



Technical Specification of CVD Machines—HT510

Laboratory Scale Reactor for CVD/CVI

The HT510 is a versatile laboratory-scale CVD/CVI reactor which is suitable for SiC, Si₃N₄, BN, B₄C, AlN, TiC, TiN, TiB₂ and many similar materials. The all carbon working zone is suitable for operation up to 2200°C at pressures between 1 and 1000mbar.



Overview

The reactor is contained within a water-cooled stainless steel vacuum vessel. The internal graphite working chamber is heated by a single zone-graphite resistance heater. The insulation is carbon fiber. A 2-color pyrometer provides excellent temperature control. Several types of graphite jig are available to support samples within the working zone.

The gas supply system uses mass flow controllers to deliver permanent gases into the reactor. It can also be fitted with liquid and solid sources for less volatile starting materials. All parts are stainless steel. Valves are air-actuated for safety.

In the event of a supply or system failure, all reactive gases are isolated.

The reactor is evacuated by a chemically resistant rotary pump. The pressure in the reactor is controlled automatically by a motorised valve. The effluent gas is passed to a wet scrubber unit which neutralises the acid by-products of the CVD process. A cold trap can also be fitted before the vacuum pump if this is required.

The control system is housed in a single cabinet with all of the controls on its front panel. All normal operations of the equipment can be performed from the front panel. The control cabinet can be installed remotely from the rest of the system for increased safety when using toxic or flammable gases.

Specification

Criteria	Specification
Reactor Overall Dimensions	3(10) x 1.5(5) x 2(6.5) [high] m(ft)
Reactor Working Zone	125(5.0)diameter x 250(10.0) [high] mm(inch)
Temperature Range	900-2200°C
Temperature Measurement	2-colour pyrometer
Pressure Range	10-100mbar (standard control range) Lowest operating pressure: 1 mbar Highest operating pressure: 1000mbar
Pressure Measurement	Absolute pressure transducer
Feed Gases	H ₂ , Ar, N ₂ , CH ₄ as standard - others are possible
Feed Liquids	TiCl ₄ , SiCl ₄ , CH ₃ SiCl ₃ , etc.
Flow Control	Mass flow controllers for gases (4 are standard) Metering pump for liquids (1 is standard)
Vacuum Pumps	Chemically resistant rotary oil pump Automatic pressure control by motorised valve
Materials of Construction	Vacuum vessel: 304L stainless steel Heater: graphite Reactor inner chamber: graphite Thermal insulation: carbon fibre
Electricity	50KVA (3-phase)
Cooling Water	20litre/min
Compressed Air	6.5bar (100 psi) in small amounts for actuators

CVD / CVI Processes

