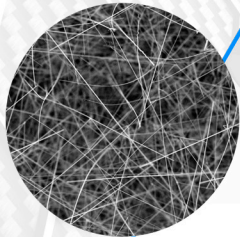


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Equipment  
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# Chemical Vapor Deposition Equipment for EV Battery Materials



Silicon

Coating & Infiltrating  
Powders with  
High Performance  
Nanomaterials & Thin Films



Increased Energy Density



## State-of-the-Art CVD PowderCoat 1104™



- Production Systems for High-Volume, Uniform Coating & Infiltration
- Functionalize substrate surfaces with silicon, carbon, metals, oxides etc. for enhanced performance
- Multi-Chamber Reactor Design for Parallel or Sequential Processing

Complete Turn Key Systems for  
Chemical Vapor Deposition & Infiltration - Gas Management - Abatement

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Corporation

CVD Equipment Corporation  
355 South Technology Drive, Central Islip, NY 11722  
Tel: +1 631-981-7081 | Fax: +1 631-981-7095  
E-mail: sales@cvdequipment.com  
[www.cvdequipment.com](http://www.cvdequipment.com)



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# PowderCoat 1104™ - Chemical Vapor Deposition System

The PowderCoat 1104™ is a multi-reactor Chemical Vapor Deposition and Infiltration System designed to process powder materials for high technology applications including EV battery manufacturing. Precursor gases react to form a coating onto powder substrates. Source gases are supplied through a gas management system to the inlet of a heated Inconel chamber. Thermodynamics and kinetics drive both precursor reaction and decomposition. A five-zone resistive heating furnace is core to the system design; the chamber can maintain process temperatures up to 900°C. Ramp up and ramp down rates are achieved by real time PID precision control. Our robust process control system maintains temperatures within half a degree as well as the pressure within +/- 1% of set point throughout deposition runs. Controlled and rapid cool-down features result in consistent, high-throughput processing for high-volume manufacturing.

The multi-reactor design allows for parallel or sequential processing of up to four batches per system, where each zone can be independently controlled to set up the ideal thermal profile, from the inlet to the exhaust end of the reactor. The size of each process chamber is customizable to afford the flexibility to vary internal configurations for future differentiation.

CVD technology makes it possible to deposit a wide variety of materials, including silicon, silicon nanowires, carbon, metals, oxides, etc. onto powder substrates to functionalize the surface for enhanced performance. In addition, continuous coatings can be attained on substrates with irregular surfaces. Depending upon the process, particle size can vary from sub-micron to hundreds of microns, and the coating thickness can be a few nanometers to tens of microns.

## Features and Options

- High Volume Powder Infiltration & Uniform Coating
- Multi-Reactor Chambers for Parallel or Sequential Processing
- Low Pressure CVD
- 5 Zone Resistance Furnace Heating Systems
- Customizable Inconel Chamber
- Rotating Tumbler for Uniform Mixing
- Robust Production System with Enhanced Process Controls
  - Temperature Control +/- 0.5°C
  - Pressure Control +/- 1%
- Rapid Cool Down
- Powered by CVDWinPrC™
- MES Compatible



Hazardous gas storage and delivery, process reactor, and exhaust treatment subsystems can be provided as a complete integrated solution. Each component of the system is taken from our expansive library of process equipment configurations.

## Technical Data

Process chamber inner diameter	340 mm nominal
Process chamber length	3350 mm nominal
Powder load	up to 50 kg per chamber
Resistive heating furnace	5 Zones
Working temperature	max 900°C nominal
Working pressure	0.5-500 Torr



## High-Touch Customer Service

CVDE has a customized approach to client support. We offer onsite presence, site survey, installation coordination and field acceptance. NRTL/CE Certification is available. Initial start-up support and on-site training, warranty response and remote capability through help desk support are all available through our tailored service plans. Support contracts can be customized for spares and consumables, preventative maintenance and site personnel.



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