



Industrial Process Measurement

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COURSE CONTENT

Aim

To provide candidates with the underpinning knowledge and understanding of measurement systems and calibration techniques through workshop practicals which accumulate up to 65% of the course duration.

Pre-requisites

Suited to those who may require training towards multi-discipline engineering and who are required to perform an instrumentation role on return to their workplace.

Course Duration

The course is of five days in duration.

Optimum Number

Maximum of six delegates per course.

Training Aids

OHP, Information hand-outs.

COURSE SYLLABUS

Pressure Measurement

Pressure Measurement Principles, Units and Types.
Liquid Head Devices (Manometers).
Elastic Deformation Elements (Diaphragms, Capsules, Bellows).
Pressure Switches.
Bourdon Tube Gauges ("C" type, Spiral, Helical, Compound and Duplex).
Installation of Bourdon Tube Gauges.
Pressure Transducers (Piezoresistive Crystals and Capacitance Cell).
Pressure Calibration Standards (DWT, Venier Manometer and Standard Gauge).
Calibration Procedures, Errors and Correction.

Pneumatic Transmission Systems

Pneumatic Transmitter (Force Balance).
Flapper and Nozzle Mechanism.
Feedback Bellows and Pneumatic Relay Amplifier.
Pneumatic Transmitter (Motion Balance).
Set Point Transmitter.

Electronic Transmission Systems

Electronic Transmitter (Force Balance).
Detector Armature (LVDT).
SMART and Intelligent Transmitters.
Transmission Signal Converters (I to P and P to I).
Electronic Display Devices.

Level Measurement

Dipsticks and Dip Tapes.
Sight Glass.
Hydrostatic Methods (Wet Leg and Dry Leg).
Purged Dip Pipe Level Measurement Principle.
Buoyancy Methods (Floats and Displacer).
Capacitor Methods.

Ultrasonic Methods.
Nucleonic Methods.
Radar Methods.
Load Cell Methods.
Other Methods.

**Flow
Measurement**

Rate and Quantity of Flow.
Laminar, Transient and Turbulent Flow.
Reynolds Number, Velocity Profile and Critical Flow.
Quality Displacement Meters.
Bernoulli's Theorem and Basic Flow Law.
Constant Area, Variable Pressure Devices.
Constant Head, Variable Area Devices.
Square root Extraction.
Flow Integrators.
Inferential (Velocity) Flowmeters.
Mass Flowmeters.
Installation Practices.

**Temperature
Measurement**

Temperature Units and Scales.
Liquid-in-glass Thermometers.
Liquid, Gas and Vapour Filled Systems.

Bimetal Thermometers.

**Electrical Methods
of
Temperature
Measurement**

Resistance Thermometers.
The Wheatstone Bridge.
2, 3 and 4 Wire Systems.
Thermistors.
Thermocouples.
Deflection Type Temperature Indicator.
Reference Junction Compensation.
Compensating and Extension Cable.
The Potentiometric Measuring Circuit.
Radiation Pyrometers.

Dates available on request

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