Special Measuring Equipment
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- Indicating System
- Oil Consumption / Dilution (Tracer Method)
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Exhaust Gas Analysing Systems

Exhaust Gas Analyzing
- FTIR (Sesam 4) AVL
- i60 2-Line AVL
- Mexa 7170 D Horiba
- Mexa 7100 H Horiba
- Pierburg 4000 AVL

NH3-Slip
- Mexa 1170 NH₃-, NO₂-Analyzers Horiba
- LDS 6 NH₃ and H₂O Siemens (In Situ Measurement)

EGR-Rate
- EGR CO₂-Measurement

Particel Mass
- Partial Dilution Tunnel
  - Smart-Sampler SPC 472 AVL
- PSS-20 Control Sistem (MS4)
- Micro Balance Clean work bench
  - acc. to EPA 1065 requirements
- Pegasor Control Sistem (MS4)

Particel Counting
- Mexa 2300 (particle counter) Horiba
- Pegasor Control Sistem (MS4)

Smoke
- Smoke Meter 415S, -HD AVL
- Micro Soot Sensor 483 AVL
- Opacimeter 439 AVL
Vibration Analysis

- Metrology Müller-BBM
- Up to 160 channels simultaneously
- Vibration, strain, acoustics, temperature, analog variables
- 3 measurement systems for 220 V and 12 V operation
Indicating Systems

- D2T Osiris (up to 16 channels)
- AVL Indicating Module (8 channels)
- AVL Indicating Set (4 channels)
- Kistler $P_{\text{max}}$-Meter (4 channels), Peak-pressure control including statistic evaluation
- D2T FFRM electric speed trigger via sprocket (60-2 impulse)
Oil Consumption / Dilution

(Radiotracer Measuring Method)

- Real-time data logging
- High resolution:
  - consumption measurement < 1 mg/h
  - dilution measurement > 0.01 %/h
- Tracer embedded in oil molecules, (contamination-free test sample after test / directly reusuable)
RNT Wear Measurement

Use Field

- Cylinder: liner wear at TDC
- Piston: piston ring ring groove
- Bearing: connecting rod crankshaft camshaft
- Valve: seat, stem, guide
- Cam lobe, bucket tappets

Combination of Blowby Measurement, external oil pressure control

Thin Layer Differential Metrology measurement directly on component, e.g. valve

Concentration Metrology measurement within oil circuit, e.g. crankshaft
Thermal Imaging

Thermal Imaging of Exhaust Gas Components

Temperatures at Nominal Output
Automation System

Automation System Morphée / D2T

- Data acquisition max. 20 Hz / measurand
- Special design max. 1 kHz / measurand

- Driving cycles at any size
  Program set point max. 50 Hz

- Integration of any external measurement instruments via all established bus systems

- Measuring boom for 92 measurands and 6 control variables (arbitrarily expandable)

- All customer formulas and descriptions directly available at test bench
### Asynchronous Machines

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<th>Torque [Nm]</th>
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<th>Inertia [kgm\textsuperscript{2}]</th>
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Further Measuring Systems

- Fuel Consumption Measurements: AVL, Pierburg, Tannhäuser, Rheonik
  measurement range: 1 to 1200 kg/h

- Oil Conditioning: AVL, KST
  in-house development: e.g. turbocharger lubrication

- Air Mass Flow Measurement: Sensyflow, Venturi

- Gas Content Measurement: (TMT, Flucon, DSi)

- (Hot) Shaker: up to 57 kN,
  vertical and horizontal + climate

- Blowby Measurement: KST 80 / 150 l/min
  Natec 350 / 500 / 1500 l/min
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