HFCVD—Hot Filament Chemical Vapour Deposition

The Nitor 301 Hot Filament Chemical Vapour Deposition (HFCVD), also known as Hot Wire Chemical Vapour Deposition (HWCVD), is the first of a family of systems aimed at the Photovoltaic R&D and high volume production segments.

Its modular design enables quick development of cluster tools for the deposition of silicon films from amorphous to crystalline layers, thanks to its wide substrate temperature range of 400°C to 750°C, and innovative design.

The Nitor 301 HFCVD system consists of 4 main modules:

The process chamber is water cooled stainless steel and uses a proprietary hot filament array on a deposition area of up to 300 x 300 mm. An optional laser interferometer can be added to monitor real-time film thickness.

The load-lock is supported by a single vacuum pump capable of achieving fast cycle times from atmospheric pressure down to $10^{-5}$ mbar. It has manual loading as standard, which can be upgraded to an automated system.

A separate gas box houses up to 12 gas sticks along with all the process gas control valves. The wall mounted design provides easy access to gas sticks whilst minimising system footprint.

The control system allows manual or automatic operation, with process recipe storage and data logging. Three different user levels: Operator, Process Engineer or Service Engineer. Ethernet connection is also available for system monitoring.
**Main frame**
Dimensions (HxWxD): 1370 x 2050 x 800mm
Material: Mild steel powder coated

**Process chamber**
Dimensions (HxWxD): 330 x 840 x 890mm
Material: Stainless steel

**Gas cabinet (wall mounted)**
Dimensions (HxWxD): 1400 x 800 x 300mm
Material: Mild steel powder coated

**Vacuum connections**
Process pump exhaust: NW40
Load-lock pump exhaust: NW25

**Gas line connections**
Process gas lines 1-12: 1/4” VCR
Chamber nitrogen vent: 1/4” Swagelok
Load-lock nitrogen vent: 1/4” Swagelok
Load-lock pump purge: 6mm pushfit
Gas supply pressure: 20 psi (1.4 bar) maximum

**Compressed air**
Connection: 6mm quick release
Gas supply pressure: 80 psi (5.5 bar)

**Process cooling water**
Supply connection: 2 x 3/4” G
Return connection: 2 x 3/4” G
Supply pressure: 50 psi (3.5 bar)
Total flowrate: 25 lpm

**Other connections**
Main cabinet extract: NW25
Gas cabinet extract: NW40
Spare process ports: 3 x NW40

**Electrical specifications**
Voltage: 200/400 V, 50/60Hz, 3-phase
Power: 15 kW

**Communications**
Ethernet: RJ45