

COURSE OVERVIEW FE0930
API 577: Welding Inspection and Metallurgy
(API Exam Preparation Training)

Course Title

API 577: Welding Inspection and Metallurgy
(API Exam Preparation Training)

Course Date/Venue

November 10-15, 2024/Al Aziziya Hall, The Proud Hotel Al Khobar, Al Khobar, KSA

Exam Window: TBA

Exam Closing TBA

Exam Venue: Abu Dhabi, Dubai, Al-Khobar, Jeddah, Kuwait, Amman, Beirut, Cairo, Manama and Muscat. Participant has the option to attend at any of the above cities.

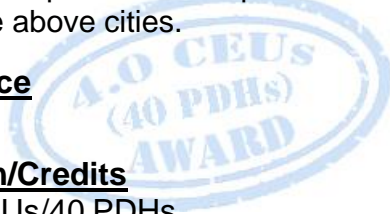


Course Reference

FE0930

Course Duration/Credits

Five days/4.0 CEUs/40 PDHs



This practical and highly-interactive course includes practical sessions and exercises where participants carry out welding inspection. Theory learnt in the class will be applied using the “AWS Tool Kit” and “Structural Weld Replica Kit” suitable for in-class training.



This course is designed to provide participants with a detailed and up-to-date overview of Welding Inspection and Metallurgy in accordance with the API 577 Standard. It covers the welding process for SMAW, GTAW, GMAW, FCAW, SAW, SW, PAW and EGW; the welding materials, P-number assignment and F-number assignment; the AWS classification, filler metal selection, consumable storage and handling; the welding procedure specification (WPS), procedure qualification record (PQR) and tube-to-tubesheet welding procedures; and the welding qualification including expiration, revocation and renewal.



During this interactive course, participants will learn the welding general requirements of ASME BPVC IX; the welding procedure qualifications and welding performance qualifications; the welding data and standard welding procedure specifications (SWPSs); the nondestructive examination and welding inspection; the metallurgy and refinery and petrochemical plant welding issues; and the safety precautions and annexes of API 577.

Course Objectives

Upon the successful completion of this course, participants will be able to:-

- Get prepared for the next API 577 exam and have enough knowledge and skills to pass such exam in order to get the API 577 Inspector certificate
- Apply welding process for SMAW, GTAW, GMAW, FCAW, SAW, SW, PAW and EGW
- Identify welding materials including P-number assignment and F-number assignment
- Carryout AWS classification, filler metal selection, consumable storage and handling
- Employ welding procedure specification (WPS), procedure qualification record (PQR) and tube-to-tubesheet welding procedures
- Recognize welding qualification including expiration, revocation and renewal
- Discuss the welding general requirements of ASME BPVC IX as well as apply welding procedure qualifications and welding performance qualifications
- Review welding data and standard welding procedure specifications (SWPSs)
- Apply nondestructive examination and welding inspection and discuss metallurgy and refinery and petrochemical plant welding issues
- Explain the safety precautions and annexes of API 577 covering technology and symbols, actions to address improperly made production welds, WPS/PQR review, etc

Who Should Attend

Any inspector who is currently certified as API 510, 570 or 653 Inspector. Valid certificate (or certification number) in one of the above three programs shall be submitted to Haward Technology prior to registration in this course. Otherwise, you must have one of the combinations of education and experience listed in the grid below:

- The minimum years of experience required is based upon your level of education and must have been acquired within the last 10 years.

Education	Years of Experience	Minimum Experience Required
BS or higher in engineering or technology	1 year	Any experience in the petrochemical industry
2-year degree or certificate in engineering & technology	2 years	Any experience in the petrochemical industry
High school diploma or equivalent	3 years	Any experience in the petrochemical industry
No Formal Education	5 or more years	Any experience in the petrochemical industry

Required Codes & Standards

API Publications

- **API Recommended Practice 577, *Welding Processes, Inspection, and Metallurgy*, 3rd Edition, October 2020**
 - Entire document is subject to testing

American Society of Mechanical Engineers (ASME) Publications

- **ASME Boiler and Pressure Vessel Code (BPVC), 2021 edition**
 - Section IX, *Welding, Brazing, and Fusing Qualifications: Part QW only*

Note: API and ASME publications are copyrighted material. Photocopies of API and ASME publications are not permitted. CD-ROM versions of the API documents are issued quarterly by Information Handling Services and are allowed. Be sure to check your CD-ROM against the editions noted on this sheet.

Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures
- 20% Practical Workshops & Work Presentations
- 30% Hands-on Practical Exercises & Case Studies
- 20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Training Fee

US\$ 7,000 per Delegate + **VAT**. This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Exam Fees

US\$ 550 per Delegate + **VAT**.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

API Certificate(s)

API-577 certificate will be issued to participants who have successfully passed the API-571 examination.



- (2) Official Transcript of Records will be provided to the successful delegates with the equivalent number of ANSI/IACET accredited Continuing Education Units (CEUs) earned during the course.

Haward Technology Middle East
Continuing Professional Development (HTME-CPD)

CEU Official Transcript of Records

TOR Issuance Date: 28-Feb-21
HTME No: 74852
Participant Name: Waleed Al Habeeb

Program Ref	Program Title	Program Date	No. of Contact Hours	CEU's
FE0930	API 577: Welding Inspection and Metallurgy (API Exam Preparation Training)	February 24-28, 2021	40	4.0


Total No. of CEU's Earned as of TOR Issuance Date: **4.0**

TRUE COPY



Jany Castillo
Academic Director


Haward Technology has been approved as an Accredited Provider by the International Association for Continuing Education and Training (IACET) with the ANSI/IACET 1-2018 Standard which is widely recognized in the education of good practice internationally. As a result of their Accredited Provider membership status, Haward Technology is authorized to offer IACET CEUs for programs that qualify under the ANSI/IACET 1-2018 Standard. Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking Continuing Education Units (CEUs) from IACET. IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

Haward Technology is accredited by

 P.O. Box 26070, Abu Dhabi, United Arab Emirates | Tel: +971 2 3091 714 | E-mail: info@haward.org | Website: www.haward.org



Certificate Accreditations


Certificates are accredited by the following international accreditation organizations: -

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The International Accreditors for Continuing Education and Training (IACET - USA)

Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

Haward Technology’s courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units (CEUs)** in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

Haward Technology Middle East will award **4.0 CEUs** (Continuing Education Units) or **40 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant’s involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant’s CEU and PDH Transcript of Records upon request.

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British Accreditation Council (BAC)

Haward Technology is accredited by the **British Accreditation Council for Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:



Dr. Igor Martic PhD, MSc, BSc, is a **Senior Mechanical & Inspection Engineer** with extensive years of industrial experience within the **Oil & Gas, Refineries** and **Petrochemical** industries. His expertise lies in the areas of **Welding Engineering, Fabrication & Inspection, Welding Techniques, Practical Welding Technology, Welding Inspection, Welding & Machine Shop, Welding & Fabrication, Welding & Machining, Welding Types &**

Applications, Welding Safety, Welding Defects Analysis, TIG & Arc Welding, Shielded Metal Arc Welding, Gas Tungsten & Gas Metal Arc Welding, Welding Procedure Specifications & Qualifications (WPS & WPQ), Aluminium Welding, Safe Welding, International Welding Codes, Welding Procedure Specifications, Welding & Brazing, Welder Performance Qualification, Inspection & Test Plans, Pipe Stress & Flexibility Analysis using CAESAR II Software, NDT/NDE Procedures, Corrosion, Painting, Underwater Inspection of Rigs, Platforms & Jackets, Static Equipment, Piping, Pipelines & Valves, Liquid Penetrant Testing, Magnetic Particle Testing, Ultrasonic Testing, Radiographic Testing, Visual Testing, Eddy Current Testing, External & Internal Auditing for API Q1/Q2, API Monogram Specifications, ISO 9001, ISO 17020, ISO 17025 and ISO 17024. He is currently the **API Auditor** within Europe, Africa, Middle East and Asia wherein he performs audits worldwide at manufacturers and service company in Oil & Gas industry against the criteria of API Q1/Q2, API product specifications and ISO 9001.

Throughout his career life, Dr. Igor has provided significant contributions to the companies he has worked with, having filled key positions such as being the **Senior Inspector, Quality Inspector, Mechanical Static Engineer/Inspector, Inspector Coordinator, Auditor, Teaching Assistant and Researcher** for various international companies such as the Wafa Plant / Sabratha Platform-Libya, Zubair Oil Field-Iraq and University of Belgrade.

Dr. Martic is a **Chartered Engineer** and has **PhD, Master and Bachelor** degrees in **Mechanical Engineering and Industrial Management & Engineering** from the **University of Belgrade and Novi Sad University, UK** respectively and a **Graduate Engineer of Production Management**. Further, he is a **Certified Instructor/Trainer, a Certified Piping Inspector (API 570), a Certified Pressure Vessel Inspector (API-510), a Certified Welding Inspection & Metallurgy (API 577), a Certified NDT Level II Inspector** Liquid Penetrant Testing (PT), Magnetic Particle Testing (MT), Ultrasonic Testing (UT), Visual Testing (VT), Radiography Testing (RT) and Eddy Current Testing; a Recognized Quality Management Systems (QMS) **Auditor/Lead Auditor**, a Recognized **European Welding Engineer and International Welding Inspector**; a member of the **Institution of Mechanical Engineers** and holds certification in Underwater Inspection Controller Grade 3.4U in accordance with the **CSWIP DIV-7-95 Part 2, 4th Edition and API Auditor Summit Certificate**. He has further published numerous scientific paper and journals and has delivered numerous trainings, courses, workshops, seminars and conferences internationally.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: Sunday, 10th of November 2024

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	PRE-TEST
0830 – 0930	API 577: Welding Process Shielded Metal Arc Welding (SMAW) • Gas Tungsten Arc Welding (GTAW) • Gas Metal Arc Welding (GMAW) • Flux-Cored Arc Welding (FCAW)
0930 - 0945	Break
0945 – 1230	API 577: Welding Process (cont'd) Submerged Arc Welding (SAW) • Stud Arc Welding (SW) • Plasma Arc Welding (PAW) • Electrogas Welding (EGW)
1230 – 1330	Lunch
1330 – 1530	API 577: Welding Materials P-Number Assignment to Base Metals • F-Number Assignment to Filler Metals • AWS Classification of Filler Metals • A-Number • Filler Metal Selection • Consumable Storage & Handling
1530 – 1545	Break
1545 – 1645	API 577: Welding Procedure Welding Procedure Specification (WPS) • Procedure Qualification Record (PQR) • Reviewing the WPS & PQR • Tube-to-Tubesheet Welding Procedures
1645 – 1700	Distribute Homework & Recap
1700	End of Day One

Day 2: Monday, 11th of November 2024

0730 – 0830	Review of Day 1 & Homework Answers
0830 – 0930	API 577: Welding Qualification Welders & Welding Operators • Examination Failure of a Production Weld • Retest for Qualification • Expiration, Revocation, and Renewal of Welder or Welding Operator Qualification
0930 – 0945	Break
0945 – 1230	API 577: Welding Qualification (cont'd) Welder Performance Qualification • Reviewing a WPQ • Limitations for Welder Qualifications
1230 – 1330	Lunch
1330 – 1530	ASME BPVC IX: Welding General Requirements Weld Orientation • Test Position for Groove Welds • Test Position for Fillet Welds • Types & Purposes of Tests & Examination
1530 – 1545	Break
1545 – 1645	ASME BPVC IX: Welding General Requirements (cont'd) Tension Tests • Guided-Bend Tests • Toughness Tests • Fillet-Weld Tests • Other Test & Examinations
1645 – 1700	Distribute Homework & Recap
1700	End of Day Two

Day 3: Tuesday, 12th of November 2024

0730 – 0830	Review of Day 2 & Homework Answers
0830 – 0930	ASME BPVC IX: Welding Procedure Qualifications Preparation of Test Coupon • Hybride Welding Procedure Variables • Welding Variables • Temper Bead Welding
0930 – 0945	Break
0945 – 1230	ASME BPVC IX: Welding Performance Qualifications Qualification Test Coupons • Retests & Renewal of Qualification • Welding Variables for Welders • Welding Variables for Welding Operators • Special Processes
1230 – 1330	Lunch
1330 – 1530	ASME BPVC IX: Welding Data Variables • Technique • P- Numbers • F-Numbers • Weld Metal Chemical Composition • Specimens • Graphics • Etching- Processes & Reagents
1530 – 1545	Break
1545 – 1645	ASME BPVC IX: Standard Welding Procedure Specifications (SWPSs) Adoption of SWPSs • Use of SWPSs Without Discrete Demonstration • Forms • Production Use of SWPSs
1645 – 1700	Distribute Homework & Recap
1700	End of Day Three

Day 4: Wednesday, 13th of November 2024

0730 – 0830	Review of Day 3 & Homework Answers
0830 – 0930	API 577: Nondestructive Examination Discontinuities/Imperfections • Materials Identification • Visual Examination (VT) • Magnetic Particle Examination (MT) • Alternating Current Field Measurement • Liquid Penetrant Examination (PT)
0930 – 0945	Break
0945 – 1230	API 577: Nondestructive Examination (cont'd) Eddy Current Examination (ET) • Radiographic Examination (RT) • Ultrasonic Examination (UT) • Hardness Testing • Pressure & Leak Testing/Examination (LT)
1230 – 1330	Lunch
1330 – 1530	API 577: Welding Inspection Tasks Prior to Welding • Tasks During Welding Operations • Tasks Upon Completion of Welding
1530 – 1545	Break
1545 – 1645	API 577: Welding Inspection (cont'd) Nonconformances and Defects • NDE Examiner Certification • Weld Inspection Recording
1645 – 1700	Distribute Homework & Recap
1700	End of Day Three

Day 5: Thursday, 14th of November 2024

0730 – 0830	Review of Day 4 & Homework Answers
0830 – 0930	API 577: Metallurgy Structure of Metals and Alloys • Physical Properties • Mechanical Properties • Preheating • Heat Treatment • Material Test Reports • Weldability of Metals • Weldability of High Alloys
0930 – 0945	Break
0945 – 1230	API 577: Refinery & Petrochemical Plant Welding Issues Hot Tapping & In-Service Welding. • Lack of Fusion with GMAW-S Welding Process • Caustic Service • Controlled Deposition Welding
1230 – 1330	Lunch
1330 – 1530	API 577: Safety Precautions & Annexes Safety Precautions • Annex A: Technology and Symbols • Annex B: Actions to Address Improperly Made Production Welds • Annex C: WPS/PQR Review
1530 – 1545	Break
1545 – 1615	API 577: Safety Precautions & Annexes (cont'd) Annex D: Guide to Common Filler Metal Selection • Annex E: Example Report of RT Results • Annex F: Inspection Considerations • Annex G: Welding Safety
1615 – 1630	Course Conclusion
1630 – 1645	POST TEST
1645 – 1700	Presentation of Course Certificates
1700	End of Course

MOCK Exam

Upon the completion of the course, participants have to sit for a MOCK Examination similar to the exam of the Certification Body through Haward's Portal. Each Participant will be given a username and password to log in Haward's Portal for the Mock exam during the 7 days following the course completion. Each participant has only one trial for the MOCK exam within this 7-day examination window. Hence, you have to prepare yourself very well before starting your MOCK exam as this exam is a simulation to the one of the Certification Body.

Practical Sessions

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout welding inspection using the “AWS Tool Kit” and “Structural Weld Replica Kit”, suitable for classroom training.



Course Coordinator

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