

## Vulcan Infa Red Powder Curing Oven

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Stock No	<a href="#">JR007C</a>
Manufacturer	<a href="#">Vulcan</a>
Model	Gas-Catalytic Flameless Infra Red Oven
Year of Manufacture	2011
Work Envelope (WxDxH mm)	500 x 14,000 x 2,000mm high
Process Stages	7 linear heat zones x 2 upper and lower
Location	Birmingham
External Dimensions (WxDxH mm)	2,000 x 16,000 x 5000mm high

### Description

Gas-Catalytic Flameless Infra Red Oven Concept

Gas Infra Red Catalytic heaters work on the "heat without a flame" concept. Natural Gas is passed through a pad which has been impregnated with a proprietary catalyst. This catalyst oxidizes the gas thus releasing energy in the form of heat,

water vapour and carbon dioxide

In order to initiate the reaction, the platinum catalyst needs to be preheated. This is achieved by the inclusion of a low wattage electrical heating element embedded in the heater.

Once the catalyst has reached 149°C, safety devices are activated by the preheat controls and gas is dispersed into the catalyst through the back of the heater. Oxygen for the reaction enters through the front of the heater face. The face screen protects the catalyst from process mishaps while allowing the air to freely reach the reaction sites of the catalytic process.

Since the reaction temperature with current catalysts reaches a maximum of 538°C, which is well below the auto-ignition point for gas (704°C), the reaction is flameless. Two minutes after the gas enters the heater, the catalytic reaction is sufficiently established that the pre heater is turned off. The catalytic reaction is self sustaining until the gas supply is turned off.

Efficiency tests have established that up to 80% of the gas is converted into Infra Red heat. The heat that is produced by the catalytic reaction maintains a heater surface temperature of 200 - 400 °C, and is evenly distributed across the surface of the heater.

The Infra Red heat is in the form of medium to long wavelength energy which is readily and evenly absorbed by a wide range of materials. It is this particular form of low intensity IR that matches the absorption characteristics of organic coatings such as powder and liquid as well as that of water.

As a result these coatings quickly increase in temperature when exposed to catalytic heaters. It is the wavelength aspect of Gas Catalytic Infra Red that gives this process a slight advantage over Electric Infra Red heaters, which give off a shorter wavelength.

Due to the flameless nature of the catalytic reaction, the only by-products are Carbon Dioxide and water vapour. There is NO production of any of the gases in the NOx group of pollutants, such as Nitric Oxide and Nitrogen Dioxide. The creation of these pollutants is highly temperature dependent and recognized as the most relevant source when combusting natural gas.

The killer advantage that Gas Infra Red has over convection heating is the highly efficient conversion of natural gas into heat that is used to raise the part temperature.

Old style convection ovens, use 5%–7% of the heat generated to raise the part temperature. Gas Infra Red heaters heat the part directly, and do not rely on convection, as with a conventional oven.

With the catalytic process, 80% of the energy in the natural gas is converted to heat energy, and directly absorbed into the part.

So not only are Vulcan Catalytic Systems environmentally firendly, they are also highly efficient.

Control.



Gas Catalytic Infrared heaters have a very useful property that allows control over heat output. This is achieved by controlling the amount of gas that flows over the catalytic bed of the heater.

Apart from the inherent increase in efficiency that is achieved by using Gas Infra Red, Vulcan has developed state-of-the-art UL approved PLC controls , which incorporate a unique Gas Pulse System (GPS).

This provides a methodology for creating zones within the oven that can be controlled to give the right amount of heat in the right place, thus reducing the amount of wasted energy. The GPS carefully meters precise volumes of gas which is pulsed through each heater, ensuring ideal heat output while allowing for multi zoned heating arrays.

The Vulcan Gas Pulse Control System incorporates a recipe-based menu which interfaces with digital output cards.

Operators merely call up the recipe on the touch-sensitive screen and the system automatically sets the heat output to suit the part type.

Additionally, during production downtime, the oven can be switched into a Lo-Fire state, which reduces the gas input to the minimum required to maintain the catalytic reaction. This equates to about 20% of the full load output. The transition back to Hi-Fire is less than 60 seconds. This further adds to the potential energy savings of a Vulcan system.

The system control will be by PLC, which will provide a methodology for creating zones within the oven that can be controlled to give the right amount of heat in the right place, thus reducing the amount of wasted energy.

Additionally, during production downtime, the oven can be switched into a lowfire state, which reduces the gas input to the minimum required to maintain the catalytic reaction. The transition back to hi-fire is less than 60 seconds.

With the system being controlled and monitored through a central control panel the oven currently has all of the hardware installed but will require a master PLC and touchscreen to complete the installation. (Control software though is available).

Technical description:

14 zones of heating are available with an overall length of approximately 14 metres.

Each zone will have a maximum heat output of 48 kW and a lo-fire output of 16 kW.

Construction:

The oven will comprise a 14000mm long, floor mounted straight line catalytic infrared heated oven plus vestibules at the entrance and exit for an approximate 16000mm overall length.

The Catalytic oven is modular in design with 7 x 2000mm long fully reflective sheet metal sections.

The heaters are mounted horizontally 8 panels high with the top and bottom panels tilted inward to surround the parts window.

The sections are pre-wired with junction boxes, and pre-plumbed with unions to provide complete ease of Transport and

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final field installation.

The oven also has a top-hat type hood system; designed to straddle the overhead conveyor and has a 203mm exhaust duct for each heated section.

Type: Gas-Fired Flameless Catalytic

Process Time: 9.33 minutes @ 1.5 metres/minute

Dimensions:

Length: 14000 mm effective

Width: 2400mm overall

Height: 3200 mm overall

Number of Heater Modules: 56-off

Maximum Heat Input: 655 kW

Estimated Running Load: 440 kW

Idling Load: 112 kW

Exhaust Volume: 5000 m3/hour

Exhaust Fan:

Type: 1-off Bifurcated Axial

Duty: 5000 m3/hour @ 200 Pa

Motor: 2.2 kW

Professional disconnection, dismantling and loading service provided by Beck & Pollitzer is included in the advertised price.

Individual quotes for Installation service provided by Beck & Pollitzer available on request.

**Photographs taken prior refurbishment. Our refurbishment service is not available on all machines.**