Knowledge creates competence
We cordially invite you to get to know the various aspects and possibilities of modern flow measurement technology and calibration together with us. Get an overview of the flowmess technology in our basic course or get to know flow measurement and calibration with laminar flow elements or laval nozzles in our second course. Together with our experienced instructors, solve tasks from the field of business practice and then carry them out on the measuring system by means of practical exercises.

Course 1
Basics of flow measurement technology
• Physical basics
• Introduction Flow Measurement
• Leak testing
• Demonstrations and practical exercises

24. – 25. October 2017
1,250.00 €

Course 2
Basics of flow calibration
• Differential pressure method
• Laminar flow elements
• Critically operated nozzles (Laval nozzles)
• Basic knowledge Calculation of measurement uncertainty
• Demonstrations and practical exercises

26. – 27. October 2017
1,250.00 €

We aroused your interest?
If you would like to receive further information on the training or products presented by EP Instruments Metrology + Calibration GmbH, please call us, send us the attached reply fax or simply an e-mail. Of course, we also offer tailor-made courses tailored to your needs, as required, or on-site training courses. Please contact us!

We will get back in touch with you!
Your EP Instruments team
**Physical basics**
- Thermodynamic properties of fluids
  - temperature
  - pressure
  - humidity
  - density
  - viscosity
  - compressibility factor
- Compressibility of gases
  - density of gases
  - general equilibrium of gases
- Flow measurements
  - flow
  - mass flow
  - standard volume
  - continuity act
- Sizeless sizes
  - similarity theory
  - Reynolds number
- Properties of flows
  - flow profile
  - turbulence

**Introduction Flow measurement methods**
- Displacement method
  - rotary piston gas meters
  - bellows counter
  - piston / bell displacer
- Differential pressure method
  - laminar flow elements
  - apertures
  - venturi nozzles / tubes
- Velocity Measurement Methods
  - pressure probes
  - critically operated nozzles
  - ultrasonic gas meters
- Thermal processes
- Force Procedure
  - turbine wheel gas meter
  - float
  - coriolis measuring instruments
- Other
  - magnetic-inductive measuring devices - vortex / spin meters

**Leakage test**
- Definitions
- Measurement method
- Principles of calculation
- Limitations

**Demonstrations and practical exercises**
- Demonstration of various measuring instruments
- Calibration setup flow measurement
- Leakage test

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**Short repetition**
- Thermodynamic properties of fluids
- Compressibility of gases
- Flow measurements
- Dimensions without dimensions
- Properties of flows

**Differential pressure method**
- Physical principle
  - Bernoulli equation
  - Differential pressure measurement
  - Characteristic curve
  - Limits of application
- Designs
  - Apertures
  - Nozzles
  - venous glands, venturial tubes
- Application examples

**Laminar-flow-elements**
- Physical principle
  - Law of Hagen-Poiseulle
  - Differential pressure measurement
  - Characteristic characteristic
  - Application limits
- designs
  - Matrix elements
  - gap / capillary forms
- Application examples

**Sonic operated nozzles (Laval nozzles)**
- Physical principle
  - Laval nozzles
  - Sound speed
  - Critical pressure ratio
- Design and installation
  - Standardization
  - Test stands
- Application
  - Calculation principles
  - Application examples
  - Variable flow rates

**Basic knowledge Calculation of measurement uncertainty**
- Statistical meaning and terms
- Computation path to GUM
- Calculation example

**Demonstrations and practical exercises**
- Measurement setup with active pressure element
- Measurement setup with laminar flow element
- Measurement setup with critical nozzle
General Informations

Location of venue
EP Ehrler Prüftechnik Engineering GmbH
Wilhelm-Hachtel-Str. 12, 97996 Niederstetten

Registration
The number of participants for each seminar is maximum 10 participants. The minimum number of participants is four persons. Registrations will be considered in the order of their receipt.

Lunch / Drinks
Coffee and a snack are available in the breakfast break. For lunch we invite you to the restaurant. Various refreshments are of course available all day long.

Cancellation
Up to six weeks before the start of the seminar, no fees will be charged. In case of cancellation up to three weeks before the start of the seminar, we will charge you 50% of the participation fees and the hotel cancellation fees. In the case of a later cancellation, we must charge the participation fees as well as any hotel cancellation fees in full. Of course, you can name a substitute participant from your company for the appropriate seminar. If the minimum number of participants for a seminar is not reached five days before the start, we reserve the right to cancel the seminar or to inform you of an alternative date.

Certificate of participation
After completion of the respective seminar, each participant will be given a certificate of participation with an indication of the subjects covered.

Participation fee
You can find the participation fee in the respective seminar catalog. The participation fee includes the following services:

• Accommodation from the 1st to 2nd day of the course (Hotel Gasthof Krone)
• Participation in the seminar
• Seminar documents
• Having lunch
• Break drinks / snack
• Dinner

All prices are per participant plus the statutory VAT. Please transfer the seminar fees to our account only after receipt of the invoice.

Notifying confirmation
You will receive a registration confirmation after your seminar registration. Further documents, e.g. The detailed seminar program and information on how to get to the hotel and the hotel address, you will be given in time before the start of the seminar.

Other nights
If you need accommodation before or after the training, please let us know. We will gladly take over the booking.

Registration Form

Fill out the registration form and fax it to +49 (0) 7932. 60 666 11.

Registration "Basics of Flow Measurement" (Curso 1)
Participants:
First and last name of the participants:

Registration "Basics of Flow Calibration" (Curso 2)
Participants:
First and last name of the participants:

Please enter your address and / or company stamp:

Company:
Street, Nr.:
ZIP / City:
Responsible:
Phone:
fax:
E-Mail:

Date
Signature

Direct contact
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