COURSE OVERVIEW FE0935

API 571 (Damage Mechanism) Supplementary Certification - Preparatory

Course Title

API 571 (Damage Mechanism) Supplementary Certification – Preparatory

Course Reference

FE0935

Course Duration/Credits

Five days/4.0 CEUs/40 PDHs

Course Date/Venue

Sessions	Date	Venue	Exam Window	Exam Closing Date
1	June 22-26, 2025	Oryx Meeting Room, Double Tree by Hilton Al Saad, Doha, Qatar	August 08-29, 2025	May 30, 2025
2	September 21-25, 2025	Oryx Meeting Room, Double Tree by Hilton Al Saad, Doha, Qatar	December 05-26, 2025	September 26, 2025
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 Description

This practical and highly-interactive course includes real-life case studies and exercises where participants will be engaged in a series of interactive small groups and class workshops.

A key first step in safely and reliably managing equipment is identifying and understanding the relevant damage mechanisms. Proper identification of damage mechanisms is important when implementing the API Inspection Codes (API 510, API 570, API 653) and in conducting risk-based inspection per API 580 and API 581. When performing a fitness-for-service assessment using API 579, the damage mechanisms need to be understood and need to be considered when evaluating the remaining life.

This API 571 Supplemental Inspection Certification program is designed to train inspectors on damage mechanisms affecting fixed equipment in the refining and petrochemical industries. The objective of this program is to provide documented evidence of advanced (above the basic core API 510, 570 & 653 examinations) knowledge and expertise in the area of Corrosion and Materials based on the information contained in API RP 571.

An API Supplemental Inspection Certification is defined as “Documentation that indicates that minimum requirements have been met for additional qualification in the designated area of expertise”. This would include an **API issued letter**, **certificate**, and a **wallet card**. This certificate will add significant value to your professional credentials. It will show your employers and clients that you have obtained a high level of proficiency and understanding in this important field.

This supplemental inspection certification program is open to anyone who is currently certified to either API 510, 570 or 653. Included with the course is a pre-study guide and student classroom workbook. The student receives instruction regarding how to take the test, as well as insight into the intricacies of "real world" situations. Daily tests are designed to gauge students’ proficiency and understanding of the material.

Haward Technology is proud of its **90% pass rate** on all our API sponsored courses.

Course Objectives

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

- Get prepared for the next API 571 exam and have enough knowledge and skills to pass such exam in order to get the API 571 Inspector certificate
- Discuss damage mechanism and causes and 885 °F (475 °C) embrittlement
- Review amine corrosion, stress corrosion cracking and ammonia stress corrosion cracking
- Explain ammonium bisulfide corrosion (alkaline sour water), ammonium chloride and amine hydrochloride corrosion
- Identify aqueous organic acid corrosion, atmospheric corrosion and boiler water and steam condensate corrosion
- Determine brine corrosion, brittle fracture and carbonate stress corrosion cracking
- Recognize carburization, caustic corrosion, caustic stress corrosion cracking and cavitation and chloride stress corrosion cracking
- Describe CO_2 corrosion, concentration cell corrosion, cooling water corrosion, corrosion fatigue and corrosion under insulation
- Recognize dealloying, decarburization and dissimilar metal weld cracking
- Discuss erosion/erosion-corrosion and ethanol stress corrosion cracking
- Identify flue gas dew point corrosion, fuel ash corrosion and galvanic corrosion
- Review gaseous oxygen-enhanced ignition and combustion, graphitic corrosion of cast irons, graphitization, high-temperature H_2/H_2S corrosion and hydrogen attack
- Identify hydrochloric and hydrofluoric acid corrosion and hydrofluoric acid stress corrosion cracking of nickel alloys
- Interpret hydrogen embrittlement, hydrogen stress cracking in hydrofluoric acid, liquid metal embrittlement and mechanical fatigue (including vibration-induced fatigue)
- Discuss metal dusting, microbiologically influenced corrosion, naphthenic acid corrosion, nitriding, oxidation, oxygenated process water corrosion, phenol (carbolic acid), phosphoric acid corrosion and polythionic acid stress corrosion cracking
- Describe refractory degradation, stress relaxation cracking (reheat cracking) and short-term overheating-stress rupture (including steam blanketing)

- Recognize sigma phase embrittlement, soil corrosion and sour water corrosion (acidic)
- Explain spheroidization (softening), strain aging, sulfidation and sulfuric acid corrosion
- Discuss temper embrittlement, thermal fatigue and thermal shock
- Describe titanium hydriding, wet H_2S damage and process unit process flow diagrams

Exclusive Smart Training Kit - H-STK®

*Participants of this course will receive the exclusive "Haward Smart Training Kit" (**H-STK®**). The **H-STK®** consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.*

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

Required Codes & Standards

Listed below are the effective editions of the publications required for this exam for the date(s) shown above. **Each student must purchase these documents separately and have them available for use during the class as their cost is not included in the course fees**:-

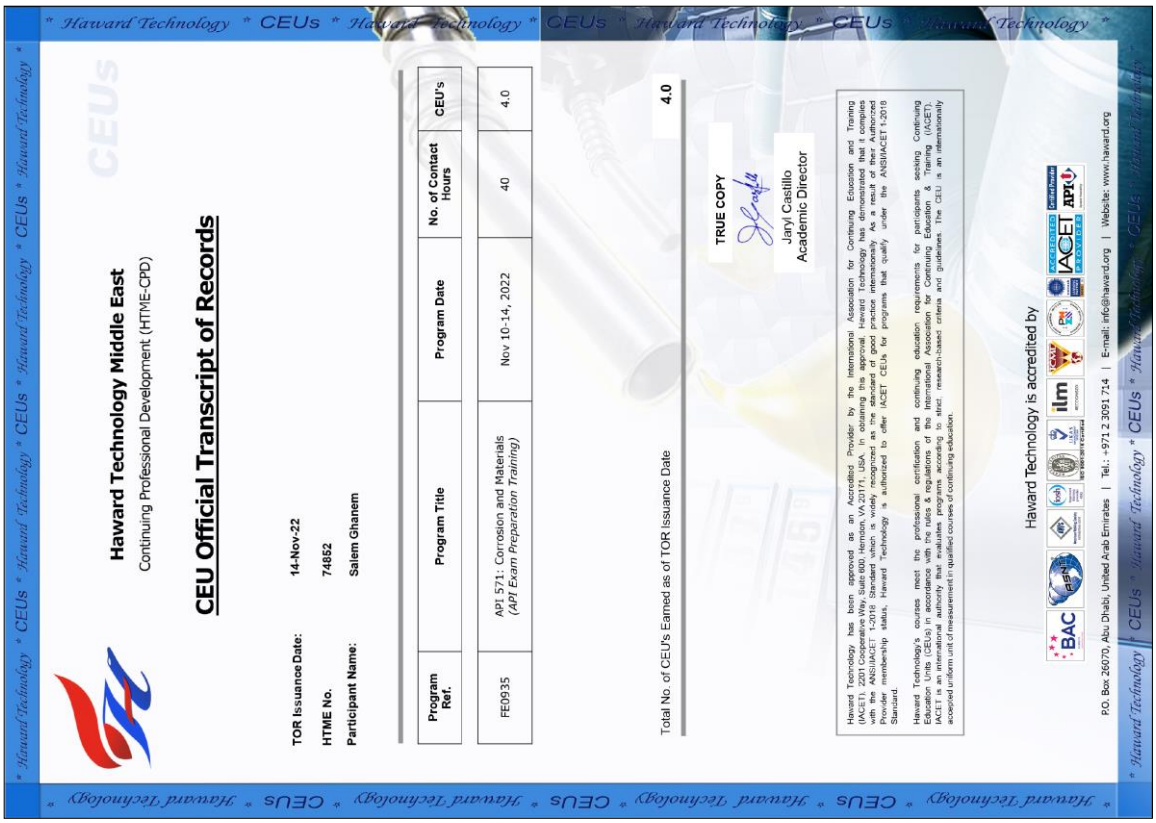
- The Body of Knowledge for the API 571 exam consists of the entire **API RP 571**, 3rd edition (2020)

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**.

API Certificate(s)

API-571 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.



Certificate Accreditations

Certificates are accredited by the following international accreditation organizations: -

- 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.

- 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.

Accommodation

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

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

Mr. Steve Murphy (**UK**) is a **Senior Inspection Engineer** with almost **30 years** of extensive industrial experience within the **Oil & Gas**, **Refinery** and **Petrochemical** industries. His expertise widely covers in the areas of **Damage Mechanisms** (**API 571**), **Pressure Vessel Inspection** (**API 510**), **Piping Inspection** (**API 570**), **Risk Based Inspection** (**API 580**), **Aboveground Storage Tank Inspection** (**API 653**), **Asset Integrity** Management, **Welding & Fabrication**, **Piping Inspection**, **Pipelines**, Risk-Based Inspection (**RBI**), Fitness-for-Service (**FFS**), Asset Integrity Management (**AIM**), **Plant Inspection & Corrosion** Engineering, **Metallurgy**, **Corrosion** & **Prevention of Failures**, **Material** Selection & Properties, **Welding** Technology, Welded Steel Tanks for Oil Storage, **Cathodic Protection**, **Damage Mechanisms**, **Mechanical & Metallurgical** Failure Mechanisms, Atmospheric & Low-Pressure **Storage Tank Inspection**, **Welding Inspection** & **Metallurgy** Pressure Design Thickness Calculation, **Metallurgy**, **Corrosion**, **Mechanical Integrity** Assessment, **Vibration Analysis**, **Pressure** & **Hydrostatic Leak** Testing, **Pneumatic Leak** Testing & Calculations, Preheating & Heat Treatment Requirements, **Pressure Piping** Design, **Pressure Piping** Inspection Practices, **Piping** Inspection, **Repair** & **Re-rating**, **Corrosion** & **Remaining Life** Calculation, **Fabrication** & Inspection, Conventional & Advanced Non-destructive Testing (**NDT**), Positive Material Identification (**PMI**), **Pressure-Relieving Devices** and Construction, Installation Fabrication, Erection, Inspection, Maintenance, Operation, Rating, Repair, Alteration, Reconstruction, Pigging, Integrity Assessment, Flaw Evaluation and Fitness-for-Service (**FFS**) of **Piping**. He is currently the **Plant API Inspector** wherein he is responsible for the statutory inspection of process plant and all pressurized equipment on the new three-train natural gas facility.

During his career life, Mr. Murphy has gained his practical and field experience through his various significant positions and dedication as the **Senior Project Quality Control Manager**, **Acting QA Manager**, **Site EPC Quality Manager**, **Asset Integrity Management Specialist**, **Quality Specialist**, **Asset Integrity Engineer**, **Quality Engineer**, **Senior Piping Inspector**, **Lead Corrosion Inspector**, **Statutory Inspector** (**TPI**), **Senior NDE Technician**, **Mechanical Surveyor**, **Quality Coordinator** and **Project Management Team Quality Control Representative** for various international companies like the Chuandongbei Gas Project, PT Donggi-Senoro LNG, Oceaneering – CABGOC (**Chevron**), **Fluor** Mid-East Ltd, **Fluor** Arabia Ltd, **ENGEN** Petroleum Refinery Ltd, Inspection Services – **Sasol** II, Badger Africa, Gasal Management Systems (Pty) Ltd. and PETROSA.

Mr. Murphy has a **Bachelor** degree in **Engineering** and **Foundation** degree in **Materials Fabrication & Engineering** from the **Open University**, **UK**. Further, he holds a **Diploma** in **Welding Technology** from the **TWI Cambridge**, **UK** and a **Certified Quality Assurance & Quality Control** from the **City & Guilds**, **UK**. Moreover, he is a **Certified Instructor/Trainer**, a Certified Pressure Vessels Inspector (**API 510**), a Certified Piping Inspector (**API 570**), a Certified Corrosion & Material Specialist (**API 571**), a Certified Risk Based Inspector (**API 580**), a Certified Above Ground Storage Tank Inspector (**API 653**), a **NACE – CIP Coating Inspector Level 1** from the National Association of Corrosion Engineers (**NACE-USA**), a **Certified SAIW Level II Welding/Fabrication Inspector**, a **Certified CSWIP 3.2 Senior Welding Inspector**, a **Certified SAIW-SAQCC IPE** (**Inspector of Pressurized Equipment**) and a **SAIW Certified Level II** in Magnetic Particle Testing (**MT**), Liquid Penetrant Testing (**PT**), Ultrasonic Testing (**UT**) and Radiographic Testing (**RT**). He is a **Registered Incorporated Engineer** by the Engineering Council (The Welding Institute) and has further delivered numerous courses, workshops, trainings, seminars and conferences worldwide.

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.

Course Fee

US$ 8,000 per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Exam Fees

US$ 560 per Delegate.

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

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0900	***Introduction to API 571***
0900 – 0930	***Damage Mechanisms & Causes***
0930 – 1000	***885 °F (475 °C) Embrittlement***
1000 – 1015	*Break*
1015 – 1045	***Amine Corrosion & Stress Corrosion Cracking***
1045 – 1200	***Ammonia Stress Corrosion Cracking***
1200 – 1300	*Break*
1300 – 1400	***Ammonium Bisulfide Corrosion (Alkaline Sour Water)***
1400 – 1500	***Ammonium Chloride & Amine Hydrochloride Corrosion***
1500 – 1515	*Break*
1515 – 1530	***Aqueous Organic Acid Corrosion & Atmospheric Corrosion***
1530 – 1615	***Boiler Water & Steam Condensate Corrosion***
1615 – 1650	***Quiz***
1650 – 1700	***Distribute Homework & Recap***
1700	*End of Day One*

Day 2

0730 – 0830	***Review of Day 1 & Homework Answers***
0830 – 0915	***Brine Corrosion & Brittle Fracture***
0915 – 1000	***Carbonate Stress Corrosion Cracking***
1000 – 1015	*Break*
1015 – 1100	***Carburization, Caustic Corrosion & Caustic Stress Corrosion Cracking***

1100 – 1145	***Cavitation & Chloride Stress Corrosion Cracking***
1145 - 1230	***CO_2 Corrosion, Concentration Cell Corrosion & Cooling Water Corrosion***
1230 – 1330	*Break*
1330 – 1400	***Corrosion Fatigue***
1400 – 1430	***Corrosion Under Insulation***
1430 – 1500	*Break*
1500 – 1530	***Creep & Stress Rupture***
1530 - 1600	***Dealloying, Decarburization & Dissimilar Metal Weld Cracking***
1600 – 1630	***Quiz***
1630 – 1700	***Distribute Homework & Recap***
1700	*End of Day Two*

Day 3

0730 – 0830	***Review of Day 1 & Homework Answers***
0830 – 0915	***Erosion/Erosion-Corrosion***
0915 – 1000	***Ethanol Stress Corrosion Cracking***
1000 – 1015	*Break*
1015 – 1100	***Flue Gas Dew Point Corrosion, Fuel Ash Corrosion & Galvanic Corrosion***
1100 – 1145	***Gaseous Oxygen-enhanced Ignition & Combustion***
1145 - 1230	***Graphitic Corrosion of Cast Irons & Graphitization***
1230 – 1330	*Break*
1330 – 1400	***High-temperature H_2/H_2S Corrosion & Hydrogen Attack***
1400 – 1430	***Hydrochloric & Hydrofluoric Acid Corrosion***
1430 – 1500	*Break*
1500 – 1530	***Hydrofluoric Acid Stress Corrosion Cracking of Nickel Alloys***
1530 - 1600	***Hydrogen Embrittlement & Hydrogen Stress Cracking in Hydrofluoric Acid***
1600 – 1630	***Quiz***
1630 – 1700	***Distribute Homework & Recap***
1700	*End of Day Three*

Day 4

0730 – 0830	***Review of Day 1 & Homework Answers***
0830 – 0915	***Liquid Metal Embrittlement & Mechanical Fatigue (Including Vibration-induced Fatigue)***
0915 – 1000	***Metal Dusting & Microbiologically Influenced Corrosion***
1000 – 1015	*Break*
1015 – 1100	***Naphthenic Acid Corrosion, Nitriding & Oxidation***
1100 – 1145	***Oxygenated Process Water Corrosion***
1145 - 1230	***Phenol (Carbolic Acid) & Phosphoric Acid Corrosion***
1230 – 1330	*Break*
1330 – 1400	***Polythionic Acid Stress Corrosion Cracking***
1400 – 1430	***Refractory Degradation***
1430 – 1500	*Break*
1500 – 1530	***Stress Relaxation Cracking (Reheat Cracking)***
1530 - 1600	***Short-term Overheating-Stress Rupture (Including Steam Blanketing)***
1600 – 1630	***Quiz***
1630 – 1700	***Distribute Homework & Recap***
1700	*End of Day Four*

Day 5

0730 – 0830	***Review of Day 4 & Homework Answers***
0830 - 1000	***Sigma Phase Embrittlement, Soil Corrosion & Sour Water Corrosion (Acidic)***
1000 - 1015	*Break*
1015 - 1130	***Spheroidization (Softening), Strain Aging, Sulfidation & Sulfuric Acid Corrosion***
1130 - 1230	***Temper Embrittlement, Thermal Fatigue & Thermal Shock***
1230 - 1330	*Break*
1330 - 1430	***Titanium Hydriding & Wet H_2S Damage***
1430 – 1500	*Break*
1500 - 1615	***Process Unit Process Flow Diagrams***
1615 - 1630	***POST-TEST***
1630 – 1645	***Course Conclusion***
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 30 days following the course completion. Each participant has only one trial for the MOCK exam within this 30-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

This practical and highly-interactive course includes real-life case studies and exercises:-

Course Coordinator

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