AVL TRAINING CATALOG 2016

North America

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Disclaimer

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FAST TRACK TO COMPREHENSIVE SKILLS.

TRAINING

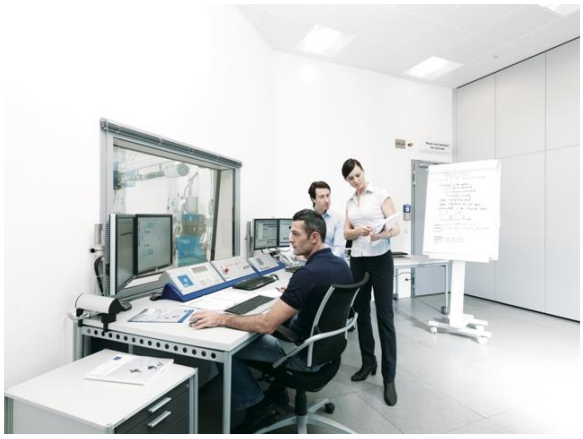
EQUIPPING PEOPLE FOR ENGINE AND POWERTRAIN TESTING

Engine / Powertrain development is taking place in an extremely challenging and competitive environment. Fast time-to-market requirements, increasing complexity and strong cost pressure are setting the stage for development projects.
Success largely depends on the people who can make it happen. Their motivation and skills set are the key. If project team members are not optimally trained on the testing tools or shown the methodical approach to take, projects may not be completed in terms of time and quality and usually result in cost overruns.

AVL's TRAINING program equips for competent, safe and reliable engine / powertrain testing.

Instructor-led Training

Training classes are conducted either at the customer site or at one of the global AVL Training Centers. Well-equipped class rooms and simulators for practical exercises as well as real test equipment guarantee efficient knowledge transfer and fast learning.



Didactically and professionally skilled trainers (through regular practical assignments) impart the necessary knowledge to perform the testing tasks.

Available training classes:

Product Training courses allow staff to develop knowledge to understand and utilize AVL test systems for engine / power train testing.
Open-Enrollment Training for staff to develop knowledge to understand and utilize AVL test systems for engine / power train testing. Regularly scheduled throughout the year.

Benefits

- Sustained build-up of knowledge in the operation of AVL testing equipment
- Fast track to comprehensive skills to meet testing goals
- Competitive advantage through shorter development cycles
- Highly motivated staff

Financial Aspects

Return on this effective training investment is immediate. E.g. avoiding the additional costs associated with a 2-week time delay in a development project would already pay for the education of a small team of operators and testing engineers

References

- > 1600 training days per year for products and technologies at customer sites or AVL Training Centers
- > 500 trainees per year from almost all engine and powertrain companies

Customer statements

- Expectations met to 100%
- Professional trainers - excellent expertise and know-how of trainers
- Interesting discussions and mutual exchange of experiences
- Well-structured and consistent training content

www.avl.com/training

HOW TO READ THIS CATALOG

Different job titles require different skill sets ("User Level").
Taking this into account, you'll find the relevant "User Level" information in each course description based upon the following common tasks and roles:

- Operation (Test Operator)
- Parameterization (Test Engineer)
- Data Evaluation (Post Processing Personnel)
- Maintenance & Service (Calibration / Maintenance / Service Personnel)
- Administration (Test Field Administrator)

TRAINING PARTICLE COUNTER
TT05DA010A.01

User Level
Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant is able to operate the Particle Counter to perform measurements and carry out simple maintenance work.

Content
- Basic knowledge of emissions measurement & legislation
- Overview of System set-up (mechanical, pneumatically and electrical installation)
- Explanation of the installation of both Sampling Probe and Sampling Line
- Operation
  - Measurement principle and different measurement procedures
  - Operating States and Functions
  - Operation PUMA system or PC
  - Explanation of important parameters
  - Functionality of implemented options
- Maintenance
  - Cleaning
    - Venturi Pump (Particle Counter Advanced)
    - High Pressure Option
  - Changing the Filter element
  - Replacing Filter mats
  - Function check
    - Leak check
    - Response Check
    - Flow Check
  - Refill Butanol

If there are different job titles / tasks available in your organization and you need assistance in setting up a curriculum / education package for your organization, please get in touch with either your local representative or the AVL Skills Center North America (mailto: bruce.digna@avl.com).

GENERAL CANCELLATION POLICY

Cancelation or rescheduling of confirmed training dates are subject to following cancelation policy and fees:

Business days prior to the scheduled training start date	Handling fee	Charges incurred of contracted fee
35 to more than 30	$50	
30 to more than 20	$150	30%
20 to more than 5	$250	50%
5 or less	$300	100%

TRAINING FOR MONITORING, CONTROL, SIMULATION

In this section you will find courses designed to enhance your knowledge and skills on AVL Testbed Control and Simulation.

TRAINING EMCON 400 STAND ALONE

TNASKTR303.01

This training refers to version 5.4.2 and 5.4.3– for a training dealing with older versions, please contact your local representative.

User Level

Operation (Test Operator), Parameterization (Test Engineer), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal

The participant is able to operate the EMCON via menus on the operating panel. In addition he understands the database structure and is able to adjust the engine-dyno controllers.

Content

- Hardware overview
- Connection possibilities and hardware environment
- Engine and Dyno Interface
- Discussion of the EMCON database by means of practical examples
- Explanation of engine and dynamometer controllers for stationary purposes
- Adjustment of engine and dynamometer controllers for stationary purposes
- Operation of the EMCON via operating panel
- Parameter menu
- Recall mode

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services

Each consisting of:

- 2 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING EMCON 400

TNASKTR309.01

This training versions 5.4.2 and 5.4.3 – for a training dealing with older versions, please contact your local representative.

User Level
Parameterization (Test Engineer), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant is able to operate the EMCON via menus on the operating panel. In addition he is able to understand and parameterize the database structure. The participant integrates EMCON 400 I/O components into the system, using the PUMA parameter editor PAM.

Content

- Hardware overview
- PUMA – EMCON integration, Engine and Dyno Interfaces
- Discussing the EMCON database with practical examples
- Modification of the EMCON database to extend EMCON functions
- Connection possibilities and hardware environment (example F-FEM-CON)
- Basic explanation of engine and dynamometer controllers for stationary purposes
- Demand value setting with Operating panel or PUMA automation system
- Parameter menu
- Safety concept:
- PUMA testbed monitoring and Safety Engineering EN ISO 13849, EN IEC 62061
- Concept for Single and Multiple Dynamometer testbed

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Experience in operation and parameterization of the PUMA Open System
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 4 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING TESTMATE II

TNASKTR541.01

Goal

The participant is able to operate the TESTMATE II via the web based menu and the operating panel. In addition he understands the database structure and is able to adjust the engine-dyno controllers.

User Level

Parameterization (Test Engineer), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Content

- Hardware overview
- Connection possibilities and hardware environment
- Engine and Dyno Interface
- Setup / Adjustment of different parameters based upon your configuration
- Explanation of engine and dynamometer controllers for stationary purposes
- Adjustment of engine and dynamometer controllers for stationary purposes
- Operation of the TESTMATE II via operating panel
- Parameter menu (web based interface)
- Recall mode

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services

Each consisting of:

- 2 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING FOR TESTBED AUTOMATION

In this section you will find courses designed to enhance your knowledge and skills on AVL Testbed Automation for different applications.

TRAINING PUMA OPEN ENGINE TESTBED

TNASKTR340.01

This training refers to PUMA Open version 1.5.2 and 1.5.3 – for a training dealing with older versions, please contact your local representative.

User Level
Operation (Test Operator), Parameterization (Test Engineer)

Goal
The participant is able to operate the PUMA Open Engine testbed automation system. The trainee is able to define and execute manual measurements, run pre-defined engine test runs and modify basic testbed parameters.

Content

- Starting the system and PUMA application programs
- Manual and automatic operation
- Limit monitoring and operating states
- Definition and execution of manual measurements
- Operation of a pre-defined recorder
- Values and results display
- Overview of PUMA parameter sets (System-, Test Facility-, Unit Under Test- and Test Parameters)
- Selection of testbed parameters, results and results series
- Modification and activation of existing testbed parameters
- Using the message window and the help functions

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of the operation of an unit under test
- Knowledge of PC's and Windows
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 4 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING PUMA OPEN HYBRID TESTBED

TNASKTR341.01

This training refers to PUMA Open versions 1.5.2 and 1.5.3 – for a training dealing with older versions, please contact your local representative.

User Level
Operation (Test Operator), Parameterization (Test Engineer)

Goal
The participant is able to operate the PUMA Open Hybrid Testbed automation system. The trainee is able to define and execute manual measurements, run pre-defined hybrid test runs and modify basic testbed parameters.

Content

- Starting the system and PUMA application programs
- Manual and automatic operation
- Limit monitoring and operating states
- Activation of the Hybrid function
- Interface to HCU (Hybrid Control Unit)
- Definition and execution of manual measurements
- Operation of a pre-defined recorder
- Values and results display
- Overview of PUMA parameter sets (System-, Test Facility-, Unit Under Test- and Test Parameters)
- Selection of testbed parameters, results and results series
- Modification and activation of existing testbed parameters
- Using the message window and the help functions

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- Training regarding „e-STORAGE SYSTEM" is not part of Scope of Services
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of the operation of an unit under test
- Knowledge of PC's and Windows
- If the training class is conducted on site the client has to provide the sufficiently installed and commissioned E-MOTOR TESTBED running properly for practical exercises

Scope of Services
Each consisting of:

- 4 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING PUMA OPEN E-MOTOR TESTBED

TNASKTR342.01

This training refers to PUMA Open versions 1.5.2and 1.5.3 – for a training dealing with older versions, please contact your local representative.

User Level
Operation (Test Operator), Parameterization (Test Engineer)

Goal
The participant is able to operate the PUMA Open E-Motor testbed automation system. The trainee is able to define and execute manual measurements, run pre-defined E-Motor test runs and modify basic testbed parameters.

Content

- Starting the system and PUMA application programs
- Manual and automatic operation
- Limit monitoring and operating states
- Definition and execution of manual measurements
- Operation of a pre-defined recorder
- Values and results display
- Overview of PUMA parameter sets (System-, Test Facility-, Unit Under Test- and Test Parameters)
- Selection of testbed parameters, results and results series
- Modification and activation of existing testbed parameters
- Using the message window and the help functions

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue on site. Traveling time and traveling expenses for the trainer have to be ordered additionally
- Training regarding „e-STORAGE SYSTEM" is not part of Scope of Services
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of the operation of an unit under test
- Knowledge of PC's and Windows
- The client has to provide the sufficiently installed and commissioned E-MOTOR TESTBED running properly for practical exercises

Scope of Services
Each consisting of:

- 3 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- AVL Certificate for participants

TRAINING PUMA OPEN TESTRUN PREP.

TNASKTR323.01

This training refers to PUMA Open versions 1.5.2 and 1.5.3 – for a training dealing with older versions, please contact your local representative.

User Level
Parameterization (Test Engineer)

Content

- Functions and tools
- General functions like Cut/Copy/Paste…
- SSQ Demand Value Definition
- Search
- Normname Commander
- Link status
- Import functions
- Version handling
- BSQ
- General properties (timing)
- Programflow elements
- Operator interface commands
- Structural elements (group, subroutine, exception)
- Online window (debugging)
- SSQ
- Properties of the dynamic SSQ
- Step buffer handling
- Properties of the steady state SSQ
- Export/Import example
- Recorder
- Steady State Measurement
- Exception Handling
- Exception types
- Definition of exception handlers
- Remind/Recover
- Library Handling
- Purpose and overview
- Functions and tools
- Creation of a complex automatic testrun

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Experience in operation and parameterization of the PUMA Open System
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 3 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily

- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING F-FEM HARDWARE & PARAMETER

TNASKTR329.01

This training refers to PUMA Open versions 1.5.2 and 1.5.3 – for a training dealing with older versions, please contact your local representative.

User Level
Parameterization (Test Engineer), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant is able to parameterize the modular F-FEM I/O system. He is able to configure the In- and Output Channels for typical sensors used on an AVL testbed system. In addition he is able to check the functionality using the AVL Service Tools.

Content

- System architecture PUMA Open with F-FEMs
- Overview and Parameterization of the F-FEMs Network
- I/O Description of different kinds of F-FEMs
- Parameterization of Analog Input- and Output Channels
- Parameterization of Digital Input- and Output Channels
- Parameterization of Counter Inputs (typical speed sensors on an AVL testbed)
- Parameterization of Frequency Output Channels (Signal splitter function)
- Manual and Semi-Automatic Calibration of Analog Input Channels
- Functionality of the I/O channels using the F-FEM Testmodules
- Diagnosis via PUMA Open System Explorer and Tracer

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally

Prerequisites

- Experience in operation and parameterization of the PUMA Open System
- Basic knowledge of industrial electronics, measurement techniques and control
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Scope of Services
Each consisting of:

- 3 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING SCRIPTING IN PUMA OPEN

TNASKTR344.01

This training refers to PUMA Open versions 1.5.2 and 1.5.3 – for a training dealing with older versions, please contact your local representative.

User Level
Parameterization (Test Engineer)

Goal
The participant understands the basic usage of scripting in PUMA Open (Activation Objects, Scripting, Extensibility Scripts, State Machine and BSQ/SSQ). He/she is able to create, modify scripts and to test the scripts in the PUMA Open system.

Content

- Introduction into the VB programming language
- VB script syntax and best practices
- VB concepts: variables, constants and control structures
- VB concepts: functions, subroutines, data arrays
- Basic introduction into scripting in PUMA Open
- Creation and modification of script contexts
- Definition of hand-over parameters (Systemchannels / script parameters)
- Integration of scripts into the automatic testrun (BSQ/SSQ)
- Execution of scripts from other PUMA components
- Practical exercises using extensibility scripts
- Debugging and problem analysis

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- It is necessary to have basic knowledge in programming languages e.g. C++, VBA, VBS and to understand the fundamental concepts of those, e.g. functions/subroutines, hand-over of parameters by reference and by value, indexed data types
- Experience in operation and parameterization of the PUMA Open System
- Knowledge of drawing up automatic test runs with BSQ / SSQ
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 4 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING ASAP3-MC INTERFACE

TNASKTR327.01

This training refers to PUMA Open versions 1.5.2 and 1.5.3 – for a training dealing with older versions, please contact your local representative.

User Level
Parameterization (Test Engineer)

Goal
The participant is able to connect the ECU-application system with the PUMA automation system based on ASAP 3. He is capable to vary data in the engine electronics.

Content

- Adaptation of an ECU-application system to the PUMA automation system
- Parameterization of the ASAP3-MC / ASAM-MCD 3MC interface
- Reading actual values from the ECU-application system
- Reading, writing and varying parameters and engine maps
- Implementation of the ECU interface in automatic test runs

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Experience in operation and parameterization of the PUMA Open System
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 1 day instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING TEST CELL CONTROL (TCC)

TNASKTR300.01

This training refers to PUMA Open versions 1.5.2 and 1.5.3 – for a training dealing with older versions, please contact your local representative.

User Level
Parameterization (Test Engineer)

Goal
The participant is able to setup the programmable test cell control according to his requirements.

Content

- States of the test cell control
- Extensibility Scripts
- State Machine

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Experience in operation and parameterization of the PUMA Open System
- Basic knowledge about VB Scripts
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 2 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING CAN INTERFACE

TNASKTR304.01

This training refers to PUMA Open versions 1.5.2 and 1.5.3 – for a training dealing with older versions, please contact your local representative.

User Level
Parameterization (Test Engineer)

Goal
The participant is able to connect the "In Vehicle Network" CAN Bus interface with the PUMA automation system by means of an A2L description file. He is familiar with application examples on PUMA Open with CAN Bus data.

Content

- Adaptation of a CAN-Bus system to the PUMA automation system
- Parameterization of the CAN Interface
- Examples for data transfer via the CAN Bus interface
- PUMA Open application examples with CAN Bus data (e.g. limit monitoring, recording)

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Experience in operation and parameterization of the PUMA Open System
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly as well as the "A2L description file" for practical exercises

Scope of Services
Each consisting of:

- 1 day instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING DATA PLAUSIBILITY PODD

TNASKTR336.01

This training refers to PUMA Open versions 1.5.2 and 1.5.3 – for a training dealing with older versions, please contact your local representative.

User Level
Parameterization (Test Engineer)

Goal
The participant is able to operate PODD and understand the working principle. He is able to adapt existing settings according to his requirements.

Content

- Functionality of PODD
- Explanation and operation of standstill diagnosis
- Explanation and operation of cyclic online diagnosis
- Explanation and operation of the measurement synchronous diagnosis
- Change settings on parameterized system according to test run requirements

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Experience in operation and parameterization of the PUMA Open System
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 2 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING AVL INMOTION OPERATING

TNASKTR345.01

This training refers to versions 3.5.x and 4.x – for a training dealing with older versions, please contact your local representative.

User Level
Operation (Test Operator)

Goal
The participants are able to setup different testruns within INMOTION and to adjust specific model parameters. Obtained simulation results can be visualized and evaluated in post processing. In addition, the attendees are capable to operate INMOTION in an AVL testbed environment.

Content

- Introduction to maneuver based testing
- System overview of INMOTION
- Overview GUI (Graphical User Interface)
- Overview project folder structure
- Creation, parameterization and testing of INMOTION testruns comprising:
- Road
- Maneuver
- Driver and Vehicle
- Validation of model parameters using “Model Check”
- Execution of simulations using “Test Manager”
- Control of simulations using:
- Minimaneuver commands
- Realtime Expressions
- Operation of INMOTION / PUMA Open Interface
- Post Processing:
- Online evaluation (Analysis of simulation data within INMOTION)
- Offline evaluation (Analysis of simulation data using AVL-Concerto)

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- Training regarding „CONCERTO” is not part of Scope of Services
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge on vehicles and model-based testing
- Basic Knowledge CONCERTO Data Post Processing
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 3 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING AVL INMOTION EMBEDDED

TNASKTR346.01

This training refers to PUMA Open versions 1.5.2 and 1.5.3 – for a training dealing with older versions, please contact your local representative.

User Level
Parameterization (Test Engineer)

Goal
The participants are able to apply and to parameterize INMOTION Embedded in PUMA Open automatic testruns. In addition, attendees are aware of the interaction between ISAC and INMOTION Embedded.

Content

- Introduction to maneuver based testing
- System overview of INMOTION Embedded
- Overview GUI (Graphical User Interface)
- Integration in PUMA Open automatic testruns
- Simulation
- Important parts of ISAC
- Important parts of INMOTION Embedded
- Creation, parameterization and testing of INMOTION testruns comprising:
- Road, Maneuver, Driver
- Controlling of testruns using Minimaneuver Command Language

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Good knowledge in test run parameterization (BSQ/SSQ) and ISAC 400
- Basic knowledge on vehicles and model-based testing
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 2 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING ISAC 400

TNASKTR560.01

This training refers to versions 1.5.2 and 1.5.3 – for a training dealing with older versions, please contact your local representative.

User Level
Operation (Test Operator), Parameterization (Test Engineer)

Goal
The participant is able to parameterize and operate the dynamic testbed. He/She is able to execute and adjust the parameters to pass statutory dynamic test profiles, parameterize various vehicles, different road load definitions and different drivers.

Content

- Basic description of the vehicle and driver simulation model
- Parameterization of a vehicle and road-load definition
- Adjustment of the driver
- Operation of the dynamic testbed
- Creation of dynamic sequences
- Optimization of gear shifts and controllers according to legal cycles

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Experience in operation and parameterization of the PUMA Open System
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 4 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING CONCERTO EVALUATION

TNASKTR305.01

This training refers to version 4.5 or above – for a training dealing with older versions, please contact your local representative.

User Level
Operation (Test Operator), Data Evaluation (Post Processing Personnel)

Goal
The participant is able to use the CONCERTO post processing software to create diagrams, tables and reports.

Content

- Overview of the data structure and data management
- Creation of diagrams and tables
- Creation of reports
- Data comparison
- Import and export of data
- Composer
- Hands-on exercises with application examples for above topics

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Knowledge of PC's and Windows
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 2 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING CONCERTO ADVANCED

TNASKTR306.01

This training refers to version 4.5 or higher – for a training dealing with older versions, please contact your local representative.

User Level
Data Evaluation (Post Processing Personnel)

Goal
The participant is able to create formulae and macros for calculations and to automate evaluations using the CONCERTO script programming language.

Content

- Creation of CONCERTO formulae for calculations
- Creation of CONCERTO macros
- Parameterization of scripts to automate work flows
- Using working environments
- Hands-on exercises with application examples for above topics

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- TRAINING CONCERTO Evaluation
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 2 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING CONCERTO ADMINISTRATION

TNASKTR307.01

This training refers to version 4.5 or higher – for a training dealing with older versions, please contact your local representative.

User Level
Data Evaluation (Post Processing Personnel)

Goal
The participant is able to set up and administrate the AVL CONCERTO according to company specific requirements. He has the knowledge to adapt directories and storage locations in the network.

Content

- Overview of the data structure and data management
- CONCERTO licensing
- CONCERTO installation
- Administration of CONCERTO specific files

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- TRAINING CONCERTO evaluation
- Training L2: CONCERTO advanced
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 1 day instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING OPERATING BOBCAT

TNASKTR523.01

User Level
Operation (Test Operator), Parameterization (Test Engineer)

Goal
The participant is able to operate the bobcat automation system. He is able to define and execute manual measurements, run pre-defined test runs and modify basic parameters.

Content

- Starting the system
- Manual and automatic operation
- Limit monitoring and operating states
- Definition and execution of manual measurements
- Operation of a pre-defined recorder
- Use pre-defined values and results displays
- Overview of bobcat parameter sets (Testcell, Engine, and Test parameters)
- Selection of test bed parameters
- Using the message window
- Using the help functions
- Reviewing data with the Data Browser

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue on site. Traveling time and traveling expenses for the trainer have to be ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of the operation of an unit under test
- Knowledge of PC's and Windows
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises as well as the necessary authorization for access.

Scope of Services
Each consisting of:

- 1.5 day instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- AVL Certificate for participants

TRAINING BOBCAT ENGINEER

TNASKTR521.01

User Level
Parameterization (Test Engineer)

Goal
The participant is able to set up channels, connect input/output devices, and parameterize automatic test runs in bobcat.

Content
- Overview of bobcat hardware architecture
- Contents of testcell, engine, and test parameters
- Setting up Input/Output channels
- Writing automatic test runs, startup and shutdown routines
- Sequence Library and subroutines
- Creating and use Datasheets
- Setup of Exception routine
- Creating and editing formulas
- Setting up of testcell limits and engine limit groups
- Data post processing with Data Browser (check of results)
- Importing and exporting of testrun parameters

Notes
- Training class is conducted in English
- Max. participants: 6 persons
- Venue on site. Traveling time and traveling expenses for the trainer have to be ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites
- TRAINING Operating Bobcat
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises as well as the necessary authorization for access.

Scope of Services
Each consisting of:
- 2 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- AVL Certificate for participants

TRAINING iGEM ENGINE LD

TNASKTR553.01

This training refers to versions iGEM Engine LD 2010, 2011 and 2012.

Goal

The participant understands the function of iGEM LD engine. He is able to operate a iGEM LD system and to carry out test runs. In addition he is able to use iGEM Offline and CONCERTO to evaluate emission tests by creating test specific reports.

Content

- Introduction to iGEM
- Overview: Integration of your emission measurement devices with iGEM ENGINE LD
- Software structure
- Overview LD emission legislation
- Basics in LD emission calculation
- Online part:
- Operating of CDX
- Parameterization of LD emission test runs (Pre Test Dialog)
- Execution of emission test runs
- Offline Test Evaluation:
- Overview on interfaces and tools
- Handling of report generator
- Management console
- Overview report content

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- This training deals with the complete iGEM package and includes both the online part and the topic Offline Test Evaluation.
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Experience in the area of exhaust emissions and related legislation
- Experience in operation and parameterization of the PUMA Open System
- Experience in operation of the data post processing software CONCERTO
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services

Each consisting of:

- 3 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING iGEM ENGINE HD

TNASKTR540.01

This training refers to versions iGEM Engine HD 2010, 2011 and 2012.

Goal

The participant understands the function of iGEM HD engine. He is able to operate a iGEM HD system and to carry out test runs. In addition he is able to use iGEM Offline and CONCERTO to evaluate emission tests by creating test specific reports.

Content

- Introduction to iGEM
- Overview: Integration of your emission measurement devices with iGEM ENGINE HD
- Software structure
- Overview HD emission legislation
- Basics in HD emission calculation
- Online part:
- Operating of CDX
- Parameterization of HD emission test runs (Pre Test Dialog)
- Execution of emission test runs
- Offline Test Evaluation:
- Overview on interfaces and tools
- Handling of report generator
- Management console
- Overview report content

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- This training deals with the complete iGEM package and includes both the online part and the topic Offline Test Evaluation.
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Experience in the area of exhaust emissions and related legislation
- Experience in operation and parameterization of the PUMA Open System
- Experience in operation of the data post processing software CONCERTO
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services

Each consisting of:

- 3 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING iGEM VEHICLE

TNASKTR554.01

This training refers to versions iGEM Vehicle 2011 and 2012.

Goal

The participant understands the function of iGEM VEHICLE. He is able to operate a iGEM VEHICLE system and to carry out test runs. In addition he is able to use iGEM Offline and CONCERTO to evaluate emission tests by creating test specific reports.

Content

- Introduction to iGEM
- Overview: Integration of your emission measurement devices with iGEM VEHICLE
- Software structure
- Overview LD emission legislation
- Basics in LD emission calculation
- Online part:
- Operating of CDX
- Parameterization of iGEM VEHICLE emission test runs (Pre Test Dialog)
- Execution of emission test runs
- Offline Test Evaluation:
- Overview on interfaces and tools
- Handling of report generator
- Management console
- Overview report content

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- This training deals with the complete iGEM package and includes both the online part and the topic Offline Test Evaluation.
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Experience in the area of exhaust emissions and related legislation
- Experience in operation and parameterization of the PUMA Open System
- Experience in operation of the data post processing software CONCERTO
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services

Each consisting of:

- 3 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING: GEM 301 EC EMISSION CYCLES L/H

TNASKTR555.01

This training refers to GEM301 EC version 2011 and above.

Goal

The participant knows the features of the GEM EC L/H system. He/she is able to understand the basic legislative background for the GEM EC L/H testruns and also the basic functions of the emission measurement devices controlled by GEM EC L/H. He/she is able to parameterize and execute GEM EC L/H testruns. He/she knows to generate an emission test cycle report and to understand it.

Content

- Tasks and features of GEM EC L/H
- Overview: Integration of your emission measurement devices with GEM EC
- Workflow and interface of the GEM EC L/H SW tools
- Basics about emission test cycles
- Parameterization of GEM EC L/H testruns
- Execution of test GEM EC L/H testruns
- Generation of a emission test cyle report and explanation of the entries

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic experience in the area of exhaust emissions and related legislation
- Experience in operation and parameterization of the PUMA Open System
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises as well as the necessary authorization for access.

Scope of Services

Each consisting of:

- 2 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING FOR TEST INFORMATION MANAGEMENT

In this section you will find courses designed to enhance your knowledge and skills on AVL Test Information Management solutions.

TRAINING SANTORIN HOST (ENG. OFFICE)

TNASKTR324.01

This training refers to version 5.2.2 – for a training dealing with older versions, please contact your local representative.

User Level
Administration (Test Field Administrator)

Goal
The participant knows the data management in a SANTORIN HOST system. He/She is able to administrate the HOST database and its parameters. The trainee understands how to maintain 'normnames' and existing measurement data.

Content

- Overview SANTORIN Packages
- Possible configurations
- Data structure and Data management
- AVL Engineers Office vs. Santorin Web Tools
- Data Backup
- Weather station
- Operation of the SANTORIN Package
- Data Manager (SPACE)
- Security Manager (SPACE)
- Storage Manager (STORM) - DBA (Database Administration) Toolbox
- E-Mail Distributor
- Data Archiving
- Parameter setting
- Automatic Archiving
- Manual Archiving
- Automatic Mixed-Mode Conversion
- Import and export processes
- Normname Editor (NED)
- Management of "normnames" (Sort, Edit, Add, Delete)
- Test field management using the PUMA Explorer
- Export of Normnames
- Central Data Management
- Test Field Data Distribution

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- This training does not include the operation of TESTGATE, for further information please see "TRAINING TESTGATE"
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Knowledge of PC data management in an network environment
- Experience in operation and parameterization of the PUMA Open System
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises as well as the necessary authorization for access.

Scope of Services
Each consisting of:

- 4 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING SANTORIN HOST (WEB TOOLS)

TNASKTR348.01

This training refers to version 5.2.2 – for a training dealing with older versions, please contact your local representative.

User Level
Administration (Test Field Administrator)

Goal
The participant knows the data management in a SANTORIN HOST system. He/She is able to administrate the HOST database and its parameters. The trainee understands how to maintain 'normnames' and existing measurement data.

Content

- Overview SANTORIN Packages
- Possible configurations
- Data structure and Data management
- AVL Engineers Office vs. Santorin Web Tools
- Data Backup
- Weather station
- Operation of the SANTORIN Package
- Data Manager (Santorin Explorer)
- Security Manager (Santorin Security Editor)
- Storage Manager (STORM) - DBA (Database Administration) Toolbox
- E-Mail Distributor
- Data Archiving
- Parameter setting
- Automatic Archiving
- Manual Archiving
- Automatic Mixed-Mode Conversion
- Import and export processes
- SANTORIN Quantity Manager
- Management of "normnames" (Sort, Edit, Add, Delete)
- Test field management using the PUMA Explorer
- Export of Normnames
- Central Data Management
- Test Field Data Distribution

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- This training does not include the operation of TESTGATE, for further information please see "TRAINING TESTGATE"
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Knowledge of PC data management in an network environment
- Experience in operation and parameterization of the PUMA Open System
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises as well as the necessary authorization for access.

Scope of Services
Each consisting of:

- 4 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING SANTORIN ASAM ODS SERVER

TNASKTR303.01

This training refers to version 5.2.2 – for a training dealing with older versions, please contact your local representative.

User Level
Administration (Test Field Administrator)

Goal
The participant understands the structure of the ASAM ODS database to enable the administration of normnames, measured results, parameters, projects and users.

Content

- Overview of the data structure and data management
- Operation of the Administration Tool SPACE, STORM - consisting of Data Manager, Security Manager, Storage Manager
- Management of 'normnames' using NED or WEB Admin Tool (depending on the configuration)
- PUMA EXPLORER Library Concept

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

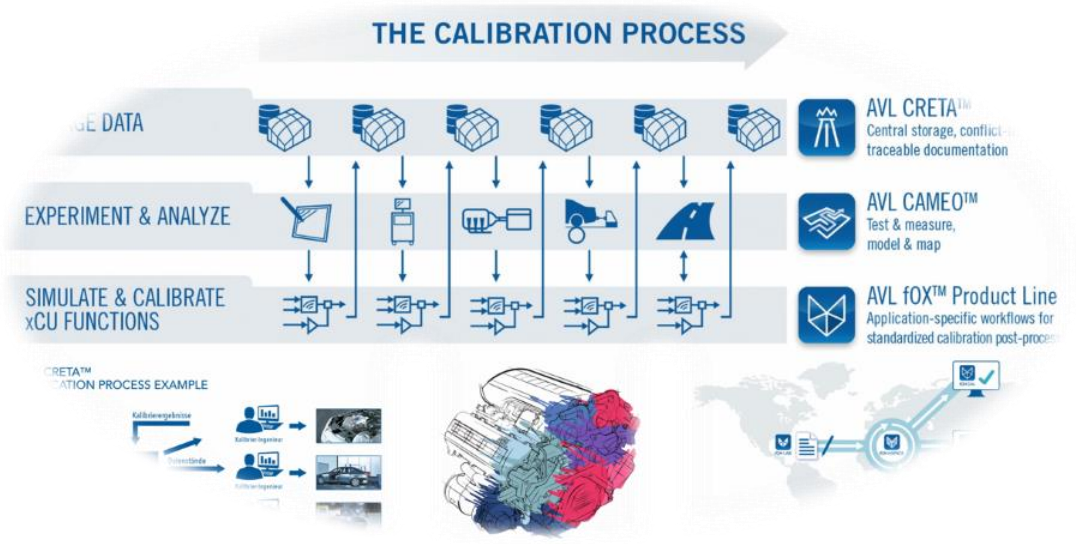
Prerequisites

- Knowledge of PC data management in an network environment
- Experience in operation and parameterization of the PUMA Open System
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises as well as the necessary authorization for access.

Scope of Services
Each consisting of:

- 2 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING FOR POWERTRAIN CALIBRATION



In this section you will find courses designed to enhance your knowledge and skills on AVL Powertrain Calibration software tools.

TRAINING CAMEO 2014 BASICS

TNASKTR320.01

This training refers to versions CAMEO 2014 (V3.7) – for a training dealing with older versions, please contact your local representative.

User Level
Operation (Test Operator), Parameterization (Test Engineer)

Goal
The participant understands the function of CAMEO. He is able to set up test runs with different variation strategies. He knows the functionality to optimize the engine map based on CAMEO results.

Content

- Introduction of functionality and operation of CAMEO
- Database with project and system handling
- Test procedures with their variants: DOE, DOE Full Factorial
- Parameterization of operating points
- Measurements and limit monitoring
- Test actions (Device and Macro service)
- Raw data plausibility check
- Modeling
- Local and driving cycle optimization
- Map-Curve Editor
- Export/Import of test data

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally

Prerequisites

- Knowledge of combustion engine and ECU
- Basic knowledge of engine testbed and operation
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Scope of Services
Each consisting of:

- 4 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING FOR CONSUMPTION MEASUREMENT

In this section you will find courses designed to enhance your knowledge and skills on AVL instrumentation solutions for the consumption measurement of fuel, blow by, oil and urea.

TRAINING FUEL MASS FLOW METER

TNASKTR402.01

User Level
Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant is able to operate the Fuel Mass Flow Meter, to perform measurements and to carry out simple maintenance.

Content

- Basic knowledge of fuel consumption measurement
- Measurement principle of the Coriolis Sensor
- Explanation of Flow Chart (Schematics)
- Overview of System setup (hydraulic and electric interfaces)
- Operation
- Operating States
- Operation via instrument controller, PUMA system or PC software
- Explanation of important measurement parameters
- Functionality of implemented options
- Maintenance
- Check
  - Emergency Stop relay
  - Pressure regulator
  - Fill Valve
  - Leak check
  - Zero Consumption Measurement
  - Filter Mat
  - Fuel pump
  - Overflow protection
- Calibration requirements and solutions

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of mechanics, hydraulics and measurement techniques
- General testbed knowledge
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 1 day instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING FUEL BALANCE 733S

TNASKTR400.01

User Level
Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant is able to operate the Fuel Balance, to perform measurements and to carry out simple maintenance.

Content

- Basic knowledge of fuel consumption measurement
- Measurement principle of the Balance (gravimetric principle)
- Explanation of Flow Chart (Schematics)
- Overview of System setup (hydraulic and electric interfaces)
- Operation
- Operating States
- Operation via instrument controller, PUMA system or PC software
- Explanation of important measurement parameters
- Functionality of implemented options
- Maintenance
- Check
  - Leak check
  - Solenoid valve
  - Damping oil
  - Spring elements
- Calibration requirements and solutions

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of mechanics, hydraulics and measurement techniques
- General testbed knowledge
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 1 day instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING BLOW BY METER

TNASKTR401.01

User Level
Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant is able to operate the Blow By Meter, to perform measurements and to carry out simple maintenance.

Content

- Basic working principle and typical application areas
- Overview of System set-up (mechanical and electrical installation)
- Explanation of the installation of the different Blow By Lines
- Blow-by Gas Line
- Blow-by Gas Feed Line
- Blow-by Gas Discharge Line
- Blow-by Gas Recirculation
- Operation
- Measurement principle
- Operation via PUMA system
- Functionality of implemented options
- Maintenance
- Cleaning
  - Orifice Measuring Pipe
  - Dampers
- Calibration

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of mechanics and measurement techniques
- General testbed knowledge
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 1 day instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING FOR COMBUSTION MEASUREMENT

In this section you will find courses designed to enhance your knowledge and skills on AVL combustion measurement devices and tools.

TRAINING INDICATING SYSTEM SETUP

TNASKTR568.01

User Level
Operation (Test Operator), Parameterization (Test Engineer)

Goal
The participants are able to set up a standard AVL Indicating system, to parameterize, calibrate and perform indicating measurements. In addition, the participants can perform basic error analysis and data management.

Content

- Explanation of the installation of an AVL Indicating system
- Connection of the necessary sensors (angle sensor, pressure sensor, TDC sensor, power claw, etc.) and the associated amplifier
- Software Installation
- Operation of the measuring chain
- Basics how to work with pressure sensors
- Installation instructions
- Cabling
- Maintenance
- Parameterization and calibration of the measurement chain, for example:
- Determination of TDC
- Amp settings
- Ignition/Injector Timing
- Low pressure sensors, etc.
- Configuring the PUMA interface (for connection to PUMA automation system)
- Measurements on the testbed or with simulator
- Plausibility analysis of the measured data and error analysis based on the parameterization and the measurement setup
- Basic structure of Indicating data and their management
- Visualization of the measured data and the basics of evaluation

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- PUMA Basic knowledge recommended (if the indicating system is connected to a PUMA system)
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 2 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING PLAUSIBILITY INDICATING RESULTS

TNASKTR569.01

User Level
Operation (Test Operator), Parameterization (Test Engineer)

Goal
The participants are able to understand the goals and interrelationships of Indicating and also to check the measurement results on plausibility. In addition, the technical background is understood and learned how to deal with interferences on signals.

Content

- Objectives of Indicating
- Validation of the crank angle measurement (TDC position)
- Comparison of the pressure curve (thermodynamic zero level correction, pV-diagram, compression curve)
- Check compression ratio and polytropic coefficient
- Comparison indicated mean effective pressure to performance measurement on the dyno
- Heat release vs. Burn Rate (Mass burn fraction, relation Fuel consumption and emissions)
- Minimizing the influence of noise (filter technologies)

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Engine testing knowledge and basic indicating skills
- Thermodynamic basics
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 1 day instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING INDICOM EVALUATION

TNASKTR570.01

This training refers to version 2.5 or above – for a training dealing with older versions, please contact your local representative.

User Level
Operation (Test Operator), Data Evaluation (Post Processing Personnel)

Goal
The participants are able to display measurement results for post processing, evaluation and archiving.

Content

- Data management
- Data Explorer
- Visualization of the measurement results
- Diagrams
- Tables
- Reports
- Creation of Layouts
- Analysis of data
- Data synchronization (crank angle and time base)
- Calculations with Calc Graf and Calculator
- Data comparison
- Series Analysis
- Calc Graf
- Library
- Creation of Models
- Data Import/Export
- Archiving
- Data, Layouts
- IFile Editor
- Correction possibilities

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Engine testing knowledge
- PUMA Basic knowledge recommended (if the indicating system is connected to a PUMA system)
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 2 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING PRESSURE SENSORS BASICS

TNASKTR571.01

User Level
Operation (Test Operator), Parameterization (Test Engineer), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participants are able to choose the right pressure transducer to parameterize correctly and to interpret the measured variables as well as factors influencing the pressure curve. In addition, the maintenance and repair of pressure transducers as well as the basic handling of the sensor data management is learned.

Content

- Basics on sensor selection
- Installation
- Cooled / Uncooled transducers
- Sparkplug Adapter / glow plug adapter
- Low pressure transducer
- Line pressure transducer
- Installation instructions
- Checking the mounting hole (tolerances)
- Necessary equipment
- Cable laying
- Mounting torque
- Amplifier settings
- Parameterization
- Grounding
- Sensor data acquisition
- Measurands and influence factors on the pressure curve
- Check of the measuring chain
- Information on troubleshooting possible sources of error
- Maintenance and repair
- Information about disassembly of a sensor
- Cleaning, storage, isolation
- Sealing surfaces
- Basics of sensor data management
- Import and management of sensor data
- GUI Sensoradmin
- Calibration with Dead weight tester or Ramp Calibration System
- Sensor Life Cycle
- Calibration intervals
- Characteristic value of calibration
- Process of calibration

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic indicating skills
- Engine testing knowledge

- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 1 day instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING FOR EMISSION ANALYSIS AND MEASUREMENT

In this section you will find courses designed to enhance your knowledge and skills on AVL Emissions Measurement solutions.

TRAINING SMART SAMPLER 472

TNASKTR514.01

User Level
Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant knows the basics of particulate measurement on diesel engines and the use of the AVL Smart Sampler 472 partial dilution tunnel. He is able to operate the system for homologation and engine development test run cycles. He is familiar to setup steady state and transient tests.

Content

- Introduction into particulate measurement and partial flow systems
- Legislation overview
- Overview of the system and the hardware structure
- Installation/Integration
- Handling of the steady state and transient test under consideration of boundary conditions and execution details
- Parameterization of test cycles (ETC, ESC)
- Running a test and analyzing of the control parameter
- Steady state and transient result calculation
- Executing of the control checks according to ISO standards
- Operation of the SPC472 using AK control commands

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- General knowledge of emissions measurement technology
- Basic knowledge of electrical and mechanical engineering
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 4 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING SMART SAMPLER 478 BASICS

TNASKTR561.01

User Level
Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant knows the basics of particulate measurement on diesel engines and the use of the AVL Smart Sampler partial dilution tunnel. He is able to perform basic maintenance tasks.

Content

- Introduction into particulate measurement and partial flow systems
- Legislation overview
- Installation/Integration
- Overview of the system and the hardware structure
- Overview GEM140 Software
- Maintenance tasks

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- Operation:
  To be able to operate the Smart Sampler please order the following courses depending on your SPC configuration (SPC Stand Alone or SPC connected to Host):
- Stand Alone system: “TRAINING: SMART SAMPLER 478 OPERATING” TNASKTR544.01
- Connected to PUMA-Host (depending on your configuration):
  - “TRAINING iGEM ENGINE LD” TNASKTR544.01
  - “TRAINING iGEM VEHICLE” TNASKTR554.01
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- General knowledge of emissions measurement technology
- Basic knowledge of electrical and mechanical engineering
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 2 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING SMART SAMPLER 478 OPERATING

TNASKTR544.01

User Level
Operation (Test Operator)

Goal
The participant is able to operate the Smart Sampler Stand Alone System for homologation and engine development test run cycles. He is familiar to setup steady state and transient tests.

Content

- Test Setup
- Handling of the steady state and transient test under consideration of boundary conditions and execution details
- Parameterization of test cycles (ETC, ESC)
- Running a test and analyzing of the control parameter
- Steady state and transient result calculation
- Executing of the control checks according to ISO standards
- Operation of the SPC using AK control commands

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- General knowledge of emissions measurement technology
- Training “TRAINING: SMART SAMPLER 478 BASICS” TT05AA478B.01
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 2 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING AVL MICRO SOOT SENSOR

TNASKTR503.01

User Level
Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant is able to operate the AVL Micro Soot Sensor, to perform measurements and to carry out simple maintenance.

Content

- Basic knowledge of emissions measurement
- Overview of System set-up (mechanical, pneumatically and electrical installation)
- Explanation of the installation of both Sampling Probe and Sampling Line
- Operation
- Measurement principle and different measurement procedures
- Operating States and Functions
- Operation PUMA system or PC
- Explanation of important parameters
- Functionality of implemented options
- Maintenance
- Cleaning
  - Windows
  - Measuring Cell
  - Sampling Lines
  - Dilution Cell
  - High Pressure Option
- Changing the Filter Elements
- Calibration check
- Laser/Microphone linearity check
- Leak check

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of mechanics, measurement techniques
- General testbed knowledge
- Knowledge of PC's and Windows
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 1 day instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING PARTICLE COUNTER

TNASKTR504.01

User Level
Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant is able to operate the Particle Counter to perform measurements and carry out simple maintenance work.

Content

- Basic knowledge of emissions measurement & legislation
- Overview of System set-up (mechanical, pneumatically and electrical installation)
- Explanation of the installation of both Sampling Probe and Sampling Line
- Operation
- Measurement principle and different measurement procedures
- Operating States and Functions
- Operation PUMA system or PC
- Explanation of important parameters
- Functionality of implemented options
- Maintenance
- Cleaning
  - Venturi Pump (Particle Counter Advanced)
  - High Pressure Option
- Changing the Filter element
- Replacing Filter mats
- Function check
  - Leak check
  - Response Check
  - Flow Check
- Refill Butanol

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of mechanics, measurement techniques
- General testbed knowledge
- Knowledge of PC's and Windows
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 1 day instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING SMOKE METER

TNASKTR502.01

User Level
Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant is able to operate the AVL Smoke Meter, to perform measurements and to carry out simple maintenance.

Content

- Basic knowledge of particulate measurement
- Overview of System set-up (mechanical, pneumatically and electrical installation)
- Explanation of the installation of both Sampling Probe and Sampling Line
- Operation
- Measurement principle and different measurement procedures
- Operating States and Functions
- Operation via instrument controller, PUMA system or PC
- Explanation of important parameters
- Functionality of implemented options
- Maintenance
- Cleaning
  - Reflectometer Head
  - Light gates
  - Camshaft
  - Sampling Probe
  - Sampling Lines
  - White value plate
- Changing the Filter Element
- Leak check
- Sampled volume check (using Volume Tester)
- Reflectometer head check (using Reflectance Standards)

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of mechanics, measurement techniques
- General testbed knowledge
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 1 day instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING OPACIMETER

TNASKTR501.01

User Level
Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant is able to operate the Opacimeter, to perform measurements and to carry out simple maintenance.

Content

- Basic knowledge of emissions measurement
- Overview of System set-up (mechanical, pneumatically and electrical installation)
- Explanation of the installation of both Sampling Probe and Sampling Line
- Operation
- Measurement principle and different measurement procedures
- Operating States and Functions
- Operation via instrument controller, PUMA system or PC (Opacimeter software)
- Explanation of important parameters
- Functionality of implemented options
- Maintenance
- Cleaning the Window Modules and the Measuring Chamber
- Cleaning the Sampling Lines
- Changing the Filter Element
- Leak check
- Calibration and linearity check

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of mechanics, measurement techniques
- General testbed knowledge
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 1 day instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING EXHAUST GAS ANALYSER AMA i60

TNASKTR513.01

This training refers to both AMA i60 generation series I and II.

User Level
Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant understands the principles of analyzers and the layout of AMA i60. He is able to operate the main functions and to do the basic maintenance task. The participant obtains a basic understanding of the foundations of emissions measurement.

Content

- Basics of emissions measurement and legislation
- Overview of the customer specific system configuration
- HSS-Prefilter
- Measurement principles of the analyzers
- Pneumatic layout of the customer specific analyzers
- Physical and pneumatic layout of AMA i60
- Electric components and control layout
- iGEM AMA software operation
- Operation of AMA i60
- Parameterization on operator level
- Basic maintenance tasks

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- The daily, weekly and monthly maintenance measures have to be performed by local staff in time because otherwise the measuring quality is no longer guaranteed (loss of accuracy). To qualify the maintenance staff the adequate training class “TRAINING L2: AMA i60 MAINTENANCE” has to be ordered in addition
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Technical, electrical/electronic and physical background
- General knowledge of engine or vehicle testing
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 4 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING AMA i60 MAINTENANCE

TNASKTR551.01

This training refers to both AMA i60 generation series I and II.

User Level
Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant is able to perform daily, weekly and monthly maintenance tasks according to the maintenance plan.

Content

- Sample Gas Preparation Unit GPU
- Replace filter element GPU
- Check/Replace pump hoses of the condensate pump
- Flow check of gas extraction unit
- Check of fans, condensate tubes clean/change
- Check and clean cooler for contamination, adjust cooler temperature
- Check measuring gas pressure sensor, check functioning of humidity sensor
- Cabinet, SGU, AVU
- Check fill level of bubbler
- Check function of touch screen
- Check internal exhaust gas sensor
- Check external extraction unit
- AVL Prefilter
- Check filter inserts of the external Prefilter module
- Gas supply
- Performance check on the gas cylinder pressure reducer (check set pressure)
- Gas cylinder pressure check
- Check of the certificates, best-by dates and connections of the gas supply
- Checks / Diagnosis Functions
- Measuring range calibration, Purge filter
- Leak check, HC hang-up check, check NOx converter efficiency
- Linearity check, linearization measuring range, interference checks

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- This training has a consumables surcharge.
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of fine mechanics
- Profound knowledge of operating the AMAi60 system
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 4 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training

- AVL Certificate for participants

TRAINING OS SORE AMA i60 COMBI

TNASKTR573.01

This training refers to both AMA i60 generation series I and II.

User Level
Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant understands the layout and functioning of both the AMA i60 Exhaust Measurement System and the CVS i60 Dilution System. He/ She is able to operate the main functions and to do the basic maintenance task. The participant obtains a basic understanding of the foundations of emissions measurement.

Content

- Basics of emissions measurement and legislation
- Overview of the customer specific system configuration
- Systems design and flow schematics
- HSS Prefilter
- Measurement principles of the analyzers
- Pneumatic layout of the customer specific analyzers
- Physical and pneumatic layout
- Electric components and control layout
- iGEM software operation
- Operation of both AMA i60 and CVS i60
- Parameterization on operator level
- Diagnostic functions, basic maintenance tasks , system check
- iCAL CVS i60 Calibration Unit, iCAL CFO

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue on customer site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Technical, electrical/electronic and physical background
- General knowledge of engine or vehicle testing
- The client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 6 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- AVL Certificate for participants

TRAINING AMA i60 REMOTE/STAND ALONE

TNASKTR552.01

This training refers to both AMA i60 generation series I and II.

User Level
Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant understands the principles of analyzers and the layout of AMA i60. He is able to operate the main functions and to do the basic maintenance task. The participant obtains a basic understanding of the foundations of emissions measurement.

Content

- Basics of emissions measurement and legislation
- Overview of the customer specific system configuration
- HSS-Prefilter
- Measurement principles of the analyzers
- Pneumatic layout of the customer specific analyzers
- Physical and pneumatic layout of AMA i60
- Electric components and control layout
- iGEM AMA software operation
- Operation of AMA i60
- Parameterization on operator level
- Basic maintenance tasks

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Technical, electrical/electronic and physical background
- General knowledge of engine or vehicle testing
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 4 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING DILUTION SYSTEM CVS i60

TNASKTR514.01

This training refers to both CVS i60 generation series I and II.

User Level
Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant understands the theory, layout and functioning of the customer-specific CVS system and is able to operate the system for gasoline and diesel applications.

Content

- Basics of emissions legislation
- Basics and function of the CVS i60 system
- Systems design and flow schematics
- iGEM CVS Software operation
- System functions and parameterization
- Basic maintenance work
- System check
- iCAL CVS i60 Calibration Unit
- iCAL CFO

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL (without system!) or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- Training regarding the particulate sampler PSS i60 is not part of Scope of Services. For details please refer to the training “TRAINING PARTICULATE SAMPLER PSS i60”
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic mechanical and electrical knowledge
- General knowledge of engine or vehicle testing
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 3 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING PARTICULATE SAMPLER PSS i60

TNASKTR515.01

This training refers to both PSS i60 generation series I and II.

User Level
Operation (Test Operator) Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant understands the theory, layout and functioning of the customer-specific PPS i60 system and is able to operate the system.

Content:

- Basics and function of a PSS i60system
- Systems design and flow schematics
- System functions and parameterization
- Operation of the system
- Basic maintenance work
- PSS i60 MFC Calibration Unit

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL (without system!) or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic mechanical and electrical knowledge
- General knowledge of engine or vehicle testing
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 1.5 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING AVL SESAM i60 FT

TNASKTR537.01

This training refers to both SESAM i60 FT generation series I and II.

User Level
Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant understands the measurement principle and the system layout of the AVL SESAM i60 FT multicomponent emissions analysis system. He is able to operate the main functions. The participant has basic understanding of emissions measurement.

Content

- Basics of emissions measurement and legislation
- Overview of the customer specific configuration
- HSS Prefilter
- Measurement principles of the analyzers
- Physical and pneumatic layout of SESAM i60 FT
- Measurement principles of the FTIR
- Physical and pneumatic layout of FTIR
- Operation of the software
- Operation of SESAM i60 FT
- Parameterization on operator level
- Basic maintenance tasks

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Technical, electrical/electronic and physical background
- General knowledge of engine or vehicle testing
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 4 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING OS AVL SESAM-FTIR

TNASKTR538.01

User Level
Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant understands the measurement principle and the system layout of the AVL FTIR – SESAM multicomponent emissions analysis system. He is able to operate the main functions. The participant has basic understanding of emissions measurement.

Content
- Basics of emissions measurement and legislation
- Overview of the customer specific configuration
- HSS Prefilter
- Measurement principles of the FTIR
- Physical and pneumatic layout of FTIR
- Operation of the software
- Operation of FTIR and practical training
- Diagnostic functions
- Parameterization on operator level
- Basic maintenance tasks

Notes
- Training class is conducted in English
- Max. participants: 6 persons
- Venue on site. Traveling time and traveling expenses for the trainer have to be ordered additionally.
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites
- Technical, electrical/electronic and physical background
- General knowledge of engine or vehicle testing
- The client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:
- 3 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- AVL Certificate for participants

TRAINING FOR MEDIA CONDITIONING

In this section you will find courses designed to enhance your knowledge and skills on AVL Conditioning systems.

TRAINING FUEL TEMPERATURE CONTROL

TNASKTR600.01

User Level
Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant is able to operate and to maintain the Fuel Temperature Control.

Content

- Basic knowledge of fuel conditioning
- Explanation of Flow Chart (Schematics)
- Overview of System setup (hydraulic and electric interfaces)
- Operation
- Operating States
- Operation via instrument controller, PUMA automation system or PC
- Maintenance
- Check
  - Leak Check
  - Filters
  - Valves and Flow Switches
  - Fan
  - Pumps

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of fuel measurement systems recommended
- Basic mechanical, hydraulic and electrical knowledge
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 1 day instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING FOR VEHICLE TESTBEDS

In this section you will find the course designed to enhance your knowledge and skills on AVL Vehicle Testbeds.

TRAINING CHASSIS DYNO

TNASKTR700.01

User Level
Operation (Test Operator)

Goal
The participant is able to operate and maintain the system. In addition he is able to detect and to solve failures.

Content:

- Physical principles
- Applications
- Mechanical principles
- Electrical principles
- Operation of the chassis dynamometer

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic electrical, electronic and mechanical knowledge
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

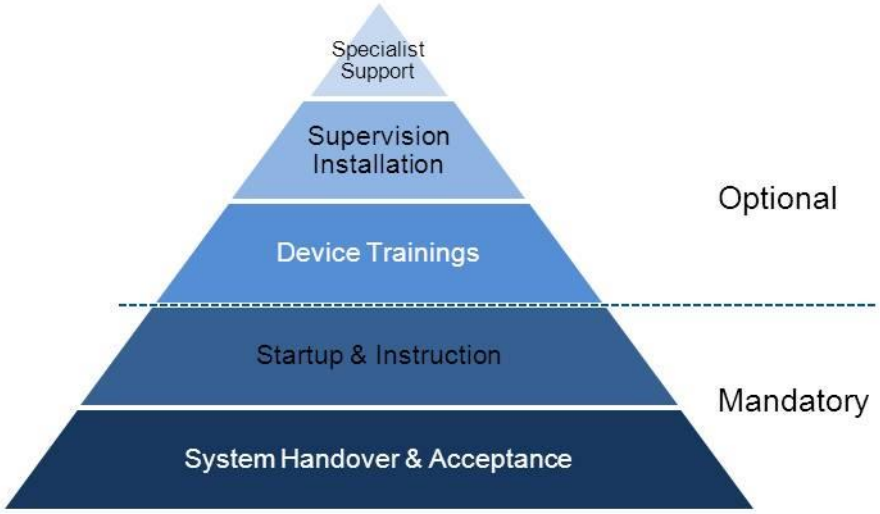
Scope of Services
Each consisting of:

- 5 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING FOR IN-VEHICLE MEASUREMENT

In this section you will find the course designed to enhance your knowledge and skills on AVL In-Vehicle Testing products.

AVL M.O.V.E (Integrated **MO**bile **V**ehicle **E**valuation**)**



System Handover & Acceptance
This mandatory service needs to be completed after receipt of the goods to check the scope of supply on completeness and to install the test equipment in a suitable environment (working room or laboratory) either at customer site or at AVL.

Ready to Work With
This mandatory service allows to set-up and operate the whole system basically and to perform daily/weekly/monthly maintenance tasks. This service is performed either at AVL or at customer site.

Device Trainings
Training courses for different AVL M.O.V.E system components impart the functionality, operation and parameterization and ensure the reliable operation of the testing equipment. All the training courses are conducted either at the customer site or at one of the global AVL Skills Centers.

Supervision Installation
Gain effective skills to install the delivered AVL M.O.V.E system components onboard one customer supplied test environment (testbed, chassis, vehicle). This service consists of remote support and supervision performed at customer site.

Specialist Support
Specialist support activities for experts provide knowledge enhancement based on the customer's specific testing tasks. This knowledge transfer is either performed at AVL or at customer facilities.

M.O.V.E. SYSTEM HANDOVER AND ACCEPTANCE

TNASKTR574.01

User Level
Operation (Test Operator)

Goal
The M.O.V.E. scope of supply is checked on completeness and installed in a suitable environment (working room or laboratory) either at customer site or at AVL. Furthermore the functionality of the scope of supply is checked and demonstrated to the customer.

Content

- Unpacking of the delivered system components
- Visual check
- Setting up the delivered system components in suitable lab
- Powering up the system components and performing a function check
- Demonstrating the proper function of the system components to the customer
- Completing the acceptance protocol together with the customer

Notes

- Detailed training for SYSTEM CONTROL, GAS PEMS, PM PEMS, CONCERTO PEMS, and KMA Mobile is not included (separate articles available)
- The System Handover and Acceptance does not include the installation onboard a vehicle
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally

Prerequisites (in case the corresponding service is performed at customer site)

- The customer has to provide a suitable working environment (working room or laboratory)
- The necessary infrastructure (power and gases) needs to be available

Scope of Services
Each consisting of:

- Handover and Acceptance for one M.O.V.E. System
- Acceptance protocol

AVL M.O.V.E SYSTEM - READY TO WORK WITH

TNASKTR549.01

User Level
Operation (Test Operator), Parameterization (Test Engineer), Data Evaluation (Post Processing Personnel), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant knows the function of the delivered AVL M.O.V.E system components ("system components") and is able to set-up and operate the whole system basically. In addition he/she is able to perform daily/weekly/monthly maintenance tasks, basic parameterization and basic calibration. Basic post processing can be performed by using demonstration data.

Content
- System overview
- Working principle
- Safety instructions
- Operating the system basically
- Performing daily/weekly/monthly maintenance
- Basic parameterization and basic calibration
- Post Processing (based upon demonstration data)

Notes
- Startup & Instruction is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- Detailed training for SYSTEM CONTROL, GAS PEMS, PM PEMS, CONCERTO PEMS and KMA Mobile is not included (separate articles available)
- The startup & instruction does not include the installation onboard a vehicle
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites / Supply by customer
- If the startup & instruction is conducted on site the customer has to provide all the required gases to be used both as operation and calibration gases for the individual system components

Scope of Services
Each consisting of:
- 5 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- AVL Certificate for participants

TRAINING AVL M.O.V.E SYSTEM CONTROL

TNASKTR546.01

User Level

Operation (Test Operator), Parameterization (Test Engineer), Data Evaluation (Post Processing Personnel), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Important Information

Both the linearization feature and the cutter efficiency testing feature are not part of this training. In order to be able to deal with the mentioned features the dedicated training courses (TRAINING AVL M.O.V.E SYST CONT LINEARIZ. and TRAINING AVL M.O.V.E SYST CONT CUTTER) have to be ordered in addition.

Goal

The participant is able to operate the delivered AVL M.O.V.E System (GAS PEMS, PM PEMS Pitot EFM and KMA Mobile) via the AVL M.O.V.E SYSTEM CONTROL device. He/she is able to perform “simple” measurements, to execute legislative tests (“in-use-tests”) and to customize visualization objects.

Content

- Overview of Emissions Measurement & Legislation
- AVL M.O.V.E SYSTEM CONTROL Hardware, Software & Use Cases
- System architecture & configuration
- Interfaces (GPS, ambient conditions, CAN)
- Integration of AVL devices (GAS PEMS, PM PEMS, Pitot EFM and KMA Mobile)
- AVL M.O.V.E SYSTEM CONTROL Operation
- Basic troubleshooting
- Diagnosis / plausibility of data
- Execution of “simple” measurements (data logging) and legislative tests (Pre-, Main- and Post Phase)
- Definition of user defined data channels (Calculator)
- Visualization of data (creation and customization of layout pages and display objects)
- Overview AVL M.O.V.E DATA POST PROCESSING (PEMS PPO)

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- Detailed training for GAS PEMS, PM PEMS and KMA Mobile is not included, separate articles available
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of mechanics, PCs and Windows
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services

Each consisting of:

- 1 day instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING AVL M.O.V.E PM PEMS

TNASKTR545.01

User Level
Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant is able to operate the AVL M.O.V.E PM PEMS system to perform measurements and carry out simple maintenance.

Content

- Basic knowledge of emissions measurement & legislation
- Measurement principles and different measurement procedures
- Installation of Sampling Probe and Sampling Line
- Overview of System set-up (mechanical, pneumatically and electrical installation)
- Operation via PC
- Explanation of important parameters
- Diagnosis of simple failures – troubleshooting
- Simple maintenance
- Explanation of checks
- Calibration check
- Laser/Microphone linearity check
- Leak check
- Overview of both operation and implemented options

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of mechanics, measurement techniques
- General testbed knowledge
- Knowledge of PC's and Windows
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 1 day instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING AVL M.O.V.E GAS PEMS 493

TNASKTR546.01

User Level
Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal

The participant is able to operate the AVL M.O.V.E GAS PEMS system to perform measurements and carry out simple maintenance.

Content

- Basic knowledge of emissions measurement & legislation
- Measurement principles and different measurement procedures
- Installation of Sampling Probe and Sampling Line
- Overview of System set-up (mechanical, pneumatically and electrical installation)
- Operation via PC
- Explanation of important parameters
- Diagnosis of simple failures – troubleshooting
- Simple maintenance
- Explanation of Diagnosis- and Calibration checks
- Span Calibration and check
- Zeroing and zero check
- Leak check
- Audit
- Overview of both operation and implemented options

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of mechanics, measurement techniques
- General testbed knowledge
- Knowledge of PC's and Windows
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 2 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING IN VEHICLE INDICATING

TNASKTR559.01

User Level

Operation (Test Operator), Parameterization (Test Engineer), Data Evaluation (Post Processing Personnel)

Goal

The participant is able to operate an AVL Indicating system installed in the vehicle. He/She is familiar with the system set up as well as the basics for parameterization. In addition the trainee is able to evaluate standard indicating measurements.

Content

- Basics of “in-vehicle indicating”
- Setup of the AVL in-vehicle indicating system and connected pressure transducers, crank angle encoder and amplifier
- Parameterization, signal conditioning and TDC-determination
- Operating interface
- Set up of single measurement and durability measurement
- Monitoring
- Plausibility check and diagnosis of failures regarding the parameterization
- Data evaluation (e.g. CalcGraf) and data presentation using different display methods
- Calculation of results by means of CalcGraf
- Data comparison
- Data Import / Export

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of combustion engines and engine testing
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services

Each consisting of:

- 2 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING AVL M.O.V.E POST PROCESSING

TNASKTR548.01

User Level
Data Evaluation (Post Processing Personnel)

Goal
The participant is able to operate the PEMS post processing CONCERTO software in order to analyze the result data.

Content

- Concerto basics
- PEMS post general
- US evaluation

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Knowledge of PC's and Windows
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 2 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

SUPERVISION INSTALLATION M.O.V.E SYSTEM

TNASKTR550.01

User Level
Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant is able to install the delivered AVL M.O.V.E system components ("system components") onboard **one** customer supplied test environment (testbed, chassis, vehicle).

Content

- The remote support serves to discuss important tasks for the preparation/adjustment of the customer vehicle to enable a successful installation of the individual system components in the vehicle by the customer's employees.
- During the remote support AVL supplies the customer with possible information about the individual system components, in particular the following topics:
- Assembly and installation of the delivered system components onboard a vehicle
- How to install the auxiliary mounting hardware (isolation plate/rugged housing)
- How to install the electrical power distribution and charging system

Notes

- The remote support is conducted in English
- Max. participants: 6 persons
- Not included in the scope of services and to be ordered separately:
- Traveling time and traveling expenses for AVL personnel in connection with the supervision
- Detailed training sessions for individual system components (SYSTEM CONTROL, GAS PEMS, PM PEMS and KMA Mobile)
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites / Supply by customer

- Customer employees have basic command in measuring technique, vehicle electricity and electronics, as well as appropriate mechanical talents, in order to be able to perform the installation of the individual system components on the customer vehicle
- Start of the remote support needs to be early enough to allow the time needed for all the preparation and adaptations of the vehicle to be done by the customer prior to the supervision
- The customer has to complete the following, in a timely manner:
- to provide a vehicle and the material for a safe assembly of the individual system components, in particular to provide or attach completely the assembly material for the connection of the exhaust flow meter at the tail pipe
- to prepare a location on the vehicle that is safe for the mounting of the damping plate/rugged case in accordance with the appropriate component manual to install the individual system components on the customer vehicle
- to perform the welding of mounting brackets and mounting frames in/at the vehicle
- to provide all the necessary equipment to lift the instruments onto the vehicle
- to provide phone and email access between AVL and the customer
- to provide all the required gases to be used both as operation and calibration gases for the individual system components
- to provide the driver for the test drive with the customer vehicle

Scope of Services
Each consisting of:

- 8 hours remote support for installation of the individual system components via email/telephone
- 3 days supervision for installation of the individual system components on site (installation performed by the customer)
- Time: 09:00 to 16:00 daily

- 1 day setup of the individual system components by AVL on site and attendance of a test measurement using the customer environment equipped with the installed system components
- Time: 09:00 to 16:00 daily

SPECIALIST SUPPORT M.O.V.E

TNASKTR578.01

The main target of this specialist support is to assist the customer in an efficient use of the AVL M.O.V.E System in a short time to deliver test results and/or perform interpretation of measurement data.

The coordination about the scope of service between the customer specialist and the AVL technical specialist has to be done before start of support.

Notes

- Travel and accommodation expenses for the AVL employee(s) are charged to the customer
- Interpreters (except for English), if necessary, have to be provided by the customer
- The date for the service work must be fixed with AVL at least 6 weeks in advance

Scope of Services
Each consisting of:

- Day(s) support by an AVL M.O.V.E Technical Specialist

TRAINING FOR BATTERY TEST SYSTEMS

In this section you will find the course designed to enhance your knowledge and skills on AVL Battery Test Systems.

TRAINING e-STORAGE SYSTEM & EMULATOR

TNASKTR805.01

User Level
Operation (Test Operator), Parameterization (Test Engineer)

Goal
The participant is able to operate the e-STORAGE System by the meaning of starting and stopping. He/She is able to select an existing battery model, parameterize initial values of the system and to adjust basic parameters. In addition he / she knows the function of the system and is able to connect the Unit Under Test.

Content

- Basic knowledge of electrochemical behavior of batteries
- Introduction into general safety instruction
- Working principle of the e-STORAGE System
- Description of the different system components
- Operation of the systems via operating panel or PUMA Open system
- Activation of an existing battery model
- Adapting of initial values and basic parameters
- Procedure for connecting the Unit Under Test
- Functionality of implemented options (e.g.: Power Distribution Unit, Discharge Unit)

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue on site. Traveling time and traveling expenses for the trainer have to be ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of electrics and electronics
- The client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 3 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING e-STORAGE SYSTEM & TESTER

TNASKTR806.01

User Level
Operation (Test Operator), Parameterization (Test Engineer)

Goal
The participant is able to operate the e-STORAGE System by the meaning of starting and stopping. He/She is able to run the battery test, parameterize initial values of the system and to adjust basic parameters. In addition he / she knows the function of the system and is able to connect the Unit Under Test. Furthermore the participant is able to configure the eStorage Tester System, to set up channels, connect input/output devices, and to parameterize automatic test runs.

Content

- Introduction into general safety instruction
- Working principle of the e-STORAGE System
- Description of the different system components
- AVL Workstation PC
- AVL e-Storage DC Power Unit
- Start Sequence
- Operation and Setup via the battery testing automation software LYNX
- Starting the system
- Manual and automatic operation
- Limit monitoring and operating states
- Definition and execution of manual measurements
- Operation of a pre-defined recorder
- Lynx parameter sets (Testcell, Battery, and Test parameters)
- Selection of testbed parameters
- Setting up Input/Output channels
- CAN channel configuration
- Writing automatic test runs, startup and shutdown routines
- Sequence Library and subroutines
- Creating and use Datasheets
- Setup of Exception routine
- Creating and editing formulas
- Setting up of testcell limits and engine limit groups
- Importing and exporting of testrun parameters
- Data post processing with Data Browser (check of results)
- Using the message window and the help functions
- Procedure for connecting the Unit Under Test

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue on site. Traveling time and traveling expenses for the trainer have to be ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of electrics and electronics
- The client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 5 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily

- Training Material
- AVL Certificate for participants

TRAINING LYNX BATTERYTESTING OPERATION

TNASKTR338.01

This training refers to version 2.0 and above – for a training dealing with older versions, please contact your local representative.

User Level
Operation (Test Operator), Parameterization (Test Engineer)

Goal
The participant is able to operate the Lynx Automation System. He/She is able to define and execute manual measurements, run pre-defined test runs and modify basic parameters

Content

- Starting the system
- Manual and automatic operation
- Limit monitoring and operating states
- Definition and execution of manual measurements
- Operation of a pre-defined recorder
- Values and results display
- Overview of Lynx parameter sets (Testcell, Stand, Battery, and Test parameters)
- Selection of testbed parameters
- Reviewing data with the Data Browser
- Using the message window
- Using the help functions

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment for practical exercises.

Scope of Services
Each consisting of:

- 1.5 day instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING LYNX BATTERYTESTING SETUP

TNASKTR339.01

This training refers to version 2.0 and above – for a training dealing with older versions, please contact your local representative.

User Level
Parameterization (Test Engineer)

Goal
The participant is able to configure the Lynx Automation System. He/She is able to set up channels, connect input/output devices, and parameterize automatic test runs.

Content

- Overview of hardware architecture
- Contents of Testcell, Stand, Battery, and Test parameters
- Setting up Input / Output channels
- CAN channel configuration
- Writing automatic test runs, startup and shutdown routines
- Sequence Library and subroutines
- Creating and use Datasheets
- Setup of Exception routine
- Creating and editing formulas
- Setting up of stand limits and battery limit groups
- Data post processing with Data Browser (check of results)
- Importing and exporting of testrun parameters

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Training LYNX BATTERYTESTING OPERATION
- Knowledge about automation technics
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment for practical exercises.

Scope of Services
Each consisting of:

- 2 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING FOR TECHNOLOGY

TRAINING EVAL. OF DYNAMIC DATA/MAGIC

TNASKTR800.01

This training refers to PUMA Open version 1.5.x – for a training dealing with older versions, please contact your local representative.

User Level
Data Evaluation (Post Processing Personnel)

Goal
The participant is able to parameterize data evaluation directives and to perform it in automatic batch runs.
He/She selects the data channels to be analyzed and connects them to the evaluation methods by means of a graphical editor. He/She defines how to save processed data channels as well as analysis results and creates a library that provides pre-parameterized standard data evaluation directives.
The participant selects the data files to be evaluated, performs the data evaluation in a batch run and imports the analysis results (e.g. classification results) as ASCII-files afterwards into the preferred SW-tool (e.g. MS-EXCEL® or AVL-CONCERTO®) for post-processing respectively in order to display it as graphics.

Content

- Handling of MAGIC editors (graphical Job-Sequence-Editor, Batch-Editor)
- Supported input- and output-data formats
- Basic evaluation methods (copy, calibrate, add, subtract, multiply, divide data channels, detect minimum and maximum values etc.)
- Mathematical functions and signal processing (generic formulas, gradient, differentiate and integrate data channels, confine, smooth data channels etc.)
- Classification methods (multidimensional random sample-, time at level-, revolution counting- and integration-classification, range transition classification, exporting and visualizing classification results)
- Event evaluation (locating the events, determination of characteristic properties, report generation)
- Signal fault detection (detecting outliers, sudden jumps and spikes, signal dropouts, noised sections and oscillations, correcting short signal faults)
- Performing voluminous data evaluations in batch runs
- Reuse MAGIC reports within AVL Concerto

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of measured data evaluation
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 3 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

TRAINING ONLINE CLASSIFICATION

TNASKTR801.01

This training refers to PUMA Open version 1.5.x – for a training dealing with older versions, please contact your local representative.

User Level
Operation (Test Operator), Parameterization (Test Engineer)

Goal
The participant is able to parameterize online classifications within PUMA Open BSQ, i.e. to insert a classification device into a test run, to select the data channels to be classified and to connect them to the classification methods by means of a graphical editor.
He/She classifies the measured data online and imports the classification results afterwards as ASCII-files into the preferred SW-tool (e.g. MS-EXCEL®) for post processing respectively in order to display it as graphics.

Content

- Insert, start and stop online classifications in a test run in PUMA Open BSQ
- Parameterize classifications (selecting the data channels to be classified as well as the desired classification method, defining classification range, number of classes etc.)
- Import classification results as ASCII-files into other SW-tools (e.g. MS-EXCEL®) for post processing respectively in order to display it as graphics

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL or optional on site if traveling time and traveling expenses for the trainer are ordered additionally
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Experience in operation and parameterization of the PUMA Open System
- If the training class is conducted on site the client has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 1 day instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

Scope of Services
Each consisting of:

- 5 days instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch if AVL is the venue for training
- AVL Certificate for participants

EDUCATION PACKAGES FOR STATIONARY PERFORMANCE & EMISSION LIGHT DUTY SYSTEM

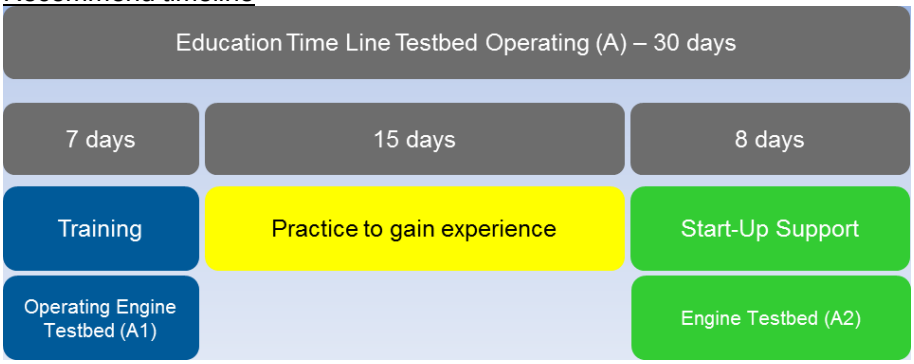
This section summarizes the education packages consisting of training and support services for AVLs standard stationary P & E Light Duty system for the most common job tasks in a comprehensive overview.
If there are different job tasks to be performed in your organization and you need to develop education packages related to the identified themes, please get in touch with your local representative to discuss.

COMMON JOB TASKS

Testbed Operating

The education package for testbed operating consists of training followed by start-up support focusing on the specific customer configuration.
The trainee is familiar with the function and operation of the customer specific testbed configuration. He is responsible to carry out pre-defined test runs and to deliver plausible test results within the defined testing time.
Start-Up Support for testbed operating to ensure that the education target is transferred as soon as possible into the real testing environment and to assist in test execution and system operation will be carried out after gaining some practice and experience.

Recommend timeline



Testbed Maintenance

The trained personnel is able to maintain the installed test equipment involving electrical/electronic, mechanical, pneumatic and hydraulic subsystems. He performs preventive maintenance activities for the installed instrumentation in a daily, weekly and monthly manner according to the maintenance plan.

Recommend timeline

TESTBED OPERATING (A)

EDUCATION PACK TESTBED OPERATING P&E LD

The education package for testbed operating consists of classroom training followed by start-up support focusing on the specific customer configuration.

Training Operating Engine Testbed (A1)
The participant is able to operate a stationary test bed system. He is able to execute predefined test runs and to adapt online values. The participant is able to modify displays and to evaluate results. He has basic operating knowledge about the measurement devices according to the testbed configuration.

Content

- Testbed overview
- Compendium of operating states
- Overview of PUMA parameter sets (System-, Test Facility-, Unit Under Test- and Test Parameters)
- Selection of test bed parameters, results and results series
- Operation of the system in manual and automatic mode (dynamometer, unit under test)
- Stationary & Continuous Measurement
- Display and storage based on predefined parameterization (e.g.: temperatures, pressures)
- Operating / Creating basic data post processing tasks with PUC
- Handling limit and engine monitoring
- Handling of TCC (e.g. deactivation / activation of simple devices)
- Basic information about data acquisition (F-FEMs)
- Safety Concept (features, handling)
- Basics about load system (working principle, torque and speed measurement)
- Engine & dyno controller for stationary operation
- Using the PUMA message window
- Using the help functions
- Overview and operating using POI window for following AVL devices and systems:
- Fuel measurement / fuel conditioning devices
- Additional conditioning and consumption devices
- Media & conditioning controller (PID)
- Emission measurement devices (Opacimeter, Smoke Meter)
- Emission measurement system (AMA i60)
- Indicating device
- ECU interface (ASAP3)

Start-Up Support Engine Testbed (A2)
To ensure that the education target is transferred as soon as possible into the real testing environment, an AVL engineer gives assistance in test execution and system operation. The AVL engineer is working together with customer personal on real projects on the testbed and helps to ramp up the testing competence of the operators to use the new testing equipment in a productive way.
The AVL engineer is monitoring the testing workflow, assists during operation, helps to understand testbed messages, advise online limit monitoring handling and show how to verify measurement results. During short sessions the engineer is repeating parts of the previous training to fasten and strengthen the theoretically background for the practical work.

Content

- Test run execution
- Set up of measurement devices
- Support for data evaluation and reporting
- Online system parameterization (e.g. limit monitoring)
- Controller adjustment (PUMA PIDs, speed, torque)
- Alignment of norm-names, formulas, templates
- Backup of data and results (archiving)
- Trouble shooting

Notes

- Training class and start-up support are conducted in English (German on customer request only)
- Max. participants: 6 persons
- Venue at customer site
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of mechanics, measurement techniques,
- The customer has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services

Each consisting of:

- 1 day preparation at customer premises
- Familiarization of customer environment, processes and tools together with customer including access to testbed
- 7 days of instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- 8 days start up support
- Time: 09:00 to 16:00 daily
- Training Material
- AVL Certificate for participants
- Travel costs, traveling time and accommodation expenses are included in the package

MAINTENANCE (B)

EDUCATION PACK MAINTENANCE P&E LD

The education package for the maintenance staff consists of training courses focusing on the specific customer configuration to enable the trainees to perform daily, weekly, monthly preventive maintenance activities according to the maintenance plan.

Maintenance-, service-, calibration- and repair-activities to be carried out only by the manufacturer are not part of the training.

Training Consumption Measurement (B1)
The participant is able to carry out regular (daily, weekly and monthly) preventive maintenance activities according to the maintenance plan for the installed AVL consumption measurement system (Fuel system, Blow by Meter, Fuel Temperature Control and Intake Air Consumption Measurement).

Content

Fuel system, Fuel Temperature Control, Intake Air Consumption Measurement

- Maintenance
- Check
  - Emergency Stop
  - Filters
  - Valves and Flow Switches
  - Leak Check
  - Zero Consumption Measurement
  - Fans and Filter Mats
  - Pumps
  - Overflow protection
- Calibration requirements and solutions
- Function check

Blow by Meter

- Maintenance
- Cleaning
- Calibration requirements and solutions
- Function check

Training Media Conditioning (B2)
The participant is able to carry out regular (daily, weekly and monthly) preventive maintenance activities according to the maintenance plan for the installed AVL media and air conditioning systems.

Content

- Maintenance
- Cleaning
- Check
  - Visual check of complete systems
  - Emergency stop
  - Pressure Reducer
  - Valves
  - Flow Switches
  - Manometer
  - Thermometer
  - Pumps
  - Heat exchangers
- Filling and Draining

- Leak Check
- Function check

Training Emission Measurement Part 1 (B3)
The participant is able to carry out regular (daily, weekly and monthly) preventive maintenance activities according to the maintenance plan for the installed AVL emission test devices (Smoke Meter and Opacimeter).

Content
Smoke Meter & Opacimeter
- Maintenance
- Cleaning
- Filter Elements
- Leak check
- Sampled volume check (using Volume Tester)
- Reflectometer head check (using Reflectance Standards)
- Calibration requirements
- Function check

Training Emission Measurement Part 2 (B4)
The participant is able to carry out regular (daily, weekly and monthly) preventive maintenance activities according to the maintenance plan for the installed AVL emission test system AMA i60.

Content
- Maintenance
- Sample Gas Preparation Unit GPU
  - Replace filter element GPU
  - Check pump hoses of the condensate pump
  - Flow check of gas extraction unit
  - Check of fans, condensate tubes clean/change
  - Check cooler for contamination
  - Check measuring gas pressure sensor
  - Check functioning of humidity sensor
- Cabinet, SGU, AVU
  - Check fill level of bubbler
  - Check function of touch screen
  - Check internal exhaust gas sensor
  - Check external extraction unit
- AVL Prefilter
  - Check filter inserts of the external Prefilter module
- Gas supply
  - Performance check on the gas cylinder pressure reducer (check set pressure)
  - Gas cylinder pressure check
  - Check of the certificates, best-by dates and connections of the gas supply
- Checks / Diagnosis Functions
  - Measuring range calibration
  - Purge filter
  - Leak check
- Function check

Notes
- Training classes are conducted in English (German on customer request only)
- Max. participants: 6 persons
- Venue at customer site
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of physics, electronics, mechanics, measurement techniques
- Basics on electrotechnics (reading wiring diagrams), electro technical instructed person
- The customer has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services

Each consisting of:

- 0.5 days preparation at customer premises
- Familiarization of customer environment, processes and tools together with customer including access to testbed
- 8 days of instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- Training Material
- AVL Certificate for participants
- Travel costs, traveling time and accommodation expenses are included in the package

COST SAVING TIP – BUY MORE, SPEND LESS

The package prices are already discounted compared to standard prices for training and support services, but further discount is applied for ordering both packages at the same time.

The complete bundle consisting of both packages can be ordered using article number TTEPPELDC.01 (EDUCATION BUNDLE OPERATING&MAINT. P&E LD) through your local representative.

OPTIONAL TRAINING COURSES

Depending on further installed functions, devices or different job tasks AVL is offering a wide range of additional training classes and support services.
To be informed in detail just contact your local representative or get the complete actual training catalog available on the internet as free PDF download: www.avl.com/training

EDUCATION PACKAGES FOR EMISSION CERTIFICATION HEAVY DUTY EU IV-V SYSTEM

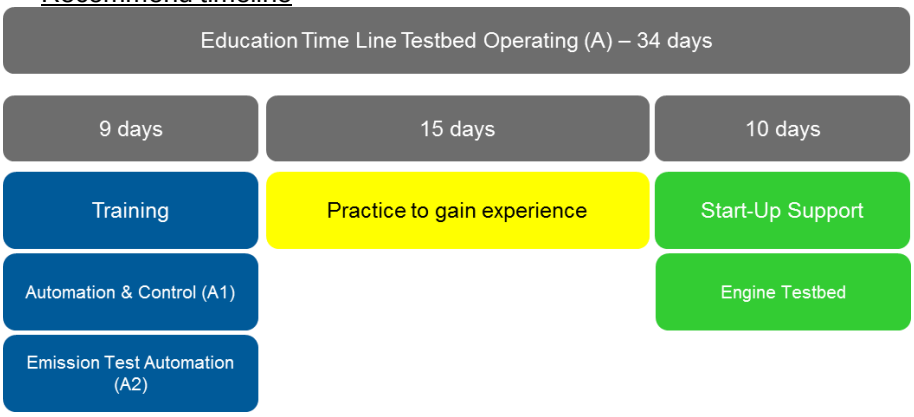
This section summarizes the education packages consisting of training and support services for AVLs standard EMISSION CERTIFICATION Heavy Duty EU IV-V system for different common job tasks in a comprehensive overview.
If there are different job tasks to be performed in your organization and you need to develop education packages related to the identified themes, please get in touch with your local representative to discuss.

COMMON JOB TASKS

Testbed Operating

The education package for testbed operating consists of training followed by start-up support focusing on the specific customer configuration.
The trainee is familiar with the function and operation of the customer specific testbed configuration. He is responsible to carry out pre-defined test runs and to deliver plausible test results within the defined testing time.
Start-Up Support for testbed operating to ensure that the education target is transferred as soon as possible into the real testing environment and to assist in test execution and system operation will be carried out after gaining some practice and experience.

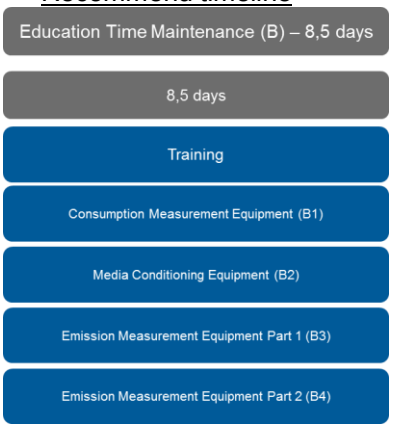
Recommend timeline



Testbed Maintenance

The trained personnel is able to maintain the installed test equipment involving electrical/electronic, mechanical, pneumatic and hydraulic subsystems. He performs preventive maintenance activities for the installed instrumentation in a daily, weekly and monthly manner according to the maintenance plan.

Recommend timeline



TESTBED OPERATING (A)

EDUCATION PACK TESTBED OPERATING EMC HD

The education package for testbed operating consists of classroom training followed by start-up support focusing on the specific customer configuration.

Training Operating Engine Testbed (A1)
The participant is able to operate a stationary test bed system. He is able to execute predefined test runs and to adapt online values. The participant is able to modify displays and to evaluate results. He has basic operating knowledge about the measurement devices according to the testbed configuration.

Content

- Testbed overview
- Compendium of operating states
- Overview of PUMA parameter sets (System-, Test Facility-, Unit Under Test- and Test Parameters)
- Selection of test bed parameters, results and results series
- Operation of the system in manual and automatic mode (dynamometer, unit under test)
- Stationary & Continuous Measurement
- Display and storage based on predefined parameterization (e.g.: temperatures, pressures)
- Operating / Creating basic data post processing tasks with PUC
- Handling limit and engine monitoring
- Handling of TCC (e.g. deactivation / activation of simple devices)
- Basic information about data acquisition (F-FEMs)
- Safety Concept (features, handling)
- Basics about load system (working principle, torque and speed measurement)
- Engine & dyno controller for stationary operation
- Using the PUMA message window
- Using the help functions
- Overview and operating using POI window for following AVL devices and systems:
- Fuel measurement / fuel conditioning devices
- Additional conditioning and consumption devices
- Media & conditioning controller (PID)
- Emission measurement devices (Opacimeter, Smart Sampler)
- Emission measurement system (AMA i60)
- ECU interface (ASAP3)

Training Emission Test Automation – iGEM Engine (A2)
The participant understands the function of iGEM HD engine. He is able to operate a iGEM HD system and to carry out test runs. In addition he is able to use iGEM Offline and CONCERTO to evaluate emission tests by creating test specific reports.

Content
- Introduction to iGEM
- Overview: Integration of your emission measurement devices with iGEM ENGINE HD
- Software structure
- Overview HD emission legislation
- Basics in HD emission calculation
- Online part:
- Operating of CDX
- Parameterization of HD emission test runs (Pre Test Dialog)
- Execution of emission test runs
- Offline Test Evaluation:
- Overview on interfaces and tools
- Handling of report generator
- Management console
- Overview report content

Start-Up Support Engine Testbed (A3)
To ensure that the education target is transferred as soon as possible into the real testing environment, an AVL engineer gives assistance in test execution and system operation. The AVL engineer is working together with customer personal on real projects on the testbed and helps to ramp up the testing competence of the operators to use the new testing equipment in a productive way.
The AVL engineer is monitoring the testing workflow, assists during operation, helps to understand testbed messages, advise online limit monitoring handling and show how to verify measurement results. During short sessions the engineer is repeating parts of the previous training to fasten and strengthen the theoretically background for the practical work.

Content
- Test run execution
- Set up of measurement devices
- Support for data evaluation and reporting
- Online system parameterization (e.g. limit monitoring)
- Controller adjustment (PUMA PIDs, speed, torque)
- Alignment of norm-names, formulas, templates
- Backup of data and results (archiving)
- Trouble shooting

Notes
- Training class and start-up support are conducted in English (German on customer request only)
- Max. participants: 6 persons
- Venue at customer site.
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites
- Experience in the area of exhaust emissions and related legislation
- Basic knowledge of mechanics and measurement techniques
- The customer has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services
Each consisting of:

- 1 day preparation at customer premises
- Familiarization of customer environment, processes and tools together with customer including access to testbed
- 9 days of instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily
- 10 days start up support
- Time: 08:30 to 16:30 daily
- Training Material
- AVL Certificate for participants
- Travel costs, traveling time and accommodation expenses are included in the package

MAINTENANCE (B)

EDUCATION PACK MAINTENANCE EMCERT HD

The education package for the maintenance staff consists of training courses focusing on the specific customer configuration to enable the trainees to perform daily, weekly, monthly preventive maintenance activities according to the maintenance plan.
Maintenance-, service-, calibration- and repair-activities to be carried out only by the manufacturer are not part of the training.

Training Consumption Measurement (B1)
The participant is able to carry out regular (daily, weekly and monthly) preventive maintenance activities according to the maintenance plan for the installed AVL consumption measurement system (Fuel system, Blow by Meter, Fuel Temperature Control and Intake Air Consumption Measurement).

Content

Fuel system, Fuel Temperature Control, Intake Air Consumption Measurement

- Maintenance
- Check
  - Emergency Stop
  - Filters
  - Valves and Flow Switches
  - Leak Check
  - Zero Consumption Measurement
  - Fans and Filter Mats
  - Pumps
  - Overflow protection
- Calibration requirements and solutions
- Function check

Blow by Meter

- Maintenance
- Cleaning
- Calibration requirements and solutions
- Function check

Training Media Conditioning (B2)
The participant is able to carry out regular (daily, weekly and monthly) preventive maintenance activities according to the maintenance plan for the installed AVL media and air conditioning systems.

Content

- Maintenance
- Cleaning
- Check
  - Visual check of complete systems
  - Emergency stop
  - Pressure Reducer
  - Valves
  - Flow Switches
  - Manometer
  - Thermometer
  - Pumps
  - Heat exchangers
- Filling and Draining

- Leak Check
- Function check

Training Emission Measurement Part 1 (B3)
The participant is able to carry out regular (daily, weekly and monthly) preventive maintenance activities according to the maintenance plan for the installed AVL emission test devices (Opacimeter and Smart Sampler).

Content

Opacimeter

- Maintenance
- Cleaning
- Filter Elements
- Leak check
- Calibration requirements
- Function check

Smart Sampler

- Maintenance
- Cleaning
- Filter elements
- Leak check
- Adjustment MV-CAL and pressure regulators
- Accuracy check
- Flow calibration
- Function check

Training Emission Measurement Part 2 (B4)
The participant is able to carry out regular (daily, weekly and monthly) preventive maintenance activities according to the maintenance plan for the installed AVL emission test system AMA i60.

Content

- Maintenance
- Sample Gas Preparation Unit GPU
  - Replace filter element GPU
  - Check pump hoses of the condensate pump
  - Flow check of gas extraction unit
  - Check of fans, condensate tubes clean/change
  - Check cooler for contamination
  - Check measuring gas pressure sensor
  - Check functioning of humidity sensor
- Cabinet, SGU, AVU
  - Check fill level of bubbler
  - Check function of touch screen
  - Check internal exhaust gas sensor
  - Check external extraction unit
- AVL Prefilter
  - Check filter inserts of the external Prefilter module
- Gas supply
  - Performance check on the gas cylinder pressure reducer (check set pressure)
  - Gas cylinder pressure check
  - Check of the certificates, best-by dates and connections of the gas supply
- Checks / Diagnosis Functions
  - Measuring range calibration
  - Purge filter
  - Leak check
- Function check

Notes

- Training classes are conducted in English (German on customer request only)
- Max. participants: 6 persons
- Venue at customer site
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of physics, electronics, mechanics, measurement techniques
- Basics on electrotechnics (reading wiring diagrams), electro technical instructed person
- The customer has to provide sufficiently installed and commissioned equipment running properly for practical exercises

Scope of Services

Each consisting of:

- 1 day preparation at customer premises
- Familiarization of customer environment, processes and tools together with customer including access to testbed
- 8,5 days of instructor led training with hands-on practical exercise sessions
- Time: 09:00 to 16:00 daily and 09:00 to 12:00 (last day)
- Training Material
- AVL Certificate for participants
- Travel costs, traveling time and accommodation expenses are included in the package

COST SAVING TIP – BUY MORE, SPEND LESS

The package prices are already discounted compared to standard prices for training and support services, but further discount is applied for ordering both packages at the same time.

The complete bundle can be ordered using article number TTEPEMHDC.01 (EDUCATION BUNDLE OPERATING&MAINT. EMC HD) through your local representative.

OPTIONAL TRAINING COURSES

Depending on further installed functions, devices or different job tasks AVL is offering a wide range of additional training classes and support services.
To be informed in detail just contact your local representative or get the complete actual training catalog available on the internet as free PDF download: www.avl.com/training

OPEN-ENROLLMENT TRAINING

TRAINING PUMA OPEN ENGINE TESTBED OPEN-ENROLLMENT

TNASKTR531.01

This training refers to PUMA Open version 1.5.x – for a training dealing with older versions, please contact your local representative.

User Level
Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant is able to operate the PUMA Open Engine testbed automation system. The trainee is able to define and execute manual measurements, run pre-defined engine test runs and modify basic testbed parameters.

Content

- Starting the system and PUMA application programs
- Manual and automatic operation
- Limit monitoring and operating states
- Definition and execution of manual measurements
- Operation of a pre-defined recorder
- Values and results display
- Overview of PUMA parameter sets (System-, Test Facility-, Unit Under Test- and Test Parameters)
- Selection of testbed parameters, results and results series
- Modification and activation of existing testbed parameters
- Using the message window and the help functions

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of the operation of an unit under test
- Knowledge of PC's and Windows

Scope of Services
Each consisting of:

- 4 days instructor led training with hands-on practical exercise sessions
  - Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch
- AVL Certificate for participants

TRAINING PUMA OPEN TESTRUN PREP. OPEN-ENROLLMENT

TNASKTR524.01

This training refers to PUMA Open version 1.5.x – for a training dealing with older versions, please contact your local representative.

User Level
Parameterization (Test Engineer)

Goal
The participant is able to parameterize automatic test runs according to complex test requirements and display the results.

Content

- Writing complex automatic test runs (SSQ/BSQ)
- Parameter setup of data storage tables, measurement requests and automatic measurements
- Usage of implemented Toolbox objects
- Test Library
- Linked objects in Project Library
- Setup of Exception routines and subprograms
- Editing test specific formulas
- Setup of test run limits and engine specific limits
- Data post processing (check of results)
- Import and export of testrun parameters using PUMA Explorer

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Experience in operation and parameterization of the PUMA Open System

Scope of Services
Each consisting of:

- 3 days instructor led training with hands-on practical exercise sessions
  - Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch
- AVL Certificate for participants

TRAINING EMCON 400 OPEN-ENROLLMENT

TNASKTR563.01

This training refers to version 1.5.x – for a training dealing with older versions, please contact your local representative.

User Level

Parameterization (Test Engineer), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal

The participant is able to operate the EMCON via menus on the operating panel. In addition he is able to understand and parameterize the database structure. The participant integrates EMCON 400 I/O components into the system, using the PUMA parameter editor PAM.

Content

- Hardware overview
- PUMA – EMCON integration, Engine and Dyno Interfaces
- Discussing the EMCON database with practical examples
- Modification of the EMCON database to extend EMCON functions
- Connection possibilities and hardware environment (example F-FEM-CON)
- Basic explanation of engine and dynamometer controllers for stationary purposes
- Demand value setting with Operating panel or PUMA automation system
- Parameter menu
- Safety concept:
- PUMA testbed monitoring and Safety Engineering EN ISO 13849, EN IEC 62061
- Concept for Single and Multiple Dynamometer testbed

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Experience in operation and parameterization of the PUMA Open System

Scope of Services

Each consisting of:

- 4 days instructor led training with hands-on practical exercise sessions
  - Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch
- AVL Certificate for participants

TRAINING CONCERTO EVALUATION OPEN-ENROLLMENT

TNASKTR527.01

This training refers to versions 4.4, 4.5 and 4.6 – for a training dealing with older versions, please contact your local representative.

User Level
Operation (Test Operator), Data Evaluation (Post Processing Personnel)

Goal
The participant is able to use the CONCERTO post processing software to create diagrams, tables and reports.

Content

- Overview of the data structure and data management
- Creation of diagrams and tables
- Creation of reports
- Data comparison
- Import and export of data
- Composer
- Hands-on exercises with application examples for above topics

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Knowledge of PC's and Windows

Scope of Services
Each consisting of:

- 2 days instructor led training with hands-on practical exercise sessions
  - Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch
- AVL Certificate for participants

TRAINING CONCERTO ADVANCED OPEN-ENROLLMENT

TNASKTR529.01

This training refers to versions 4.4, 4.5 and 4.6 – for a training dealing with older versions, please contact your local representative.

User Level
Data Evaluation (Post Processing Personnel)

Goal
The participant is able to create formulae and macros for calculations and to automate evaluations using the CONCERTO script programming language.

Content

- Creation of CONCERTO formulae for calculations
- Creation of CONCERTO macros
- Parameterization of scripts to automate work flows
- Using working environments
- Hands-on exercises with application examples for above topics

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- TRAINING CONCERTO Evaluation

Scope of Services
Each consisting of:

- 2 days instructor led training with hands-on practical exercise sessions
  - Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch
- AVL Certificate for participants

TRAINING OPERATING BOBCAT OPEN-ENROLLMENT

TNASKTR522.01

User Level
Operation (Test Operator), Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant is able to operate the bobcat automation system. He is able to define and execute manual measurements, run pre-defined test runs and modify basic parameters.

Content
- Starting the system
- Manual and automatic operation
- Limit monitoring and operating states
- Definition and execution of manual measurements
- Operation of a pre-defined recorder
- Use pre-defined values and results displays
- Overview of bobcat parameter sets (Testcell, Engine, and Test parameters)
- Selection of test bed parameters
- Using the message window
- Using the help functions
- Reviewing data with the Data Browser

Notes
- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites
- Basic knowledge of the operation of an unit under test
- Knowledge of PC's and Windows

Scope of Services
Each consisting of:
- 1.5 days instructor led training with hands-on practical exercise sessions
  - Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch
- AVL Certificate for participants

TRAINING BOBCAT ENGINEER OPEN-ENROLLMENT

TNASKTR520.01

User Level
Parameterization (Test Engineer)

Goal
The participant is able to set up channels, connect input/output devices, and parameterize automatic test runs in bobcat.

Content

- Overview of bobcat hardware architecture
- Contents of testcell, engine, and test parameters
- Setting up Input/Output channels
- Writing automatic test runs, startup and shutdown routines
- Sequence Library and subroutines
- Creating and use Datasheets
- Setup of Exception routine
- Creating and editing formulas
- Setting up of testcell limits and engine limit groups
- Data post processing with Data Browser (check of results)
- Importing and exporting of testrun parameters

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- TRAINING Operating Bobcat

Scope of Services
Each consisting of:

- 2 days instructor led training with hands-on practical exercise sessions
  - Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch
- AVL Certificate for participants

TRAINING LYNX BATTERYTESTING OPERATION & SETUP OPEN-ENROLLMENT

TNASKTR337.01

This training refers to version 2.0 and above – for a training dealing with older versions, please contact your local representative.

User Level
Operation (Test Operator), Parameterization (Test Engineer)

Goal
The participant is able to operate the Lynx Automation System. He/She is able to define and execute manual measurements, run pre-defined test runs and modify basic parameters. He/She is able to set up channels, connect input/output devices, and parameterize automatic test runs.

Content

- Starting the system
- Manual and automatic operation
- Limit monitoring and operating states
- Definition and execution of manual measurements
- Operation of a pre-defined recorder
- Use pre-defined values and results displays
- Overview of automation parameter sets (Testcell, Stand, Battery, and Test)
- Selection of test bed parameters
- Using the message window and help functions
- Reviewing data with the Data Browser
- Writing automatic test runs, startup and shutdown routines
- Sequence Library and subroutines
- Creating and use Data sheets
- Setup of Exception routines
- Creating and editing formulas
- Setting up of testcell limits
- Importing and exporting of testrun parameters

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Scope of Services
Each consisting of:

- 3.5 days instructor led training with hands-on practical exercise sessions
  - Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch
- AVL Certificate for participants

TRAINING INDICATING OPEN- ENROLLMENT

TNASKTR519.01

User Level
Operation (Test Operator), Parameterization (Test Engineer)

Goal
The participant is able to perform measurements and evaluations and to manage combustion data with an AVL indicating system. He understands the setup of an AVL indicating system and is able to parameterize it to perform measurements. In addition he is familiar with the calibration of the system the diagnoses of failures and the indicating data management.

Content

- Basic knowledge in engine indicating and the indicating measurement chain
- Signal conditioning
- Operating Interface
- Execution of crank angle- and/or time based measurements
- Data presentation
- Management of measured data
- Calculation of results by means of Calcgraf
- Data comparison
- Data Import / Export
- Plausibility check and diagnosis of failures based on the measured data
- Setup of the AVL indicating system and connected pressure transducers, crank angle encoder and amplifier
- Parameterization, signal conditioning and TDC-determination
- Management of indicating data
- Remote control and interface to a test bed automation system
- Set up of single measurement, durability measurement, monitoring and automatic mode
- Calibration
- Plausibility check and diagnosis of failures regarding the parameterization
- Data evaluation (e.g. Calcgraf) and data presentation using different display methods
- Numerous hands-on exercises based on simulated combustion sensor signals

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Skills for indicating data

Scope of Services
Each consisting of:

- 4 days instructor led training with hands-on practical exercise sessions
  - Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch
- AVL Certificate for participants

TRAINING SMART SAMPLER 478 OPEN-ENROLLMENT

TNASKTR562.01

User Level
Operation (Test Operator)

Goal
The participant knows the basics of particulate measurement on diesel engines and the use of the AVL Smart Sampler partial dilution tunnel. He is able to perform basic maintenance tasks.
He is also able to operate the Smart Sampler Stand Alone System for homologation and engine development test run cycles. He is familiar to setup steady state and transient tests.

Content
- Introduction into particulate measurement and partial flow systems
- Legislation overview
- Installation/Integration
- Overview of the system and the hardware structure
- Overview GEM140 Software
- Maintenance tasks
- Test Setup
- Handling of the steady state and transient test under consideration of boundary conditions and execution details
- Parameterization of test cycles (ETC, ESC)
- Running a test and analyzing of the control parameter
- Steady state and transient result calculation
- Executing of the control checks according to ISO standards
- Operation of the SPC using AK control commands

Notes
- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites
- General knowledge of emissions measurement technology

Scope of Services
Each consisting of:
- 4 days instructor led training with hands-on practical exercise sessions
  - Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch
- AVL Certificate for participants

TRAINING EXH. GAS ANALYSER AMA i60 OPEN-ENROLLMENT

TNASKTR559.01

This training refers to both AMA i60 generation series I and II.

User Level
Operation (Test Operator)

Goal
The participant understands the principles of analyzers and the layout of AMA i60. He is able to operate the main functions and to do the basic maintenance task. The participant obtains a basic understanding of the foundations of emissions measurement.

Content

- Basics of emissions measurement and legislation
- Overview of the customer specific system configuration
- HSS-Prefilter
- Measurement principles of the analyzers
- Pneumatic layout of the customer specific analyzers
- Physical and pneumatic layout of AMA i60
- Electric components and control layout
- iGEM AMA software operation
- Operation of AMA i60
- Parameterization on operator level
- Basic maintenance tasks

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL
- The daily, weekly and monthly maintenance measures have to be performed by local staff in time because otherwise the measuring quality is no longer guaranteed (loss of accuracy). To qualify the maintenance staff the adequate training class “TRAINING L2: AMA i60 MAINTENANCE” has to be ordered in addition
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Technical, electrical/electronic and physical background
- General knowledge of engine or vehicle testing

Scope of Services
Each consisting of:

- 4 days instructor led training with hands-on practical exercise sessions
  - Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch
- AVL Certificate for participants

TRAINING AMA i60 MAINTENANCE OPEN-ENROLLMENT

TNASKTR551.01

This training refers to both AMA i60 generation series I and II.

User Level
Maintenance & Service (Calibration / Maintenance / Service Personnel)

Goal
The participant is able to perform daily, weekly and monthly maintenance tasks according to the maintenance plan.

Content

- Sample Gas Preparation Unit GPU
- Replace filter element GPU
- Check/Replace pump hoses of the condensate pump
- Flow check of gas extraction unit
- Check of fans, condensate tubes clean/change
- Check and clean cooler for contamination, adjust cooler temperature
- Check measuring gas pressure sensor, check functioning of humidity sensor
- Cabinet, SGU, AVU
- Check fill level of bubbler
- Check function of touch screen
- Check internal exhaust gas sensor
- Check external extraction unit
- AVL Prefilter
- Check filter inserts of the external Prefilter module
- Gas supply
- Performance check on the gas cylinder pressure reducer (check set pressure)
- Gas cylinder pressure check
- Check of the certificates, best-by dates and connections of the gas supply
- Checks / Diagnosis Functions
- Measuring range calibration, Purge filter
- Leak check, HC hang-up check, check NOx converter efficiency
- Linearity check, linearization measuring range, interference checks

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL
- This training has a consumables surcharge.
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Basic knowledge of fine mechanics
- Profound knowledge of operating the AMAi60 system

Scope of Services
Each consisting of:

- 4 days instructor led training with hands-on practical exercise sessions
  - Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch
- AVL Certificate for participants

TRAINING AVL SESAM i60 FT OPEN-ENROLLMENT

TNASKTR564.01

This training refers to both SESAM i60 FT generation series I and II.

User Level
Operation (Test Operator)

Goal
The participant understands the measurement principle and the system layout of the AVL SESAM i60 FT multicomponent emissions analysis system. He is able to operate the main functions. The participant has basic understanding of emissions measurement.

Content

- Basics of emissions measurement and legislation
- Overview of the customer specific configuration
- HSS Prefilter
- Measurement principles of the analyzers
- Physical and pneumatic layout of SESAM i60 FT
- Measurement principles of the FTIR
- Physical and pneumatic layout of FTIR
- Operation of the software
- Operation of SESAM i60 FT
- Parameterization on operator level
- Basic maintenance tasks

Notes

- Training class is conducted in English
- Max. participants: 6 persons
- Venue at AVL
- General Cancellation Policy applies to this training, see page 7 of this catalog.

Prerequisites

- Technical, electrical/electronic and physical background
- General knowledge of engine or vehicle testing

Scope of Services
Each consisting of:

- 4 days instructor led training with hands-on practical exercise sessions
  - Time: 09:00 to 16:00 daily
- Training Material
- Drinks and lunch
- AVL Certificate for participants

OPEN-ENROLLMENT TRAINING SCHEDULE

Open-enrollment trainings are offered on a regularly scheduled basis.
This provides a cost-effective option when a dedicated training session is not feasible.

Cancelation and Rescheduling
Cancelation or rescheduling of confirmed training dates are subject to following cancelation policy and fees:

Business days prior to the scheduled training start date	Handling fee	Charges incurred of contracted fee
35 to more than 30	$50	
30 to more than 20	$150	30%
20 to more than 5	$250	50%
5 or less	$300	100%

Operating PUMA Open
- February 23 – 26
- April 5 – 8
- June 21 – 24
- August 16 – 19
- October 11-14
- December 6 – 9

PUMA Open Test Run Preparation
- February 29 – March 2
- April 11 – 13
- June 27 – 29
- August 22 – 24
- October 17-19
- December 12 – 14

Concerto Evaluation
- March 8 – 9
- May 24 – 25
- July 12 – 13
- September 20 – 21
- November 29 – 30

Concerto Advanced
- March 10 – 11
- May 26 – 27
- July 14 – 15
- September 22 – 23
- December 1 – 2

EMCON 400
- On demand

AVL SESAM i60 FT
- On demand

bobcat Operator
- March 29 – 30
- September 27 – 28

bobcat Engineer
- March 31 – April 1
- September 29 – 30

Indicating Training
- March 15 – 18
- July 19 – 22
- September 13 – 16
- November 15 – 18

Lynx Operation & Setup
- May 10 – 13
- November 8 – 11

AMAi60 Operation
- March 1 – 4
- May 17 – 20
- July 12 – 15
- September 20 – 23
- November 29 – December 2

AMAi60 Maintenance
- On demand