

Bosch Engineering GmbH

Applications Test Center

Transient engine dynamometer



Highlights

Load machines

- ▶ AVL Dyno Spirit (PMM machine)
- ▶ 1,200 Nm, 550 KW, 9,500 rpm, 0.35 kg*m², 40*10³ 1/min/s

Exhaust gas measurement technology (EU5 ff, US 2010)

- ▶ 3 Horiba MEXA 7100D – Dual Nox with 4 x PNS
- ▶ Horiba CVS – DLT [8–90 m³/min volume flow]
- ▶ Horiba MEXA 7200H
- ▶ Siemens LDS6

Particular measurement technology (EU5 et seqq., US 2010)

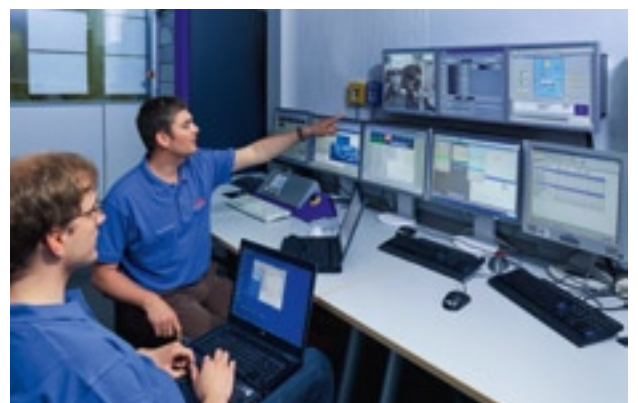
- ▶ Horiba DLS 7200E
- ▶ Horiba HFU 4770
- ▶ AVL 483 [micro soot sensor]
- ▶ AVL 415S [smoke meter]
- ▶ AVL 439 [opacimeter]

Expertise surrounds development at the engine test bench

Efficient engineering demands efficient test benches, and it was for this reason that a first-class engine test bench was installed in the test facility belonging to Bosch Engineering GmbH. This test bench makes almost every conceivable measurement possible, from stationary to transient tests. Thanks to the full flow dilution tunnel and CVS equipment, the engine test bench fulfills the legal requirements for Euro 5/6 as well as US2010.

Measurement technology for engine and exhaust systems

Test bench measurement technology is focused on the requirements of modern combustion development and application for entire engines with complete exhaust-gas treatment systems. The exhaust measurement technology is used in the test run as and when required, so that all applications can be covered according to individual requirements. This ranges from a single point station emission measurement when stationary, through to three-fold transient undiluted measurements and additional diluted measurements in the full-flow tunnel. The measurement technology is integrated through the test bench controller into a wide range of measurement programs either manually or in 24-hour automatic operation.



Other Equipment

Media conditioning

- ▶ Engine coolant [15°C to 120°C]
- ▶ Engine oil [15°C to 150°C]
- ▶ Fuel [20°C to 40°C]
- ▶ Combustion air [5,000 m³/h; 20°C to 40°C; 5.5 g to 12 g H₂O/kg]
- ▶ CVS dilution air [25°C; 10.5 g H₂O/kg]
- ▶ Supply air test area [14,000 m³/h; 15°C to 40°C]
- ▶ Circulating air test area [15°C to 40°C]
- ▶ Charge air cooling [15°C to 95°C]
- ▶ Reserve [15°C to 95°C]

Exhaust gas extraction

- ▶ 19,000 m³/h
- ▶ Suitable for double-flow systems
- ▶ Suitable for original vehicle exhaust systems

Test cell size

- ▶ Width: 6.85 m; depth: 11.7 m; height: 3.1 m

PUMA OPEN 1.41, GEM 1.42 automation

- ▶ Statutory exhaust gas cycle
- ▶ Stationary test runs
- ▶ Transient test runs with adjustable parameters
- ▶ DoE test runs
- ▶ 24-hour automatic operation

Quick-change system

- ▶ 30-minute change time for engine change

Combustion air

- ▶ Tight connection via Air Flow measurement
- ▶ Connection with overflow upstream the air filter

Cell pressure regulation

- ▶ - 5 Pa

Other measurement technology

- ▶ Indication measurement technology – AVL Indimaster
- ▶ 30 standard pressure measurement channels possible
- ▶ 45 standard temperature measurement channels possible
- ▶ AVL blowby meter
- ▶ Fuel consumption: AVL Fuel Exact

Future upgrades

- ▶ Advanced tools for DoE (Cameo, Orion)
- ▶ Upgrade to PO Suite + GEM M2010
- ▶ Gasoline engines operable from M2010

Vehicle-oriented test operation

In order to optimize the correlation between vehicle use and the engine test bench, environmental parameters such as temperature, combustion air humidity, charge air cooling and engine cooling can be controlled by the test bench management system in very wide ranges. Due to the elevated installation position of the transient dynamometer and the large cell dimensioning, original exhaust systems can be fitted onto the engine and thus development work on the aftertreatment system can be carried out very efficiently on the engine test bench.

Customer benefit

Costs are being optimized for the client by means of increased usage times, as the engine only has to stay on the test bench during test operation. By using a pallet system, the engine and exhaust system can be changed rapidly without affecting the continuity and comparability of the measurement results. In addition, the test bench includes an option for forced engine cooling, allowing the engine to be cooled to ambient temperature in a short period of time. This in turn enables project work to be carried out in measuring sections as required, so that evaluation and measuring times can be optimally adjusted to each other.



Bosch Engineering GmbH
BEG-PG/EAT

Postfach 1350
74003 Heilbronn
Germany

Contact

Johannes Dehn, Tel: +49 7062 911-7620
Michael Fröschle, Tel: +49 7062 911-6370

www.bosch-engineering.com

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