



COURSE OVERVIEW FE0580

API-579/580/581: Risk-Based-Inspection (RBI), Fitness-for-Service (FFS) and Repair Practices of Pipelines, Piping, Vessels & Tanks in Refineries, Gas, Oil & Petrochemical Facilities

Course Title

API-579/580/581: Risk-Based-Inspection (RBI), Fitness-for-Service (FFS) & Repair Practices of Pipelines, Piping, Vessels & Tanks in Refineries, Gas, Oil & Petrochemical Facilities

Course Date/Venue

November 01-05, 2026/Crowne Meeting Room, Crowne Plaza Al Khobar, KSA

Course Reference

FE0580

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs



H-STK[©]
INCLUDED



Course Description



This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.



This course presents a comprehensive and practical introduction and application of the latest techniques in Risk-Based Inspection (RBI) planning, and Fitness-For-Service (FFS) analysis of inspection results. It discusses practical techniques for the analysis of equipment, piping and pipelines defects and degradation. The focus of the course is on predicting degradation in service, setting optimum inspection intervals (API 580-581), projecting remaining life based on generic data corrected for plant specific conditions, and applying quantitative analysis for degraded conditions to determine whether equipment is fit for continued service or should be repaired or replaced (API 579-1/ASME FFS-1, ASME B31G, etc.).



The course includes a discussion on identification of API RP 571 damage mechanisms, risk management, and risk mitigation strategies. Requirements for input data and information, and the roles of the RBI Assessment Team will be described. Approaches to levels of RBI assessment and basis for implementation will be examined.



The exercise will give Delegates the opportunity to key elements for implementation of an RBI system to a process facility. The course presenters are independent of any commercial organization and the Course Notes are applicable to all commercially available systems.

Course Objectives

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

- Apply systematic techniques in Risk-Based-Inspection (RBI) and Fitness-For-Services (FFS) and identify the various repair practices of pipelines, piping, vessels and tanks in refineries, gas, oil and petrochemical plants
- Practice the analysis of defects and degradation of equipment, piping and pipelines
- Predict degradation in service and set optimum inspection intervals (API-580/581)
- Estimate the remaining life based on generic data corrected for plant specific conditions
- Employ quantitative analysis for degraded conditions to determine whether equipment is fit for continued service or should be repaired or replaced (API 579-1/ASME FFS-1, ASME B31G)

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

This course provides a wide understanding and deeper appreciation of risk based inspection, fitness-for-service and repair practices of pipelines, piping, vessels and tanks in refineries, gas, oil and petrochemical facilities in accordance with the international standards. Standard engineers, process, plant, maintenance, inspection and pipeline/piping engineers and inspectors who are responsible for the initial and continued integrity and cost-effective operation of equipment, piping systems and pipelines. Further, this course will interest all younger/graduate inspection engineers, mechanical engineers, graduate corrosion engineers, maintenance personnel and asset managers who are considering or implementing risk based inspection systems.

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 Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

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 **3.0 CEUs** (Continuing Education Units) or **30 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 Magalios, CEng, PGDip (on-going), MSc, BSc, is a **Senior Mechanical & Maintenance Engineer** with almost **40 years** of extensive **On-shore/Offshore** experience in the **Oil & Gas, Construction, Refinery** and **Petrochemical** industries. His expertise widely covers in the areas of **Valve Repair & Recalibration, Process Control Valves, Valve Repair & Recalibration, Functional Testing of Process Valves, Valve Testing & Inspection, Pressure Relief & Control Valve Inspection, Valve Integrity Inspection & Testing, Industrial Valve Inspection & Performance Testing, Field Testing & Inspection of Industrial Valves, API-Based Valve Testing & Inspection**

Procedures, Troubleshooting & Repair of Failed Valves, Gate Valve Design, Field Evaluation & Testing of Gate Valves, Operational Reliability of Gate Valves in Process Systems, Butterfly Valve Operation, Valve Testing, Pressure Vessels Fabrication, Material Science & Selection, Composite Repair Materials, Material Selection & Properties, Material & Inspection Foundation, Refractory Material Design, Application, Installation & Inspection, Preventive & Predictive Maintenance, Reliability Centered Maintenance, Applied Maintenance Management, Reliability Modelling, Reliability Techniques, Reliability Design Techniques, Advanced Root Causes Analysis & Techniques, Reliability Management, Pipeline Hot Tapping, Hot Tapping Equipment, Hot Tapping Operation, Boiler Inspection & Maintenance, Boiler Systems, Boiler instrumentation & Controls, Boiler Start-up & Shutdown, Boiler Operation & Steam System Management, Pipe Cuttings, Flange Bolt Tightening Sequence, Hydro Testing, Pump Technology, Fundamentals of Pumps, Pump Selection & Installation, Centrifugal Pumps & Troubleshooting, Reciprocating & Centrifugal Compressors, Screw Compressor, Compressor Control & Protection, Gas & Steam Turbines, Turbine Operations, Gas Turbine Technology, Valves, Process Control Valves, API 598: Valve Inspection and Testing, Bearings & Lubrication, Advanced Machinery Dynamics, Rubber Compounding, Elastomers, Thermoplastic, Industrial Rubber Products, Rubber Manufacturing Systems, Heat Transfer, Vulcanization Methods, Welding Engineering, Fabrication & Inspection, Welding Techniques, Practical Welding Technology, Welding Inspection, Welding & Machine Shop, 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, Pipeline Operation & Maintenance, Pipeline Systems, Pipeline Design & Construction, Pipeline Repair Methods, Pipeline Engineering, Pipeline Integrity Management System (PIMS). Currently, he is the **Chartered Professional Surveyor Engineer & Urban-Regional Planner wherein he is deeply involved in providing exact data, measurements and determining properly boundaries. He is also responsible in preparing and maintaining sketches, maps, reports and legal description of surveys.**

During his career, Mr. Magalios has gained his expertise and thorough practical experience through challenging positions such as a **Project Site Construction Manager, Supervision Head/Construction Manager, Construction Site Manager, Project Manager, Deputy PMS Manager, Head of the Public Project Inspection Field Team, Technical Consultant, Senior Consultant, Consultant/Lecturer, Construction Team Leader, Lead Pipeline Engineer, Project Construction Lead Supervising Engineer, Lead Site Engineer, Senior Site Engineer Lead Engineer, Senior Site Engineer, Mechanical Engineer, R.O.W. Coordinator, Site Representative, Supervision Head, Contractor, Client Site Representative** and Acting Client Site Representative for international Companies such as the Public Gas Corporation, Penspen International Limited, Eptista Servicios de Ingenieria S.I., J/V ILF Pantec TH. Papaioannou & Co. – Emenergy Engineering, J/V Karaylannis S.A. – Intracom Constructions S.A., Ergaz Ltd., Alkyonis 7, Palaeo Faliro, Piraeus, Elpet Valkaniki S.A., Asprofos S.A., J/V Depa S.A. just to name a few.

Mr. Magalios is a **Registered Chartered Engineer** and has **Master** and **Bachelor** degrees in **Surveying Engineering** from the **University of New Brunswick, Canada** and the **National Technical University of Athens, Greece**, respectively. Further, he is currently enrolled for **Post-graduate** in **Quality Assurance** from the **Hellenic Open University, Greece**. He has further obtained a Level 4B Certificates in Project Management from the National & Kapodistrian University of Athens, Greece and Environmental Auditing from the Environmental Auditors Registration Association (EARA). Moreover, he is a **Certified Instructor/Trainer**, a **Chartered Engineer** of Technical Chamber of Greece and has delivered numerous trainings, workshops, seminars, courses and conferences internationally.





Course Fee

US\$ 5,500 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

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, 01st of November 2026

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	PRE-TEST
0830 – 0915	Overview of Codes & Standards API & ASME
0915 – 1000	Latest Developments in Integrity & Fitness-For-Service
1000 – 1015	Break
1015 – 1100	Overview of Material Strength & Toughness
1100 – 1145	Overview of Design Rules
1145 – 1230	Overview of Corrosion & Degradation Mechanisms
1230 – 1245	Break
1245 – 1330	Corrosion
1330 – 1420	Design Margins & Corrosion Allowance
1420 – 1430	Recap
1430	Lunch & End of Day One

Day 2: Monday, 02nd of November 2026

0730 – 0800	Evaluation of Inspection Results
0800 – 0830	Flaw Assessment: A Practical Approach
0830 – 0915	Fitness-For-Service Overview API 579-1/ASME FFS-1
0915 – 0945	Brittle Fracture Analysis
0945 – 1000	Break
1000 – 1045	General Metal Loss Analysis
1045 – 1130	Analysis of Wall Thinning & Remaining Life
1130 – 1215	Team Exercise: Wall Thinning Analysis
1215 – 1230	Break
1230 – 1315	Calculate Initial Strength of Component
1315 – 1400	Calculate Remaining Strength of Corroded Equipment or Pipeline
1400 – 1420	Predict Remaining Life & Failure Mode
1420 – 1430	Recap
1430	Lunch & End of Day Two

Day 3: Tuesday, 03rd of November 2026

0730 – 0830	Local Metal Loss Analysis
0830 – 0930	Pitting Corrosion Analysis
0930 – 0945	Break
0945 – 1100	Blisters & Laminations Analysis
1100 – 1215	Team Exercise: Local Metal Loss Analysis
1215 – 1230	Break
1230 – 1330	Analyze Remaining Strength of Component with Local Corrosion
1330 – 1420	Compare ASME B31G & API 579-1/ASME FFS-1 Results
1420 – 1430	Recap
1430	Lunch & End of Day Three





Day 4: Wednesday, 04th of November 2026

0730 – 0830	<i>Distortions, Dents & Gouges Analysis</i>
0830 – 0930	<i>Introduction to Fracture Mechanics</i>
0930 – 0945	<i>Break</i>
0945 – 1215	<i>Crack Flaws Analysis & Fracture Mechanics</i>
1215 – 1230	<i>Break</i>
1230 – 1330	<i>Fatigue Analysis & Remaining Life</i>
1330 – 1420	<i>Introduction to Risk-Based-Inspection API 580-581</i>
1420 – 1430	<i>Recap</i>
1430	<i>Lunch & End of Day Four</i>

Day 5: Friday, 05th of November 2026

0730 – 0815	<i>API 581 Failure Likelihood Analysis</i>
0815 – 0845	<i>Corrosion Loops & Failure Margins</i>
0845 – 0915	<i>API 581 Failure Consequence Analysis</i>
0915 – 0930	<i>Break</i>
0930 – 1015	<i>Preparation of Inspection Matrix</i>
1015 – 1130	<i>Examples of Plant RBIs</i>
1130 – 1215	<i>Team exercise: Risk-BASED Ranking</i>
1215 – 1230	<i>Break</i>
1230 – 1245	<i>Determine Corrosion Rate</i>
1245 – 1315	<i>Calculate Likelihood & Consequence of Failure</i>
1315 – 1345	<i>Rank Systems & Equipment for Inspection</i>
1345 – 1400	<i>Course Conclusion</i>
1400 – 1415	POST-TEST
1415 – 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch & End of Course</i>



Simulator (Hands-on Practical Sessions)

Practical session will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the state-of-the-art simulators. “RiskWISE”, “PV-Elite” and “IntegriWISE™”.

The screenshot shows the RiskWISE software interface. On the left is a navigation menu with options like Home, Recommended Proposals, Current Revisions, Risk Analysis, Inspection / Mitigation Planning, Inspection / Mitigation Schedule, and Archived Equipment Records. The main window displays a 'Risk Analysis' window with a 'Risk Matrix' and a 'Records' table. The Risk Matrix is a 5x5 grid with 'Probability of Failure' on the y-axis (1-5) and 'Consequence' on the x-axis (A-E). The color scale ranges from green (low risk) to red (high risk). The Records table has columns for Site, Facility, Equipment Number, Component Number, AP1, and AP2.

Site	Facility	Equipment Number	Component Number	AP1	AP2

RiskWISE Simulator

The screenshot shows the PV-Elite software interface. On the left is a 'General Input' panel with a list of 'Element Data' for a shell. The main window displays a 3D model of a cylindrical vessel with various components and labels like 'TOP HEAD', 'LWRCS', and 'LCS-PI'. The status bar at the bottom shows design parameters like 'Design C...', 'Load Co...', 'Wind Data', 'Seismic...', and 'Heading'.

Element Description	SHLL #9
From Node	140
To Node	129
Element Type	Cylindrical
Diameter Basis	ID
Inside Diameter, mm	3330
Cylinder Length, mm	3300
Finished Thickness, mm	8
Nominal Thickness, mm	0
Internal Corrosion All., mm	1.5
External Corrosion All., mm	0
Wind Diameter Multiplier	1.2
Material Name	SA-516 70
Longitudinal Efficiency	1
Circumferential Efficiency	1
Internal Pressure, N, kg/cm ²	0.5
Temp. for Internal Pressure, C	300
External Pressure, N, kg/cm ²	0.2
Temp. for External Pressure, C	300

PV-Elite Simulator



The image displays two screenshots of the IntegriWISE software. The top screenshot shows the main application window with a menu bar (Home, Tool, Help) and a toolbar with icons for New Assessment, Site, Facility, Equipment, Component, and Exit. Below the toolbar is a search bar labeled 'Items' and a large central area displaying the 'IntegriWISE™ Fitness-for-Service Assessment Tool' logo. The bottom status bar shows: 'User: USER-PC2\user1 Server: USER-PC2 Database: C:\Users\user1\Documents\IntegriWISEData\IntegriWISE_LocalDB.mdf Application: IntegriWISE v1.0.1.22453'. The bottom screenshot shows the same main window but with an 'Equipment' dialog box open. The dialog box is titled 'IntegriWISE Equipment' and contains the following fields: Equipment Number*, Equipment Type*, Equipment Name, Design Code, Description, Site*, Facility*, Manufacturer*, Design Pressure (MPa), Design Temperature (°C), Minimum Temperature (°C), and Hydrotest Pressure (MPa). It includes 'OK' and 'Cancel' buttons at the bottom.

IntegriWISE™

Course Coordinator

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org

