Technical Specification of CVD Machines – IVA1824HL

Isobaric Vapour Aluminising

The IVA1824 HL 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 150kg.

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 1050°C 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 IVA1824 HL consists of a single horizontal retort together with a vacuum pump and electrical control box mounted on a mobile skid. The normal operating temperature range is 900 to 1100°C. The normal operating pressure range is 1 to 50 mbar.

The furnace is stationary and the retort is moved via a pallet truck or forklift truck. The furnace can be maintained at the working temperature, thus decreasing the heat-up time.

The 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. The frame also supports the vacuum pump, and associated control, piping, valves & sensor.

Optional additional retorts can be added which could be for IVA, atmospheric pack aluminising or heat treatment.

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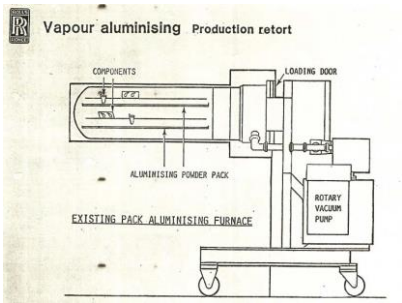
Specification

Criteria	Specification
Reactor Overall Dimensions	457mm x 1350mm
Reactor Working Zone	440mm x 600mm
Footprint	2.5 x 2 x 3 m (8 x 6 x 10 feet) plus space for loading & unloading
Tray Sizes	1 off 420 x 600mm, 2 off 320 x 600mm
Temperature Range	900-1100^{o}C
Temperature Measurement	S-Type Pt/Rh thermocouple
Temperature Control	Single zone 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	Edwards E1M80 Rotary Vane Oil Pump Capacity: 80m^3/Hr (50 cfm) approx.
Gas Control	Argon purge controlled by mass flow controller
Materials of Construction	Furnace shell: carbon steel Insulation: Fire brick backed by ceramic felt Door & Top All ceramic felt Retort: Inconel 601 Heaters: Kanthal A1 Vacuum lines: Stainless steel
Electricity	45KVA
Cooling Water	10litre/min



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