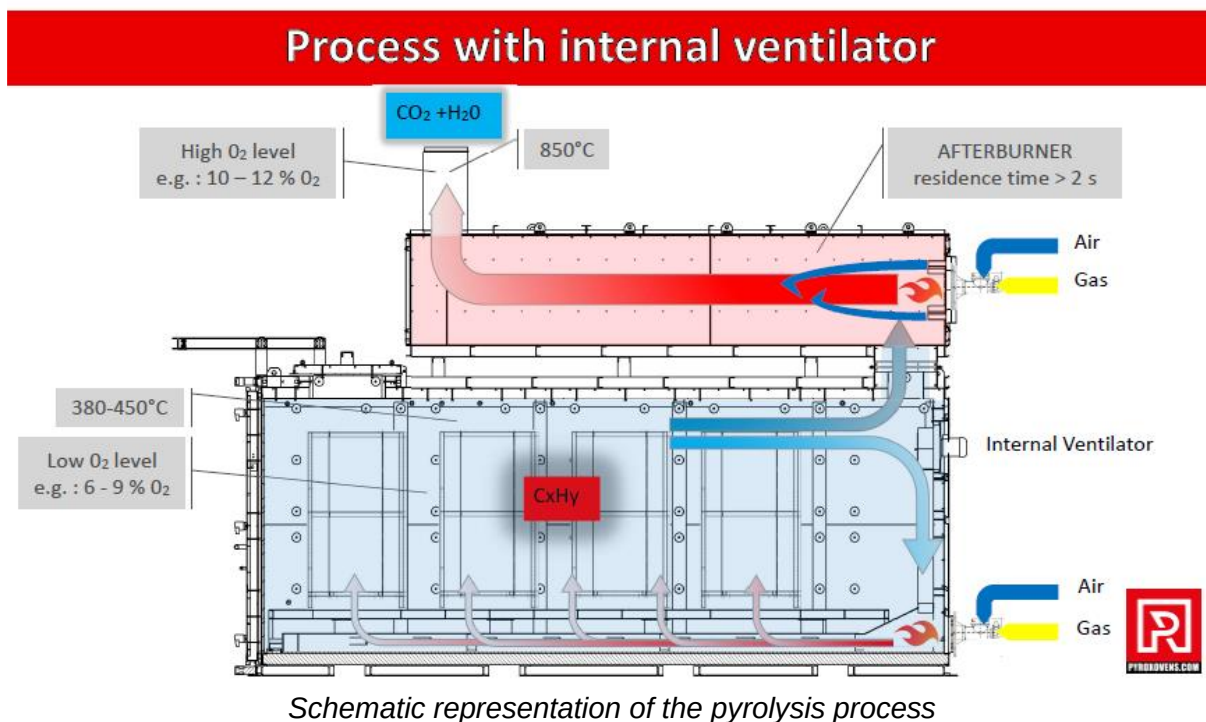


The working principle

The operating principle of a Low Oxygen Cleaning Oven is based on the decomposition of the organic materials by thermal heating in a low oxygen environment (pyrolysis).

The oven consists of two main components, namely:

- The oven room in which the products are heated, with a low content of oxygen.
- The afterburner room where the organic components (VOC) are burned, with a high level of oxygen (temperature: 850°C minimum).



The pyrolysis process itself takes place in the oven room where the product is heated (convective heat). The temperature in the oven is programmable and is $\pm 420^{\circ}\text{C}$ for cleaning painted parts. The process time depends on the quantity and mass of the materials to be treated and is 6 to 18 hours.

During the process, the temperature in the afterburner room is continuously at least 850°C , with the released gases remaining in the afterburner room for at least 2 seconds. When the process time has ended, the oven burner is switched off, after which the afterburner continues to burn the released gases for several minutes.

All Pyrox ovens are designed to comply with the applicable European environmental guidelines, provided that the operating guidelines are observed.

The industrial burners

A good pyrolysis process is only guaranteed if both rooms (oven room and afterburner room) are heated by industrial modulating burners. This technology, in combination with a very accurate process control, obtains excellent results with significant energy savings. The protections, temperature control, gas and air flow of the burner are controlled and monitored by **an integrated PLC with a multifunctional TFT Touch Screen**.

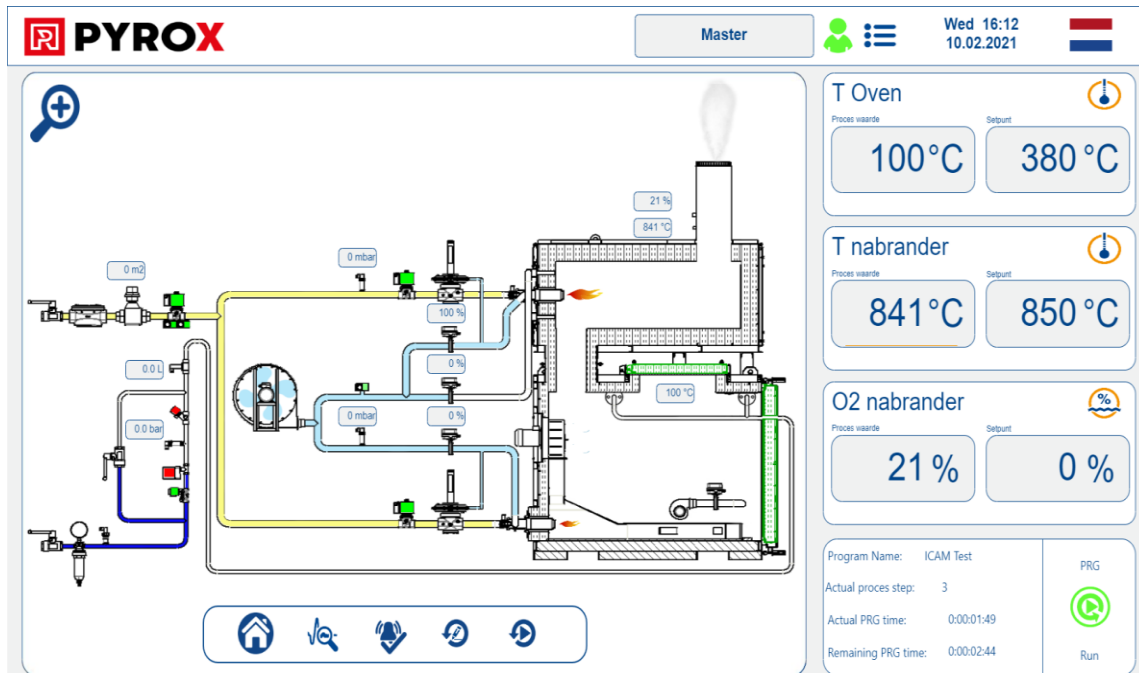
This modern process control (Jumo PLC type Varitron) controls the heating of the oven room and the afterburner room to the set temperatures and oxygen percentages by means of industrial high-quality gas or oil burners. The low oxygen content in the oven room prevents ignition of the organic components. This ignition could damage the parts which have to be treated.



Photo: PLC Jumo Varitron

By controlling the industrial burners via the PLC, a perfect interplay can be created between the control of the oven burner and the afterburner, which continuously adjust to each other. The afterburner heats the afterburner room to a temperature of at least 850°C. The oven burner is then switched on. The oven burner regulates the heating of the workpiece to be treated to the set temperature. The oven temperature set point is entered in the PLC program. Depending on the application, multiple temperature steps can be programmed, whereby the rise and duration time can be set per temperature level. (example: from ambient temperature to 380°C in 90 min., 120 min. at 380°C, from 380 to 395°C in 40 min., 120 min. at 395°C, etc.) During heating of the oven room, the capacity of the afterburner and oxygen percentage must be continuously adjusted. This is because the temperature of the released gases is much higher than in the initial phase. During the process, the oven burner remains continuously in operation so that the flow of contaminated gases to the afterburner room is always guaranteed.

Controlled and accelerated cooling of the oven room and afterburner room is possible via the control of the air supply to the burners or by external ventilation.



Example of an application screen (operated by Touch screen)

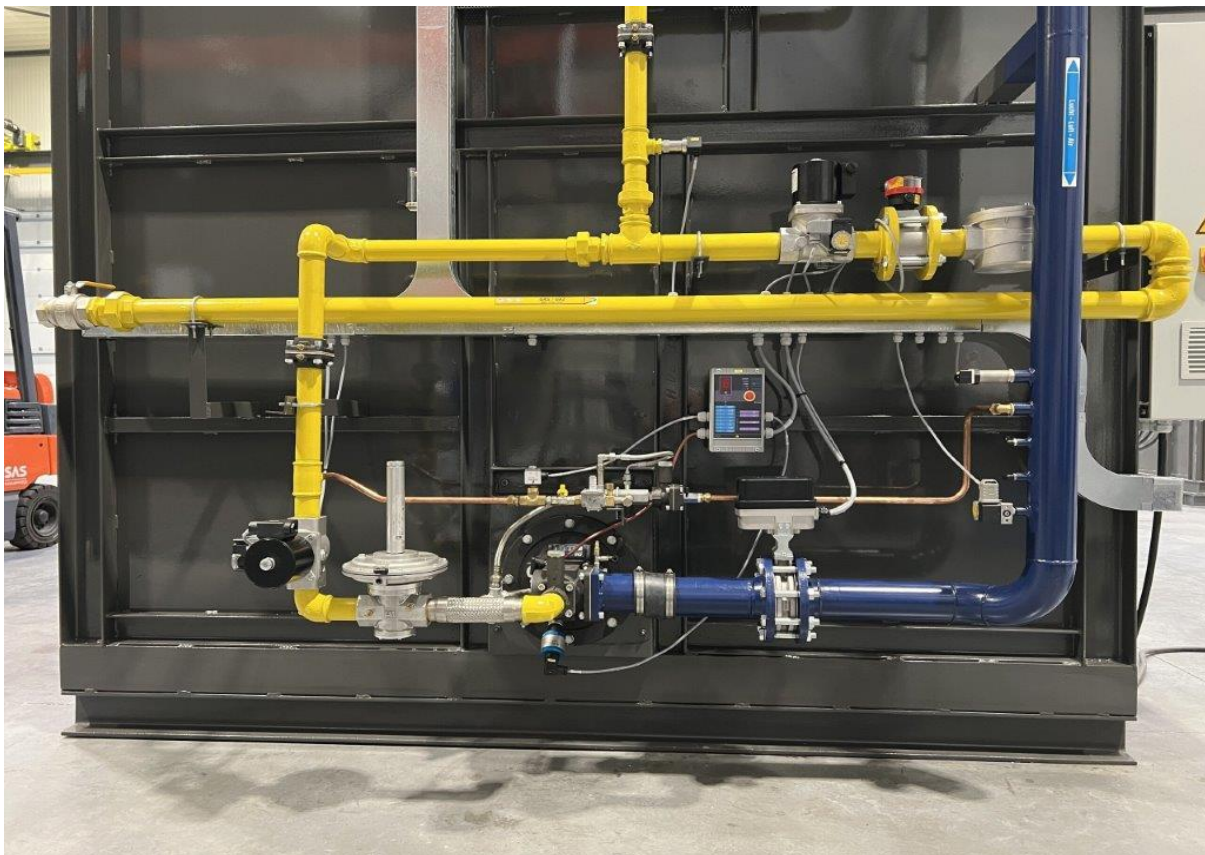


Photo : industrial ovenburner with integrated pilotburner

Dimensions and specifications

The Low Oxygen Cleaning Ovens are available in various sizes, with various options, and are supplied with industrial gas burners (Pyronics) as a standard. Ovens running on propane gas and oil are also available.

Our product range consists of several standard ovens (see below).

Pyrox bv also designs and produces ovens to customer specifications up until a net capacity of 90 m³.

Dimensions of standard cleaning ovens type Pyrox :

Type	Inside dimensions (m) measured on the cart			Usefull content on the cart
	W (m)	D (m)	H (m)	m ³
PYROX 2 iv	0,85	1,15	1,00	0,98
PYROX 3 iv	1,00	1,25	1,20	1,50
PYROX 4 iv	1,30	1,55	1,50	3,02
PYROX 5 iv	1,45	2,15	1,70	5,30
PYROX 6 iv	1,60	2,15	1,70	5,85
PYROX 8 ivs	1,90	2,15	1,90	7,76
PYROX10 ivs	2,00	2,60	1,90	9,88

all dimensions are guidelines and not binding

Symbols :

i = industrial burner

v = internal ventilator

s = sliding door

Technical characteristics (natural gas):

	PYROX 2 iv	PYROX 3 iv	PYROX 4 iv	PYROX 5 iv	PYROX 6 iv	PYROX 8 ivs	PYROX 10 ivs
Max. Gas consumption*(m ³ /h)	12	12	14	21	21	26	33
Avg. Gas consumption*(m ³ /h)	5,5 – 8,0	5,5 – 8,0	6,0 – 9,5	9,0 - 14	9,0 - 14	11,5 - 17	15 – 22
Gas pressure	25 - 100 mbar on the oven by max. gas consumption						
Max. capacity oven burner:	60 kW	60 kW	60 kW	90 kW	90 kW	130 kW	150 kW
Max. capacity after burner:	60 kW	60 kW	80 kW	120 kW	120 kW	130 kW	180 kW
Water pressure	Water pressure needs to be between 2 and 6 bar						
Water connection (diameter)	15 mm	15 mm	15 mm	15 mm	15 mm	15 mm	15 mm
Electrical power**:	3 kW	3 kW	3 kW	4 kW	4 kW	5 kW	5 kW
Voltage supply:	3 x 400 V + PE	3 x 400 V + PE	3 x 400 V + PE	3 x 400 V + PE	3 x 400 V + PE	3 x 400 V + PE	3 x 400 V + PE

* = the average gas consumption depends on the load of the oven and also on the caloric value of the natural gas.

** = electric power without options

Chimney parts

The total chimney height depends on the version (construction) and the height of the oven. Local regulations may require a minimum height of the chimney above the roof.

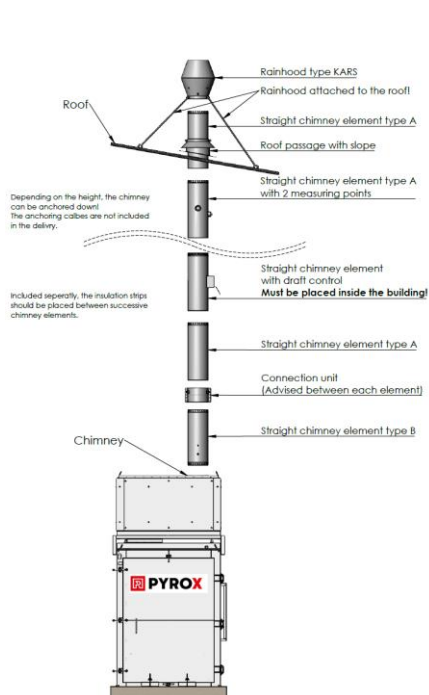
The diameter of the chimney for the standard ovens is:

- Type Pyrox 2 iv – 4 iv : diameter 355 mm
- Type Pyrox 5 iv – 10 ivs : diameter 400 mm

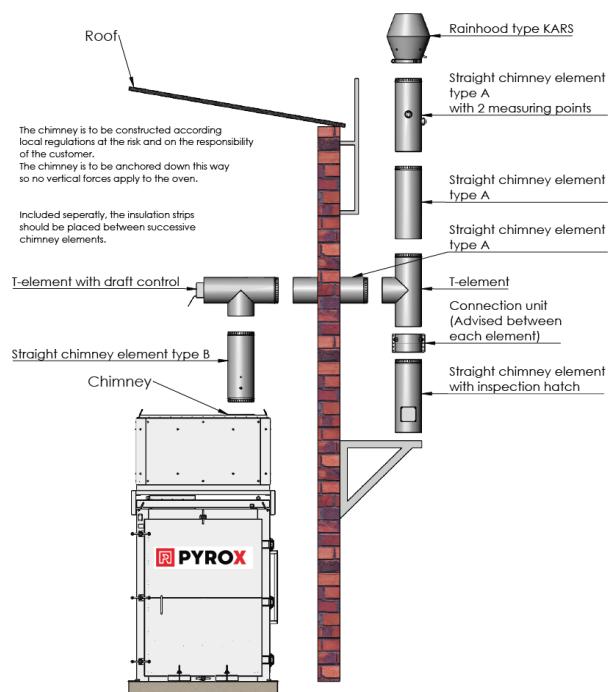
The chimney is usually constructed as follows :

- Version A : straight up through the roof
- Version B : out through the wall and up along the outside wall by means of 2 T-elements

Version A :



Version B :



Depending on the building of the customer, the chimney can be made to measure.

Options

Our cleaning ovens can be equipped with various options :

- Temperature measurement of the unit to be treated
- Electronic gas flow measurement (photo 1)
- Extra cooling in the oven room (photo 2)
- O₂-measurement + O₂-control in the afterburner room (photo 3)
- Stainless steel protective covers in the oven room (photo 4)
- Hydraulic closing system (photo 5)
- Indirectly driven internal fan, frequency controlled (photo 6)
- Electric door lock (photo 7)
- Chain-driven cart (photo 8)

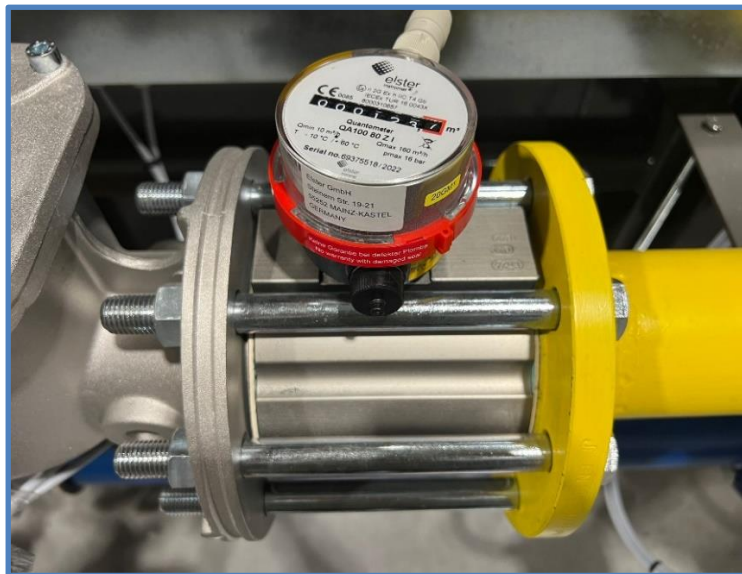


Photo 1

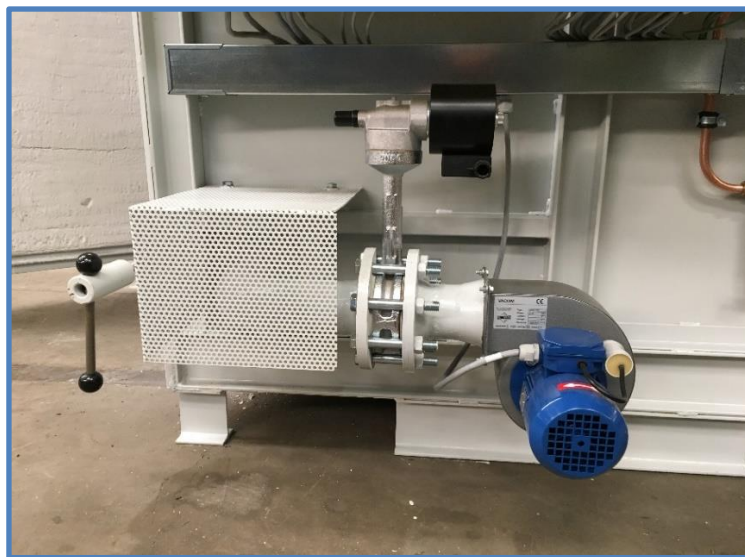


Photo 2



Photo 3



Photo 4



Photo 5



Photo 6



Photo 7



Photo 8

For further information, do not hesitate to contact us.

We to refer you to our website : <https://www.pyroxovens.com>

We are also happy to carry out a test with parts that you make available to us.