

TECHNICAL SPECIFICATION

CVD/CVI REACTOR FOR SiC, C AND BN TYPE HT2439

The HT 2439 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 300 Kg 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 1,600°C at pressures between 1 and 1000mbar.



The CVD/CVI system HT 2439 has a graphite working chamber of 700 x 1000 mm high. This is surrounded by two independent resistance heaters controlled by thermocouples and two colour pyrometers. Thermal insulation is provided by ceramic fibre, all contained in a stainless steel vacuum vessel and water-jacketed. The main axis of the chamber is vertical and is accessed from the top.

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

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

The gas delivery system will handle six gas flows (CH_4 , H_2 , Ar, N_2 , NH_3 , BCl_3) and one gas from a liquid source evaporator for CH_3SiCl_3 (MTS). All gas flows have mass flow controllers. 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 PLC microprocessor that will run complete cycles without the need for operator intervention. All process parameters are monitored and any variation outside of chosen limits initiates a safe shutdown procedure. The control system is usually installed remote from the rest of the machine for increased safety.

In association with:
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Archer Technicoat Ltd.

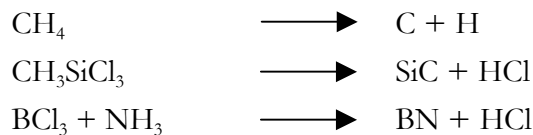
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Specification for CVD/CVI Reactor HT2439:

Reactor overall dimensions:	10 x 7 x 6m high+ height above for loading
Working zone:	700 diameter x 1000mm top loading
Temperature range:	900-1600°C
Temperature measurement:	2-colour pyrometer or thermocouple
Pressure range:	1-100 mbar (standard control range)
Pressure measurement:	Absolute pressure transducer
Feed gases:	H ₂ , Ar, CH ₄ , NH ₃ , BCl ₃
Feed liquids:	CH ₃ SiCl ₃ or SiCl ₄
Flow control:	Mass flow controllers
Vacuum pumps:	Liquid ring vacuum pump - 260m ³ /hr @ 50Hz Mechanical booster pump 1 – 1,220m ³ /hr @ 50Hz Mechanical booster pump 2 – 4,280m ³ /hr @ 50Hz Automatic pressure control by servo controlled line valve.
Materials of Construction:	Vacuum vessel – 316L stainless steel Heaters - graphite Reactor inner chamber - graphite Thermal insulation – ceramic or carbon fibre
Electricity:	225 KVA (3-phase)
Cooling water:	80 L/min
Compressed air:	100 p.s.i. small amount for actuators
Effluent Scrubber:	Wet scrubbing column with 1,500L tank. Continuous pH monitoring & control.

CVD/CVI processes normally operated in the HT2439:



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