

# Delphi Kokomo Technical Center Environmental Testing

Delphi conducts testing that subjects components to a variety of environmental conditions, including varying temperature and humidity.

Utilizing the latest technology, Delphi offers environmental testing services. Our experienced engineers develop testing programs for many different types of products, including:

- Complex engine controllers
- Hybrid vehicle battery assemblies
- Radar systems
- Sensors
- Entertainment products
- Other Non-Automotive products

### ► Capabilities

- **Altitude**
  - Interior dimensions:
    - Width: 48 in. (1.22 m)
    - Depth: 48 in. (1.22 m)
    - Height: 48 in. (1.22 m)
  - Temperature range: -73°C to 177°C
  - Humidity range: 20% to 95% relative humidity
  - Altitude range: Ambient to 100,000 ft. (30 km) in 20 minutes
- **Angular Velocity**
  - Rate range: 0 to 1,000 degrees/second
  - Accuracy:  $\pm 0.1\%$  of set rate
  - Peak torque: 25 lb./ft. (3.5 kg/m)
  - Acceleration:  $0.5^\circ/\text{sec}^2$
  - Maximum weight: 250 lbs. (113 kg)
- **Connector Insertion / Extraction**
  - Load-weighing accuracy:  $\pm 0.5\%$  of reading
  - Strain measurement accuracy:  $\pm 0.5\%$  of reading
  - Test speed: 0.02 - 20 in./min. (0.508 - 508 mm/min.)
  - Static load limit: 2 kN
- **Dust**
  - Interior dimensions:
    - Width: 72 in. (1.83 m)
    - Depth: 60 in. (1.52 m)
    - Height: 24 in. (0.61 m)



**Constant and Cyclic Temperature Chambers**



**Altitude Test Chamber**



**Dust Chamber**

- **Low Temperature Exposure**
  - Individual storage sections:
    - Width: 21 in. (0.53 m)
    - Depth: 21 in.(0.53 m)
    - Height: 9.5 in. (0.24 m)
  - Minimum Temperature: -55°C
  
- **Leak Detection / Water Spray**
  - Internal dimensions:
    - Width: 43 in. (1.09 m)
    - Depth: 41 in. (1.04 m)
    - Height: 42 in. (1.07 m)
  - Pressure decay (cc/min.): to 5 psig
  - Pressure threshold:  $\leq 1,000 \text{ psi} \pm 20 \text{ psi}$  ( $70 \text{ kg/cm}^3 \pm 1.4 \text{ kg/cm}^3$ )
  - Method: Applied pressure / vacuum
  
- **Gravel Bombardment**
  - Air pressure:  $\leq 1,000 \text{ psi}$
  
- **Constant or Cyclic Humidity**
  - Internal dimensions:
    - Width: 39 in. (0.99 m)
    - Depth: 36 in. (0.91 m)
    - Height: 34 in. (0.86 m)
  - Humidity range: 10% to 95% relative humidity  $\pm 5^\circ\text{C}$
  - Temperature range:  $10^\circ\text{C}$  to  $65^\circ\text{C} \pm 3^\circ\text{C}$  – ramp  $\leq 8^\circ\text{C}/\text{hour}$
  - Attributes: Non-condensing, programmable
  
- **Constant or Cyclic Temperature**
  - Interior dimensions:
    - Width: 66 in. (1.68 m)
    - Depth: 26 in. (0.66 m)
    - Height: 33 in. (0.84 m)
  - Temperature range:  $-55^\circ\text{C}$  to  $155^\circ\text{C} \pm 3^\circ\text{C}$ 
    - Ramp up in  $\leq 10^\circ\text{C}/\text{minute}$
  - Attributes: Programmable
  
- **High Temperature Exposure**
  - Internal dimensions:
    - Width: 66 in. (1.68 m)
    - Depth: 26 in. (0.66 m)
    - Height: 33 in. (0.83 m)
  - Maximum temperature:  $155^\circ\text{C}$
  - Attributes: Programmable
  
- **Salt Fog/Spray Corrosion**
  - Internal dimensions:
    - Length: 99 in. (2.51 m)
    - Width: 30 in. (0.76 m)
    - Depth: 23 in. (0.58 m)
  - Volume: 40 ft. (1.13 m<sup>3</sup>)



**Constant or Cyclic Humidity Chambers**



**Constant or Cyclic Temperature Chambers**

- **Thermal Shock**
  - Interior dimensions:
    - Width: 30 in. (0.76 m)
    - Depth: 30 in. (0.76 m)
    - Height: 30 in. (0.76 m)
  - Temperature range: -50°C to 150°C ± 3°C
  - Temperature transfer ≤ 20 sec.
  - Attributes: Programmable
  
- **Product Function Verification**
  - Function: Product function verification area with temperature chamber
  - Internal dimensions:
    - Width: 24 in. (0.61 m)
    - Depth: 29 in. (0.74 m)
    - Height: 33 in. (0.84 m)
  - Temperature range: -70°C to 180°C
  
- **Fluid Application**
  - Methods:
    - Splash
    - Brush
  
- **Visual Inspection**
  - 6-320X Digital Microscope with 3D Rotary Head
  
- **Vehicle Crash – G-force**
  - Rated force shock: 4,400 lbf
  - Displacement: 19.7 in. (0.5 m) peak to peak
  - Peak velocity: 315 in./sec. (8 m/sec.)
  - Maximum acceleration: 100 g peak
  - Maximum payload: 5 lbs. (2.27 kg)
  - Output: 80 kW
  - Frequency range: 0 to 1,000 Hz



**Fluid Application Chamber**



### ▶ **Contact Information**

For more information on the environmental testing services listed above, please contact:

Connie Wattawa  
 Validation Testing Services  
 Delphi Electronics & Safety  
 Kokomo, Indiana  
 USA  
 Tel: 765.451.8610  
 E-mail: [connie.m.wattawa@delphi.com](mailto:connie.m.wattawa@delphi.com) or  
[Kokomo.E&Stesting@delphi.com](mailto:Kokomo.E&Stesting@delphi.com)