



Technical Specification of CVD Machines— IVA2436

Isobaric Vapour Aluminising

The IVA2436 is designed for the vapour aluminising of nickel based gas turbine components. The out of pack process results in uniform and defect free coatings over the most complex shapes. The maximum weight of work and fixturing is 300Kg.



Overview

Vapour aluminising (IVA) is a form of out-of-pack aluminising operated at a low constant pressure to achieve good throwing power and uniformity of layer thickness. The process operates at temperatures between 900 and 1050oC and at pressures in the range 1 to 50 mbar. The aluminium content of the resulting layer can be adjusted by the process conditions and also by the subsequent heat treatment which can be carried out in the same furnace.

IVA has a number of advantages over pack aluminising:

1. More rapid cycle time because the parts are not surrounded by pack.
2. Better coating uniformity on each part.
3. Less variation in coating thickness from one place in the retort to another.
4. No coating defects caused by pack inclusions.
5. Lower cost of operation because less pack material is used.
6. Less pack material to be dumped safely.

The IVA2436 consists of a double-pumped vacuum furnace and retort. The normal operating temperature range is 900 to 1150oC. The normal operating pressure range is 1 to 50 mbar. The double pumping arrangement is necessary to ensure that the inner hot retort wall does not collapse.

The retort is stationary and the furnace is moved via an overhead crane from its parked position, already at the working temperature, thus decreasing the heat-up time.

The stationary retort is supported on a steel frame that also provides a platform for the loading, and unloading of the removable work trays and for any maintenance work.

Because the furnace is removed from the retort while at running temperature, a cooling shroud is placed around it to prevent damage and to accelerate cooling.



Specification

Criteria	Specification
Reactor Overall Dimensions	600mm x 1700mm
Reactor Working Zone	600mm x 900mm
Footprint	10 x 6.5 x 6 m (32 x 21 x 20 feet)
Temperature Range	900-1150°C
Temperature Measurement	S-Type Pt/Rh thermocouple in each zone
Temperature Control	3 zones with PID control
Pressure Range	1-50mBar (standard control range) Lowest operating pressure: 1mBar Highest operating pressure: 1000mBar
Pressure Measurement	Absolute pressure transducer
Pressure Control	Motorised line valve
Vacuum Pump	Rotary oil Piston Pump Capacity: 250m ³ /Hr (150 cfm) approx.
Gas Control	Argon purge controlled by mass flow controller
Materials of Construction	Furnace shell: carbon steel Retort: Inconel 601 Heaters: Kanthal A1 Vacuum lines: Stainless steel
Electricity	100KVA
Cooling Water	20litre/min

