

Scandinavian Academy
Training Center

Mobile | 00966536473335 : Mobile | 00966112695229 : Phone : 00966552365295
Email | info.en@scandinavianacademy.co Web site:https://scandinavianacademy.co/en :
Riyadh - Al Khaleej District - Sheikh Abdul Aziz Bin Abdul Rahman Bin Bishr Street - 13223 - Office No. 5 | P.O.BOX : 13224

Course: Welding Technology

Code	City	hotel	Start	End	price	Language - Hours
CM-142SA	Alula	Hotel Meeting	2027-04-25	2027-04-29	13950 SR	En - 25

The Course

Welding is a common and a very important joining process in most industries, and of particular importance in the chemical, oil and gas industries, including for example, pipelines and storage tanks.This 5-day training programme aim to provide the fundamental principles of welding and welding techniques, helping participants recognise various welding processes.

Principal emphasis is placed on:

- Understanding the types of welding processes.
- Appreciating the different types of welding joints.
- Recognising technical prints and symbols related to welding.
- Recognising weld defects and associated problems and learning about mechanical testing, failure of welds and Non Destructive Testing.Learning about basic welding metallurgy.

The Goals

The course will cover the following areas:

- Types of welding process, including oxyacetylene, SMAW, TIG, MIG, and others.
- Types of joints and joint design will be introduced, e.g. but, square, grooved, bevel, butt, U, J and T, flush.
- Various weld defects and imperfections will be presented including, porosity, solidification cracking, hydrogen cracking, incomplete root fusion or penetration, residual stresses, reheat cracking, lamellar tearing, liquation cracking, slag

inclusion and trouble shooting.

- Basic metallurgy will be presented and related to welding technology, including the weldabillity of ferrous and non ferrous metals, heat treatment and the significance of the heat affected zone, HAZ.
- Welding parameters, including standards, metal transfer, welding currents, shielding gas and electrode selection will be included in the course.
- Welding engineering drawing including standard welding symbols will be presented.
- Finally, mechanical testing and failure of welds will be presented in addition to non destructive techniques, NDT.

The Process

The course combines presentations and discussions of topics covered with relevant examples. It combines knowledge of fundamental principles related to welding processes, methods, and applicable standards and best industry practices and enforces learning with Question & Answer sessions to maximise the benefits to the participants.

Videos and computer simulation will be presented to emphasise relevant applications Relevant case studies will also be included.

Participants will be provided with comprehensive course notes and copies of presentation material that will be very valuable for detailed study and future reference.

The Benefits

Upon completion of this course, participants will have:

- Gained an understanding of the important principals of welding processes and joint design.
- Gained valuable knowledge, related to weld defects, properties and welding characteristics of various metals, mechanical and non destructive testing of welds.
- Acquire sufficient knowledge and skills to independently evaluate possible welding

and design solutions.
- Enhanced their competence and productivity thereby improving their performance level and making additional value added contributions to their organisations

The Results

- The company will be able to understand and specify relevant welding processes, with cost effective outcomes.
- The company will be able to achieve measurable improvement through effective interaction between various engineering disciplines, including design, manufacturing, workshop, operation and maintenance functions.
- This will also lead to improvement in operating and financial performance, and lead to improvement and optimisation of relevant welding processes.

The Core Competencies

At the end of the seminar, the delegates should be able to:

- Understand the use and application of welding techniques and standards
- Understand the various types of welding joints
- Learn about the different types of electrodes and standards
- Appreciate the variations of welding various types of metals
- Know, through the study of basic metallurgy, how heat treatment may be used to overcome some of the problems associated with welding, including the HAZ
- Recognise and define the basic types of welding defects and failure
- Learn how NDT can be used to detect weld defects.
- Understand how to apply materials testing techniques to examine the strength and quality of welded joints
- Gain an understanding of corrosion test methods and interpretation of results

The Programme Content

Day One: Introduction and Weld Joint Design

- Overview of welding: terminology, codes, standards, common failures, and real-world case studies.
- Introduction to quality in welding: customer requirements, satisfaction, and quality control practices.
- Principles of weld joint design:
    - Load performance and joint types (butt, square, grooved, single V, double V, bevel, U, J, T, flush).
- Welding techniques and positions:
    - Positional welding, use of backing, and examples of butt welds without backing.

Day Two: Welding Processes

- Overview of welding processes:
    - Oxyacetylene, fusion welding, SMAW, SAW, TIG, MIG.
- Process comparisons: benefits, limitations, and typical applications.
- Consumables and equipment:
    - Types of fluxes and electrodes, metal transfer modes, power sources, arc initiation, shielding gases, and operating parameters.
- Standards and classifications:
    - US and BS electrode classifications, size, current compatibility, and extended examples.

Day Three: Welding Defects and Imperfections

- Common welding defects and the Heat Affected Zone (HAZ):
    - Porosity, solidification cracking, hydrogen cracking, lack of fusion/penetration, residual stresses, reheat cracking, lamellar tearing, liquation cracking, slag inclusion.
- Geometrical imperfections:
    - Excess weld metal, undercut, overlap, linear misalignment, incomplete groove filling.
- Troubleshooting and prevention strategies.

Day Four: Welding Technical Prints, Symbols, and Basic Metallurgy

- Welding drawings and symbols:
    - Projection types, joint representations, symbol components and placement, special weld indications, weld-all-around, field welds, and multiple reference lines.
- Fundamentals of metallurgy:
    - Metal crystal structures, solidification, diffusion, inter-metallic compounds.
    - Microstructure of carbon steels, heat treatment, cooling rates, and mass effects.
    - HAZ characteristics for carbon, alloy, and stainless steels.
- Material weldability:
    - Steel groups, stainless steels, cast irons, aluminum alloys, filler materials, and techniques to avoid defects.

Day Five: Materials Testing and Non-Destructive Testing (NDT)

- Mechanical testing of materials and welds:
  - Tensile, impact (Izod & Charpy), hardness (Vickers & Rockwell), bend tests, bead-on-plate, C.T.S., fatigue, fracture toughness, creep.
- Introduction to NDT:
  - Purpose and importance of NDT in ensuring material integrity and uniform product quality.
  - Overview of NDT methods: dye penetrant, magnetic particle, X-ray, gamma-ray, ultrasonic, and eddy current testing.
  - Selection criteria and relevant ISO standards.

The Scandinavian Academy for Training Center adopts the latest scientific and professional methodologies in training and human resource development, aiming to enhance the efficiency of individuals and organizations. Training programs are delivered through a comprehensive approach that includes:

- Theoretical lectures supported by PowerPoint presentations and visual materials (videos and short films).
- Scientific evaluation of participants before and after the program to measure progress and knowledge acquisition.
- Brainstorming sessions and practical role-playing to simulate real-life scenarios.
- Case studies tailored to align with the training content and participants work nature.
- Assessment tests conducted at the end of the program to evaluate the achievement of training objectives.

Each participant receives the training material (both theoretical and practical) in printed form and saved on a CD or flash drive. Detailed reports, including attendance records, final results, and overall program evaluations, are also provided.

Training materials are prepared professionally by a team of experts and specialists in various fields. At the end of the program, participants are awarded a professional attendance certificate, signed and accredited by the Scandinavian Academy for Training Center.

Program Timings: 9:00 AM to 2:00 PM

The program includes:

- A daily buffet provided during the sessions to ensure participants comfort.
- A closing ceremony on the final day to distribute certificates and celebrate participants achievements.
- **Note: All prices are exclusive of 15% Value Added Tax (VAT).**

Our Success Partners

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المملكة العربية السعودية - الرياض - حي الخليج - شارع الشيخ عبد العزيز بن عبد الرحمن بن بشر - 13223 - مكتب رقم 5
Riyadh - Al Khaleej District - Sheikh Abdul Aziz Bin Abdul Rahman Bin Bishr Street - 13223 - Office No. 5