

**Engine test center overview** 

May 2024

# **Engine test laboratory**

### A wide range of services



- Three engine test cells
- Diesel, petrol or alcohol engines
- 40 M3 Fuel storage capacity
- 24 hours operation possible
- Engine tuning and calibration
- Engine and system ageing and durability testing
- Catalyst ageing and durability testing
- Possibility to perform special tests, high altitude simulations, hot/cold cycling tests and transmission tests
- Fully equipped workshop for test object preparation.
- Secure facility and guest offices.
- Accredited according to SS-EN ISO/IEC 17025:2018



### **General description**



- Eddy current dynamometer with torque and speed control Capacity: 2 000 Nm, 500 kW and a maximum speed of 8 000 rpm.
- Alternatively asynchronous AC dynamometer with the possibility of transient operation.

Capacity: 4 400 Nm, 660 kW and a maximum speed of 3 500 rpm

- Recording capability with up to 50 kHz sampling frequency
- Emission measurement on raw exhaust



#### **Specifications**

Dynamometer	AVL eddy current with AVL Emcon 300 control system Max. 500kW @ 2400-8000 rpm Max 2000 Nm @ 1100-2400 rpm
	Alternative dynamometer
	AVL Asynchronous transient dynamometer
	Max. 660kW @ 1500-3500 rpm (826 kW short term)
	Max 4400 Nm @ 1100-2400 rpm (5 500 Nm Short term)
Test cell	Vaisala HMI 33
environmental sensor	Ambient humidity and temperature measurement
Data acquisition	Delphin data sampler
system	53 input channels for temperature, pressure, voltage , current and resistance measurements.
	8 input channels for indicating measurements @ 50kHz
	4 input channels for speed, frequency and period measurements.
Opacimeter	AVL 439 Opacimeter

Fuel consumption	AVL 735 dynamic flow meter
	Coriolis principle 0-125 kg/h
Air mass flow	Hot film anemometer
meter	0-2400 kg/h (other range available on request)
Emission	One channel emission measurement
measurement	system.
	CO, THC, NO/NOx, CO2, and O2

### Additional equipment and measurement systems

Additional measurement systems and equipment for special test setups are available for any of the test cells. Refer to the table on page 11 for more specifications.

The test cells are subject to a constant upgrade to meet future testing demands. If something is missing for your specific needs please contact us for further information.



### **General description**



- Capacity 2 000 Nm, 500 kW and a maximum speed of 8 000 rpm
- Eddy current dynamometer with torque and speed control
- 2 X Emission bench for exhaust gas measurements
- PM sampling in partial flow dilution system
- Transient testing without motoring possible.



#### **Specifications**

Dynamometer	AVL eddy current with AVL Emcon 300 control system
	Max. 500kW @ 2400-8000 rpm
	Max 2000 Nm @ 1100-2400 rpm
Test cell	Vaisala HMI 33
environmental sensor	Ambient humidity and temperature measurement
Data acquisition system	AVL Puma V5.6 (with 100Hz recorder)
	32 input channels for temperature, voltage, current and resistance measurements.
	16 pressure sensors.
	4 input channels for speed, frequency and period measurements.
	16 digital and 12 analogue outputs.
	Additional input modules available on request.
Opacimeter	AVL 439 Opacimeter
Fuel consumption	AVL 733s dynamic flow meter
	Gravimetric principle 0-150 kg/h
Air mass flow meter	Hot film anemometer
	0-2400 kg/h (other range available on request)

Emission measurement	2 X emission benches for exhaust gas measurement CO, THC, NO/NOx, CO2, and O2
Particulate	Control Sistem Pss-20 Mini dilute
measurement	tunnel (Euro VI compliant)

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#### **General description**



- Capacity 6 000 Nm, 1 000 kW and a maximum speed of 3 500 rpm (1 200 kW and 7 200 Nm short term)
- Asynchronous AC dynamometer for transient operation
- 2 channel emission bench for exhaust gas measurements
- Full flow CVS with PM sampling system
- High altitude simulations



### **Specifications**

High altitude simulations	Engines inlet and exhaust system connected to a high altitude tunnel. Up to 4 400 meter simulated altitude possible depending on tunnel flow demands (engine size)
Non standard conditions for intake air temperature	Test setup for cooled or sub zero intake air possible by adding dryer and coolers to the inlet air flow and intercooler. Cold start simulations. Can be combined with high altitude simulation.





### High altitude simulation capacity



- A minimum total tunnel flow 2 times higher than the exhaust flow is recommended.
- Diluted exhaust temperature before the exhaust gas cooler (situated upstream exhaust blower) should not exceed 191 degC
- •The temperature after the exhaust cooler and before the blower must not exceed 50 degC



#### **Specifications**

Dynamometer	AVL Asynchronous transient dynamometer
	Max. 1 000kW @ 1500-3200 rpm (1 200 kW short term)
	Max 6 000 Nm @ 0-1 591 rpm (7 200 Nm Short term)
Test cell	Vaisala HMI 33
environmental sensor	Ambient humidity and temperature measurement
Data acquisition system	AVL Puma V5.6 (with 100Hz recorder)
	112 input channels for temperature, voltage, current and resistance measurements.
	30 pressure sensors.
	4 input channels for speed, frequency and period measurements.
	16 digital and 8 analogue outputs.
	Additional input modules available on request.
Opacimeter	AVL 439 Opacimeter
Fuel consumption	AVL 735 dynamic flow meter with AVL 753C fuel conditioning system
	Coriolis principle 0-125 kg/h

Air mass flow meter	Hot film anemometer 0-5500 kg/h (other range available on request)
Emission measurement	Two channel Horiba MEXA-ONE-D2 emission measurement system
	CO, THC, CH4, NO/NOx, CO2, CO2 EGR and O2
Particulate measurement	AVL HD CVS system (CECU-T140- D) with triple venturi system to cover a flow range of 20- 140M3/min
	Heat exchanger
	70/47mm particulate filter holders with filter switch

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# **Additional equipment**

### **Specifications**

#### Additional equipment available for any test cell

Particle counter	AVL APCP PLUS
Particulate measurement	Control Sistem Pss-20 Mini dilute tunnel (Euro VI Compliant)
Transient soot measurement	AVL MSS 483
Particulate weighing camber	Temperature and humidity control
	Mettler Toledo XP2U electronic microgram scale
Analyzers	Additional stand alone gas analyzers (NOx, HC)
NH3 measurement	NEO laser for NH3 measurements
FTIR	GASMET CX4000
Fuel consumption	High capacity Emerson Coriolis flow sensors for larger engines, alcohol engine and dual fuel engines. Capacity up to 500 kg/h
Urea injection and control systems	Air assisted atomization. PWM and frequency controlled dosing.
HC injection and control systems	Air assisted atomization. PWM and frequency controlled dosing.
Exhaust gas cooler	Tubular heat exchanger.
Custom interface and control	Custom and one off electronic control and interface between test object and test- and measurement equipment available

