MAHLE Powertrain 03/2025

Vehicle Development Centre

Climatic chamber with hydrogen extraction

Vehicle development at sub-zero temperatures

4 Wheel Drive Chassis Dyno

As the world challenges the automotive industry to develop vehicle powertrains that meet the latest real world emissions targets, MAHLE Powertrain wanted to be in the best possible position to support its customers in that goal. This is why MAHLE Powertrain has built the world's first dedicated Vehicle Development Centre (VDC).

The VDC focuses on the complete development of new powertrain solutions from concept right through to reality. Engineers have faced the difficulty of carrying out development for Real Driving Emissions (RDE) in an unpredictable environment. Now MAHLE Powertrain has enabled its customers to take control and bring development back into controlled laboratory conditions where engineers can make valued decisions in their development processes.

The VDC focuses on the complete RDE development process, starting with the latest in predictive analysis tools and vehicle simulation, allowing engineers to make conscious decisions on their powertrain hardware requirements, right at the start of their development program.

Validating those hardware choices and correlating analysis models, through steady state and transient engine testing will allow engineers to make informed decisions based on predictive vehicle behaviour before the need to build costly prototype vehicles.

Altitude testing capability
Full climatic simulation

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Benefits

- The VDC is the UK's only barometric vehicle test chamber
  - › Altitude capability up to 5,000 metres
  - › Climatic testing from -40°C to +60°C
  - › Hydrogen safety systems
  - › Curved ceiling for extraction system
  - › Solar array to SC03 specifications
- Detailed insights in diverse environments
- Robust assessment of vehicle performance in real world operating conditions
- Latest HORIBA Vulcan 4WD chassis dynamometer & full emissions equipment
- Testing to all worldwide standards

Climatic / Altitude	
Temp range, °C	-40 /+60
Temp constancy, K	+/- 1.2
Humidity, g/kg air	5.5/12.2 +/- 5%
Pressure range, mbar	540/1050
Max altitude simulation, m	5,000
Test Specifications	
Emissions	Euro 6c, US SULEV, China National 6
Max Speed, km/h	250
Max Force, N	6,400 (12,500)[1]
Max Power, kW per axle	230/230 (450/450)[1]
Mass limit per axle, kg	2,500

[1] (Overload 30 seconds every 5 minutes)

Vehicle development at sub-zero temperatures

Development process

- Steady state powertrain testing
- Powertrain system simulation
- Final validation process uncludes real world driving
  - › PEMS (Portable Emissions Measurement System testing on VCA certified routes
  - › Tailpipe emissions are dynamically measured
- VDC combined with full powertrain engineering service capabilities propels MAHLE powertrain to the forefront of powertrain development worldwide

Summary

MAHLE Powertrain offers 4WD dyno testing with both full climatic simulation and altitude capabilities. This barometric vehicle test chamber is a one of a kind facility that extends MAHLE Powertrain's testing capabilities and puts them as one of the leading powertrain development facilities worldwide with highly skilled engineers that are experts in both conventional ICE and electric powertrain design Whether it's integrating an existing powertrain into a new vehicle or completely new powertrain development.

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