TNO
Climatic-Altitude Chamber

In Service Emissions measured at Laboratory Conditions
Mission Statement

To provide R&D testing services in the field of combustion engines, drivetrains and vehicles
Background

Why this tool?

⇒ Trend to robust and durable in-service emission performance

Vehicle real-life performance

Engine type approval

Climatic – altitude chamber enables accurate testing of both
TNO climatic chamber provides unique combination of:

1. Climatic conditions: temperature & altitude
2. Transient (hub mounted) dynamometer
3. Emission measurement equipment (CVS)
4. Complete (HD) vehicle accommodation
Capabilities (1/2)

- Temperature range: -45 to +55 °C
- Altitude range: 0 to 4000 m
- Wind speed, nozzle area: 120 km/h, 1.25 x 0.7 m
- Dynamometer power, torque: 550 kW, 7000 Nm
- Regulated emissions: NO\textsubscript{x}, CO, THC, CO\textsubscript{2}
- Unregulated emissions: NO, N\textsubscript{2}O, O\textsubscript{2}, NH\textsubscript{3}
- FTIR analyser
- Particulate partial flow sampler
- Full flow CVS at standard ambient conditions
- Two direct emission lines at all ambient conditions
- Full transient dynamometers
Capabilities (2/2)

- 2WD – one driven vehicle axle only (other driven axles are disconnected)
- Gearbox is fixed into one gear
- Hub-mounted dynamometers enable transient testing
- Vehicle speed trace of actual cycle will be transformed into engine torque-speed-time diagrams
Application examples (1/2)

- IUC verification
- Benchmarking, comparative technology assessment
- OBD calibration and validation
- Vehicle fuel consumption testing
- Cold start performance optimization
- Performance at altitude
- Precalibration of summer and winter trials
- Cooling and cabine performance
Customer Benefits

- Time-to-market reduction
- Season independent
- Development cost reduction
- Accurate and reproducible
- Increased product robustness
- Independent results

Important benefit is the ability to combine a great variety of testing needs in a compact and efficient test programme
TNO Climatic Chamber

In Service Emissions measured at Laboratory Conditions

- TNO offers the capabilities on a project basis
- Based on your input, TNO will develop a program to meet your objectives
Contact Information

TNO Automotive

Peter van Gompel
Business Manager Powertrain Testing

Steenovenweg 1
5708 HN Helmond
The Netherlands

T +31 40 265 2600
E peter.vangompel@tno.nl

tno.nl/automotive