



FACT SHEET

ASME B31.4 | Liquid Pipeline Systems in Industrial Plants



Design of liquid pipeline transportation systems: Wall thickness calculation, Materials and specifications, Construction and welding, Corrosion control, Operation & Maintenance and Integrity Management.

Who Should Attend?

This course is intended for graduates (or soon to be), designers, freelancers, technicians and engineers involved in: calculation, design, selection, manufacturing, safety, quality and maintenance of systems and equipment in industrial processes.

Previous knowledge of this subject is not required to attend to the course.

Training Objectives

The main objective of this course is to transfer to participants the theoretical and practical skills required in projects, obtained from experience and sound engineering practices.

Methodology

Instructor-led training course in adult learning format with discussions, individual exercises and simplified case studies, providing practical knowledge to implement in the field.

Duration

The duration of this training course will be determined according to the training needs of the participants.

What to expect?

Acquire the vocabulary and basics of liquid pipeline transportation

Understand the scope and application of ASME B31.4

Get familiar with line pipe materials and specifications

Learn the wall thickness calculation procedure: B31.4

Understand corrosion control: coatings and cathodic protection

Design and calculate piping systems:

- Wall thickness calculation: B31.4

- Hydraulic design and pump station sizing

- Corrosion protection design

- Defect assessment and repair decision



Contents

Introduction

What is a liquid pipeline transportation system?

Applications and characteristics

Scope

Field of application of ASME B31.4

Definitions and relation to other ASME B31 codes

Applicable fluids: liquid hydrocarbons, slurries, CO₂, ammonia

Design

Design pressure and temperature

Wall thickness calculation: Barlow formula and design factor F

Longitudinal and combined stresses

Hydraulic calculation

Stresses in buried pipelines

Expansion, flexibility

Fittings, bends, flanges and branch connections

Material Selection

Line pipe materials: API 5L grades and specifications

Toughness requirements and Charpy impact testing

Fittings, flanges and valve material selection

Corrosion allowance and material limitations

Construction, Welding and Assembly

Pipeline alignment and right-of-way

Bending and field fabrication

Welding procedure specifications (WPS) and welder qualification

Joint design, fit-up and welding defects

Crossings: roads, railways and waterways

Requirements for tanks, terminals, pump stations, and special components

Hydrostatic Testing

Requirements for hydrostatic testing

Requirements for pneumatic leak tests

Benefits and limitations of pressure testing

Operation, Maintenance and Corrosion Control

Operating procedures and pressure control

Defect assessment: dents, gouges and cracks

Repair methods and fitness for service

Emergency plans and leak detection

External corrosion: coatings and cathodic protection

Internal corrosion monitoring and mitigation

Inspection and maintenance of corrosion protection systems

Special Pipelines and Integrity Management

Ammonia pipelines

Dense phase CO₂ pipelines

Slurry pipelines

Offshore liquid pipeline systems

Integrity Management



Instructor

Senior Mechanical Engineer and Master's in Business Administration (MBA). **More than 25 years of experience in design, calculation and fabrication of pressure vessels, heat exchangers, storage tanks, piping systems and structures in general.**

Duties of the above-mentioned positions cover the entire cycle of an equipment, **from the very conception, drawings, design and calculation, technical specifications, technical requisitions, vendor drawings, to the manufacturing phase and installation assistance.** Among the developed projects, clients such as SHELL, EXXON, REPSOL, CHEVRON, GALP, CEPESA, TUPRAS and SAUDI ARAMCO can be found.

Vast experience providing specific training sessions in both classroom and online approaches. More than 75 training courses carried out in different institutions and in-company, courses oriented to graduates, designers, engineers and experienced professionals.

Tailored Training

The most effective training is one that satisfies the needs of each company's business focus and deliverables. **We adapt our training programs to each specific requirement, offering bespoke solutions for each need.** The result, 100% tailored programs, developed to maximize the time investment and deliver tangible and intangible returns to the work teams.

After an assessment phase, a tailored training plan is designed jointly with the client. This plan is specifically tailored to meet the client's needs, focusing on effectively enhancing the capabilities of the work team. **We provide practical, dynamic and hands-on training,** making available the best instructors in each subject.

Arveng Training

Arveng Training has developed effective and practical solutions for today's industrial challenges by delivering specific, high-quality engineering courses utilizing three different approaches: classroom, online, and tailored training. We are proud to have taught more than 500 classroom courses, 1800 online courses, and over 200 in-company sessions. Our training activities have benefitted over 6000 professionals, our greatest accomplishment of all.

We consider our students' time to be of utmost importance. For this reason, all our courses have been designed with the main objective of quickly improving the professional skills of the participants through our expert instructors in different disciplines. **We stimulate creativity, innovation, and initiative to make the participants inquisitive, bringing good engineering practices and lessons learned to the field, that benefits their professional lives in the long term.**

Our Company

Arveng Training & Engineering SL is a leading company providing Training and Engineering services based in **Madrid, Spain.** Our mission and vision are to be a leading training and engineering services company, providing our clients with the best in the sector. We are a team of highly motivated, talented, highly qualified professionals with over 20 years of experience. We aim to exceed expectations by offering efficient, innovative, cost-effective, and transparent services.

Established in July 2010, mainly oriented to the industrial sector, from the very beginning Arveng has always worked with closeness, responsibility, and commitment in all areas of activity.

Through experience gained by partaking in multidisciplinary engineering projects in sectors such as Petrochemical, Energy Generation, and Industrial, we provide answers and solutions to concrete requirements, making the effort to build long-lasting and mutually beneficial relationships.