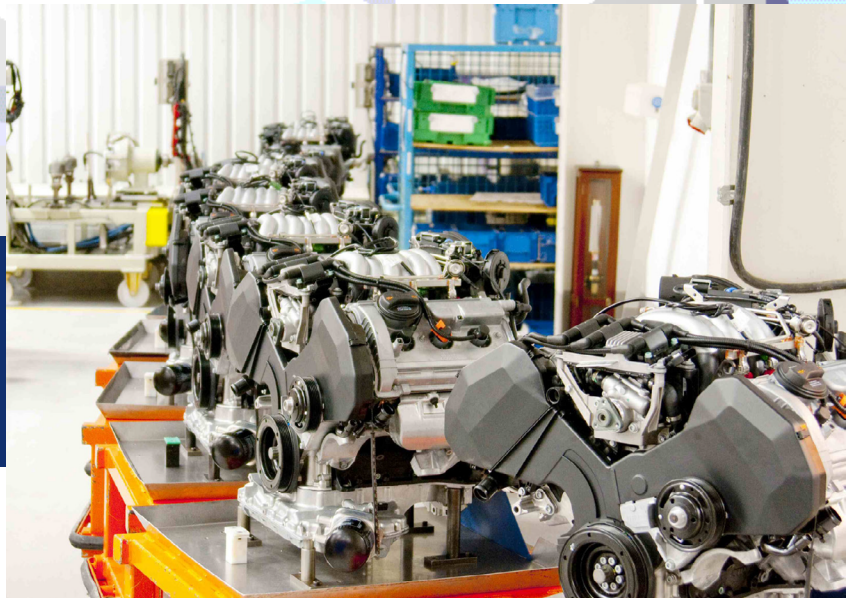


MAHLE Powertrain Engine Build & Test

- > 12 test cells and 5 test rigs
- 48V - 800V test infrastructure
- 18 build bays



Engine Build & Test

MAHLE Powertrain's highly skilled team are experienced in building prototype engines and rig assemblies from single cylinder to V12 units. The engine build facility is equipped with:

- Incoming logistics using SAP BoM management
- Goods-in inspection / quality checks
- Temperature controlled metrology area, traceable to UKAS, for component measurement
- Mitutoyo scanning CMM
- 18 x engine build bays with computerised documentation / build records
- Ability to screen off engine build bays to provide confidential build areas
- Machining & fabrication support
- Instrumentation fitting for temperature, pressure, vibration & strain
- Hot test stands for integrity checking
- 3 stage component wash



>> Engine Build

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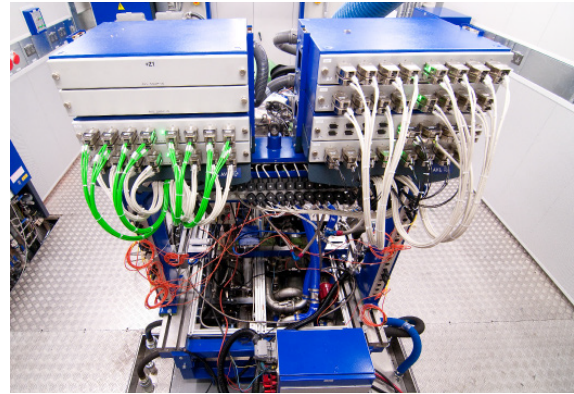
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MAHLE Powertrain Engine Build & Test

Engine Test Equipment

- E-machine / range extender test cell
- 12 Performance & Economy (P&E) engine test cells in total, 4 x motoring cells; 8 x steady state cells.
- Each cell contains:
 - › Horiba MEXA gaseous emissions measurement
 - › AVL combustion pressure measurement
 - › AVL fuel flow measurement
 - › 5 deg C chilled fluid cooling loop
 - › Automated DoE capability
 - › HBM torque flanges
 - › 4 x rapid pallet change cells



>> Engine test cell with quick change pallet

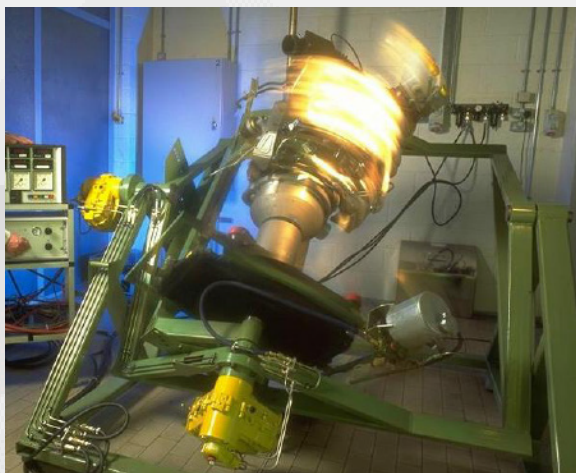
- › Combustion air temperature / humidity control
- › Barometric compensation unit
- › Particulate emissions using Cambustion DMS500's / AVL CPC's
- › AVL 250kW battery simulator
- › 48V supplementary power supplies

Engine and Rig Testing

- Extensive range of facilities to develop IC and electric powertrains
- Engine test cells are multi-fuel capable
 - › Gasoline, diesel, bio-fuel and CNG
 - › Highly configurable with up to 700kW absorption available
- Operates on a 5 day, 3-shift basis setting



>> Engine rigging area



>> Engine tilt rig for oil system development

Benefits

- Dedicated pre-rigging area / hot test cell
- Mechanical systems development equipment
 - › Oil aeration & analysis
 - › High speed camera & data acquisition
 - › Valve motion
 - › Real time piston temperature
- Dedicated test rigs for:
 - › Port flow
 - › Friction measurement
 - › Valve motion
 - › Engine tilt rig for lubrication / breather system development

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MAHLE product information 05/2022

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