

# MATERIALS FOR PIPELINES - MATERIALS DESIGN, SELECTION, MANUFACTURE & TESTING

*“Optimizing Pipeline Integrity Through Strategic Materials Engineering”*

## Schedule

Venue (InHouse)	Fees
At Your Organization Premises	Ask For The Quotation

► **Available delivery methods:** Face-to-Face & Online Training, In-House Training

## Introduction

Pipelines are critical infrastructure in the oil, gas, water, and energy sectors, and the choice of materials plays a pivotal role in ensuring their performance, safety, and longevity. This course offers participants a comprehensive understanding of pipeline materials—from material science fundamentals to the latest design, selection, manufacturing, and testing techniques. Participants will gain knowledge to make informed decisions that reduce failure risk, meet regulatory requirements, and enhance system reliability under diverse operating conditions.

## Objectives

Participants completing this course will be able to:

- Understand the mechanical and chemical properties of pipeline materials
- Apply criteria for selecting materials for specific operating environments
- Evaluate material behavior under pressure, corrosion, and fatigue
- Review manufacturing processes and quality control practices
- Interpret test results and inspection data to ensure compliance and safety

## Why Attend

- Build or refresh technical competence in pipeline materials engineering
- Prevent pipeline failures due to poor materials selection or testing gaps
- Stay current with evolving standards (API, ASME, ISO, NACE) and industry practices
- Gain practical knowledge on specification, inspection, and integrity assurance

## Target Audience

- Pipeline design and materials engineers
- Mechanical and structural engineers
- Integrity and maintenance engineers
- Procurement and QA/QC professionals
- Project engineers and HSE officers
- Pipeline operations and inspection personnel

## Individual Benefits

- Deepen understanding of materials performance in harsh environments
- Improve decision-making for design, procurement, and integrity
- Advance career potential in pipeline engineering and asset management
- Gain hands-on exposure to real-world case scenarios

## Organizational Benefits

- Strengthen pipeline reliability and asset lifespan
- Ensure better compliance with safety and environmental standards
- Reduce material failure risks and maintenance costs
- Improve cross-disciplinary collaboration between design, inspection, and operations teams

## Instructional Methodology

- Expert-led classroom training and discussions
- Practical case studies and group activities
- Visual demonstrations and engineering drawings
- Materials inspection & failure analysis samples
- Pre/post course assessments and technical workshops

## Course Outline

DETAILED 5-DAY COURSE OUTLINE (Customizable) Training Hours: 07:30 AM – 03:30 PM Daily Format: 3–4 Modules | Coffee breaks: 09:30 & 11:15 | Lunch Buffet: 01:00 – 02:00

### Day 1 - Introduction to Pipeline Materials Science

- Module 1 (07:30 – 09:30): Pipeline Material Types and Properties (Steel, Composite, Plastic)
- Module 2 (09:45 – 11:15): Stress, Strain, Fracture Mechanics, and Fatigue Behavior
- Module 3 (11:30 – 01:00): Environmental Effects: Temperature, Corrosion, and Pressure

### Day 2 - Material Selection for Pipeline Systems

- Module 4 (07:30 – 09:30): Material Selection Criteria for Various Fluids and Conditions
- Module 5 (09:45 – 11:15): Corrosion-Resistant Alloys, Coatings, and Linings
- Module 6 (11:30 – 01:00): Case Studies in Materials Failure and Selection Best Practices

### Day 3 - Manufacturing of Pipeline Materials

- Module 7 (07:30 – 09:30): Pipe Manufacturing Methods (ERW, Seamless, Spiral Welded)
- Module 8 (09:45 – 11:15): Welding Processes and Metallurgical Considerations
- Module 9 (11:30 – 01:00): Quality Control and Inspection During Manufacturing

### Day 4 - Pipeline Testing and Evaluation

- Module 10 (07:30 – 09:30): Non-Destructive Testing (NDT) and Destructive Testing Methods
- Module 11 (09:45 – 11:15): Mechanical Testing: Tensile, Hardness, Impact, and Bend
- Module 12 (11:30 – 01:00): Hydrostatic Testing, Leak Detection & Monitoring

### Day 5 - Specifications, Standards & Case Reviews

- Module 13 (07:30 – 09:30): International Material Codes and Standards (API 5L, ASTM, ISO)
- Module 14 (09:45 – 11:15): Writing and Interpreting Material Specifications
- Module 15 (11:30 – 01:00): Case Studies and Pipeline Material Failure Investigations

## Certification

Delegates who complete the course will receive a Certificate in Pipeline Materials Engineering, recognized by industry peers and aligned with international engineering standards.

## Why Choose MAWA Events

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### In-House / Customized Training

Interested in running this course for your team?

Please contact us:

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