



Engine Build & Test



18 Build Bays

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
- E-machine / range extender test cell



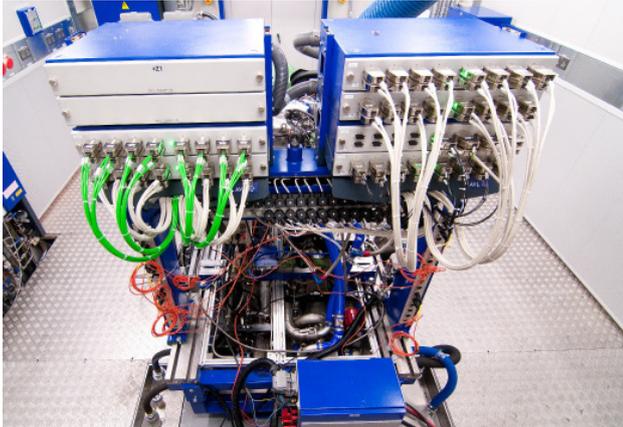
Engine build

Engine Test Equipment

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



12 test cells & 5 test rigs
48V - 800V test infrastructure



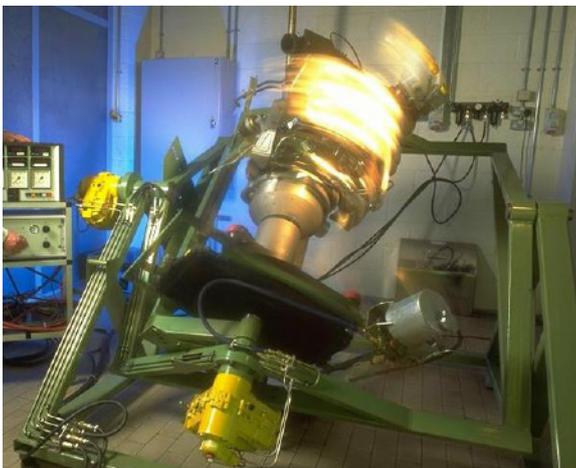
Engine test cell with quick change pallet



Engine rigging area

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 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