

### Delphi Technical Center Piracicaba Vehicle Emissions Laboratory

The Vehicle Emissions (VE) Laboratory at the Delphi Technical Center Piracicaba (TCP) offers passenger vehicle and motorcycle manufacturers and component suppliers state-of-the-art test facilities for exhaust and evaporative emissions testing to support engine and component systems development and regulatory compliance.

The TCP VE Lab conducts emissions testing according to Brazilian Standards (NBR) and Brazilian Association of Technical Standards (ABNT), Economic Commission for Europe (ECE), and U.S. Environmental Protection Agency (EPA) regulatory requirements, including:

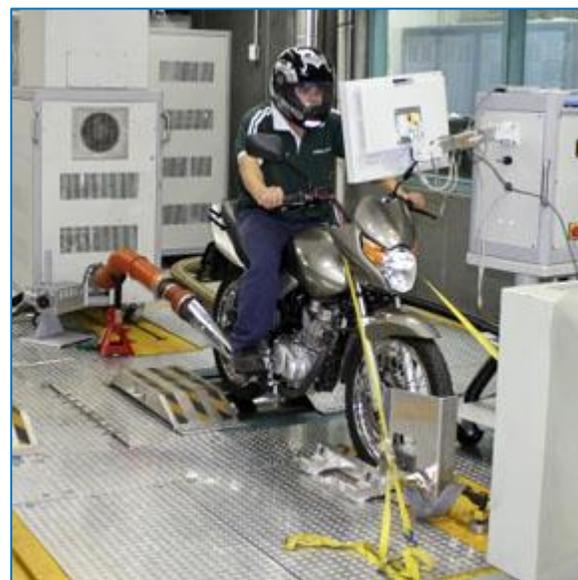
- Vehicle Air Pollution Control Program (PROCONVE/PROMOT)
- Determination of hydrocarbon, carbon monoxide, nitrogen oxide, carbon dioxide and particulate material in exhaust gas (NBR6601)
- Fuel consumption measurement (NBR7024)
- Measurement of carbon monoxide in exhaust gas operating at idle (NBR10972)
- Evaporative emissions measurement (NBR11481)
- Determination of aldehydes and ketones in exhaust gas (NBR12026)
- Determination of unburned ethanol in exhaust gas (NBR15598)
- European regulatory schedules (Directive 70/220/EEC)
- European regulatory schedules for motorcycles (Directive 97/24/EC)
- Determination of hydrocarbon during vehicle refueling, On-board Refueling Vapor Recovery (ORVR) Testing
- Custom tailored testing and development

The TCP VE Lab assures that test results have worldwide acceptance to help customers avoid the need for recertification through local government testing centers.

The Vehicle Emissions Laboratory has validation resources that have been enhanced over the years through collaboration with major manufacturers. Testing is conducted by a highly trained and experienced staff that understands the challenges facing manufacturers today. Complete confidentiality for testing is assured. Laboratory services are conducted to meet individual customer schedules and at a competitive cost. Professional, experienced account management provides customers with single-point contact to streamline test coordination.



**Typical set-up for vehicle testing in the Vehicle Emissions Laboratory at Delphi’s Technical Center Piracicaba.**



**Typical set-up for motorcycle testing at the Delphi TCP Vehicle Emissions Laboratory.**

Delphi’s TCP Vehicle Emissions Laboratory is conveniently located to support manufacturers in South America. It can support manufacturers in other regions through Delphi’s global network of technology centers. It supports customers who do not have in-house testing capabilities, or require “overflow” testing services.

► **Capabilities**

Delphi’s Vehicle Emissions Laboratory at the TCP offers:

- Two vehicle emissions test sites for measuring tailpipe emissions in passenger vehicle (4-wheel) and motorcycle (2-wheel) programs:
  - Single roll, 48 inch chassis dynamometer
  - Temperature and humidity control
  - Exhaust emissions measurement testing for engine management systems and component development, including post-engine and post-converter (modal end bag)
  - Drivability verification tests
  - Type approval/certification

- Test sites include sealed housing evaporative emissions determination (SHED) capabilities for measuring evaporative emissions (hydrocarbons)

- Sealed housing equipment for On-board Refueling Vapor Recovery (ORVR) testing of vehicles.

- Climatic chambers for cold and hot start assessment:
  - Temperature range -30°C to 45°C
  - Solar panel installed with 1,000 W/m2 power capacity
  - Chassis dynamometer:
    - Single roll, 48 inch chassis dynamometer
    - Cold/hot starting capability and drivability assessment
    - Vehicle air conditioning development

- Multiple fuel capabilities:
  - Gasoline
  - Alcohol (up to 100% ethanol)
  - Gaseous fuel

- ISO/IEC 17025 accreditation (General Requirements for the Compliance of Testing and Calibration Laboratories) from the Brazilian National Institute of Metrology Standardization and Industrial Quality (INMETRO)

- Compliant with code of practice of the Environmental Sanitation Technology Company, Brazil (CETESB) and the Brazilian Institute of Environmental and Renewable Natural Resources (IBAMA)



**Climatic Chamber at the Delphi TCP VE Lab.**



**Sealed Housing for Evaporative Emissions Determination (SHED) chamber at the TCP VE Lab.**

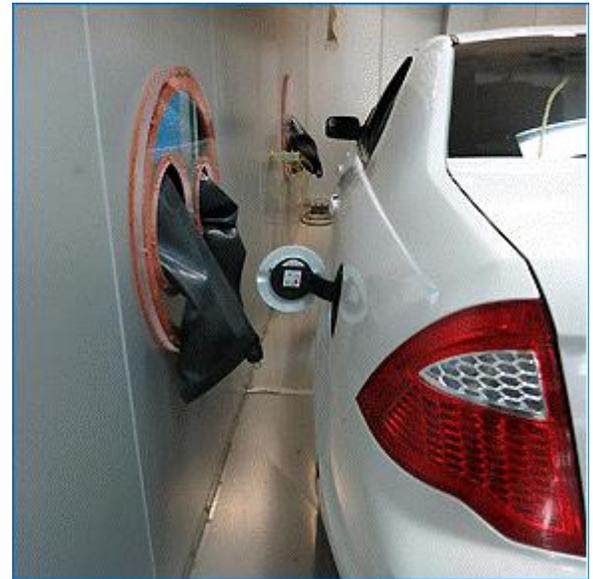
▶ **The Delphi Advantage**

The Delphi Technology Center Piracicaba supports customers worldwide in the design, development, testing and validation of their products. It is a development location for several Delphi ISO/TS 16949 certified manufacturing sites and is part of Delphi's network of state-of-the-art technical centers around the world. TCP has received a Certificate of Compliance for OHSAS 18001 (Occupational Health and Safety Management System) and a Certificate of Compliance to ISO 14001 (Environmental Management System).

Delphi is a leading global supplier of a broad range of technologies with manufacturing facilities located in more than 30 countries. Delphi's products are engineered to meet the rigorous standards of the automotive industry, but Delphi technologies are also used in many other industries. We leverage a rich heritage and extensive technical knowledge to offer customers an array of innovative, cost competitive solutions.

▶ **Contact Information**

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**Sealed Housing for On-board Refueling Vapor Recovery (ORVR) Testing.**