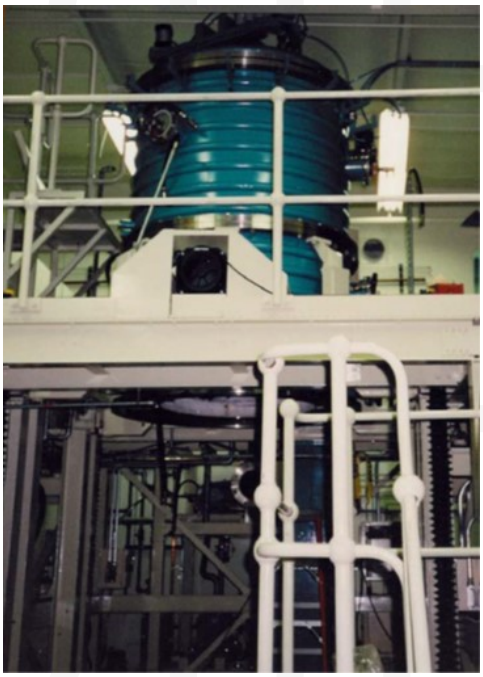
Technical Specification of CVD Machines—HT3242

CVD/CVI Reactor for SiC, C and BN

The HT 3242 is designed for the CVD/CVI of silicon carbide and boron nitride. It has a rotating platform to permit the overall coating of parts weighing up to 300kg in a single cycle. A PLC control system runs the cycle without any operator intervention. The all carbon, working zone is suitable for operation up to 1,600oC at pressures between 1 and 1000mbar



Overview

The CVD/CVI system HT3242 has a graphite working chamber of 32"DIA x 42" high. This is surrounded by 3 independent graphite resistance heaters controlled by thermocouples. Thermal insulation is provided by ceramic fibre, all contained in a stainless steel watercooled vacuum vessel. The main axis of the chamber is vertical and is accessed from the bottom. A screw jack system lifts the reactor bottom head and work into the chamber. The same screw jacks permit the chamber to be removed for maintenance of the heaters.

The reactor is evacuated by a liquid ring pump and two mechanical boosters. The booster pumps both have bypass valves so that a number of different pump combinations can be used.

It has a scrubbing system that ensures a clean effluent gas.

The gas delivery system is from the top and will handle four permanent gas flows (H2, N2, BCl3, NH3) and one gas flow from a liquid source evaporator for MTS. There are two feed lines to the reactor to permit delayed mixing of the reactants - necessary for BN.

The control system is supervised by a PC, which will run complete cycles without any operator intervention. All process parameters are displayed and monitored and any variation beyond chosen limits initiates a safe shutdown.

The machine is supplied with two jib cranes to assist in the assembly and disassembly of the unit for maintenance and replacement of parts.

Another feature is an integral pneumatically actuated lifting jig to enable the top of the reactor (pre-heater zone) to be easily accessed.

Progress Road, Sands Industrial Estate, High Wycombe, Buckinghashire, HP12 4JD, UK

Tel : +44 (0) 1494 462101 Email : info@cvd.co.uk Web : www.cvd.co.uk

ATL
Advanced Coating Solutions

Specification

Criteria	Specification
Reactor Overall Dimensions	8 x 7 x 6m high
Reactor Working Zone	813 diameter x 1066mm bottom loading
Temperature Range	750-1300°C
Temperature Control	3 independent heaters – PID controlled
Temperature Measurement	Thermocouples (2 per zone)
Pressure Range	0.1-30 Torr (0.13 – 40 mbar)
Pressure Measurement	Absolute pressure transducer
Feed Gases	H_2, Ar, CH_4, NH_3, BCl_3
Feed Liquids	$SiCl_4$, CH_3SiCl_3
Flow Control	Mass flow controllers
Vacuum Pumps	Liquid ring vacuum pump - 350m^3/hr Mechanical booster pump 1 – 1,250m^3/hr Mechanical booster pump 2 – 5,000m^3/hr Automatic pressure control by servo controlled line valve
Materials of Construction	Vacuum vessel - 316 stainless steel Heater - graphite Reactor inner chamber - graphite Thermal insulation – ceramic or carbon fibre
Electricity	190KVA (3-phase)
Cooling Water	40litre/min (35°C or less)
Chilled Water	25KVA capacity
Compressed Air	100 p.s.i. small amount for actuators
Effluent Scrubber	Wet scrubbing column with 2,000L tank. Continuous pH monitoring & control.

CVD / CVI Processes

$BCl3 + NH3 \rightarrow BN + HCl$

$CH3SiCl3 \rightarrow SiC + HCl$

$CH4 \rightarrow C + H$

Progress Road, Sands Industrial Estate, High Wycombe, Buckinghashire, HP12 4JD, UK
Tel : +44 (0) 1494 462101 Email : info@cvd.co.uk Web : www.cvd.co.uk