



**COURSE OVERVIEW FE0850**  
**API 936: Refractory Personnel**  
*(API Exam Preparation Training)*

**Course Title**

API 936: Refractory Personnel (API Exam Preparation Training)

**Course Reference**

FE0850

**Course Duration/Credits**

Five days (40 hours)/4.0 CEUs/40 PDHs



**Course Date/Venue**

Session(s)	Date	Venue	Exam Window	Exam Closing Date
1	April 28-May 02, 2024	Club B Meeting Room, Ramada Plaza by Wyndham Istanbul City Center, Istanbul, Turkey	August 09-30, 2024	May 31, 2024
2	July 08-12, 2024	Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE	August 09-30, 2024	May 31, 2024
3	October 06-10, 2024	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE	December 06-27, 2024	September 27, 2024
<b>Exam Venue</b>	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.***



This API Certification Program is designed to train individuals on Refractory installation, inspection, testing and repair in accordance with API Recommended Practice 936. API RP 936 provides guidelines for the installation quality control of refractory linings and usually used to supplement owner specifications. The course also covers the material, equipment and personnel qualification requirements along with procedures and responsibilities for quality control inspection personnel.



API Refractory Certification Program provides the industry with a means for central, independent, unbiased and legally defensible certification and ensures that refractory personnel demonstrate competence in content areas that are relevant to their practices. The program raises the bar of competence for qualified personnel and provides a peace-of-mind to the industry that the certified individual has demonstrated knowledge of the relevant content of refractory installation and inspection. For the refractory personnel, this certification provides a method to demonstrate knowledge and experience with refractories and refractory inspection to employers and clients.





By participating in API's 936 Certification Program, inspectors and other professionals serving the petroleum, petrochemicals, and chemical industries are readily able to provide evidence of proper qualification. Certification provides personnel with industry-directed and industry-accepted professional credentials.

This course is designed to train individuals who are interested in obtaining the API 936 Certification, as well as those who are seeking knowledge and skills needed for the installation, inspection, testing and repair of refractory systems. 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 API examinations.

### **Course Objectives**

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

- Get prepared for the next API 936 exam and have enough knowledge and skills to pass such exam in order to get the API 936 certification
- Perform the installation, repair, testing and inspection requirements of refractory systems
- Gain in-depth understanding on the laboratory testing procedures including the testing equipment and methods, sample preparation techniques, dimensional requirements for test specimen and the responsibilities for personnel and documentation requirements
- Determine what is an applicator and identify the various material qualification needed in the installation, sample preparation and surface separation requirements of the refractory system
- Recognize the responsibilities of personnel and list down the documentations needed in the material qualification of a refractory system
- Enumerate the various requirements and guidelines needed in the installation of the refractory system including the knowledge of detailed execution plan such as the design details and quality standards
- List gunite procedures and equipment including variables that affect gunite quality
- Employ the procedures of inspection including the job specifications, application standards and data collection procedures
- Identify the acceptance and rejection criteria for the inspection of the refractory system
- Develop an in-depth knowledge on the post-installation methods for refractory systems and be able to learn the applicable heating rates for various classes of refractories





### Who Should Attend

This course prepares participants for the API 936 exam. It is designed for those who are involved in the installation, inspection, testing or repair of refractory systems. Other engineers, managers or technical staffs who are seeking broad knowledge of refractory properties, installations and application will definitely benefit from this course.

### Required Codes & Standards

Listed below are the effective editions of the publications required for the next API-936, Refractory Personnel Certification Examination. **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:-**

#### **API Publications**

- **API Standard 936**, Refractory Installation Quality Control Guidelines – Inspection and Testing Monolithic Refractory Linings and Materials, **4th Edition, June 2014**
- **API TR 978**, Monolithic Refractories: Manufacture, Properties, and Selection, **1st Edition, March 2019**
- **API TR 979**, Applications of Refractory Lining Materials, **1st Edition, October 2018**
- **API TR 980**, Monolithic Refractories: Installation and Dryout, **1st Edition, April 2018**

#### **ASTM (American Society for Testing and Materials) Publications**

- **C113-14 (2019)** – Standard Test Method for Reheat Change of Refractory Brick
- **C133-97 (2021)** – Standard Test Methods for Cold Crushing Strength and Modulus of Rupture of Refractories
- **C181-11 (2018)** – Standard Test Method for Workability Index of Fireclay and High-Alumina Plastic Refractories
- **C704-15** – Standard Test Method for Abrasion Resistance of Refractory Materials at Room Temperatures

**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.





**API Certificate(s)**

- (1) API-936 certificate will be issued to participants who have successfully passed the API-936 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:-

-  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.

-  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.

**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. Michael Linck, MBA, BBA, is a Senior Piping & Mechanical Engineer with over 30 years of practical experience in the Oil, Gas, Petrochemical and Power industries. His expertise covers ASME Post Construction Code, Inspection Planning, Fitness-for-Service, Damage Mechanisms & Repair of Vessels, Tanks, Piping & Process Equipment, Pipeline Pigging, Pipeline Integrity Assessment, Corrosion Monitoring, Control, Prevention and Inspection, Screw Compressors, Building & Facilities Maintenance Management, Maintenance Planning, Maintenance Auditing & Benchmarking, Risk Management Program (RMP), Reliability, Availability & Maintability (RAM), Material Cataloguing, planning and implementation of small to large boiler projects, insulation, scaffolding, installation, operation and inspection of steel, cement, petrochemical and power industries, both new installations and aftermarket service projects. Currently, he is the VP of Operations for Refractory Repair Services as well as the President of LINCK REFRACTORY INTERNATIONAL SERVICES, taking full charge of all refractory and mechanical maintenance related operations.**

Earlier in his career life, Mr. Linck held numerous significant and challenging positions as the **Commissioning Specialist, Maintenance Specialist, Contract Specialist, Site Manager, General Manager, Project Manager, Branch Manager, Construction Manager, Manager and Contract Site Service Representative** in several international companies such as **Foster Wheeler, NV Gouda Vuurvast, Insultec Ltd., National Refractories Clay Alumina Specialties, Thermo Tech, Turnaround Maintenance Inc., Solar Industries and Anco Industries.**

Mr. Linck has a **Master and Bachelor** degrees in **Engineering** from the **North Texas University and University of Dallas** respectively. He is **certified** as an **API 936 Inspector** early in 2003 as well as holds or has held state contracting licenses related to heavy construction and engineering in West Virginia, Mississippi, Louisiana, Oklahoma and Arizona

**Course Fee**

<b>Istanbul</b>	<b>US\$ 8,000</b> per Delegate + <b>VAT</b> . This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
<b>Abu Dhabi</b>	<b>US\$ 7,500</b> per Delegate + <b>VAT</b> . This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
<b>Dubai</b>	<b>US\$ 7,500</b> per Delegate + <b>VAT</b> . This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

**Exam Fees**

**US\$ 780** per Delegate + **VAT**.





**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 – 0900	<b>Introduction</b>
0900 – 0930	<b>Students Take Initial Math Quiz</b>
0930 – 1000	<b>Review Math Quiz Answers</b>
1000 – 1015	Break
1015 – 1045	<b>Overview of Course Outline</b>
1045 – 1230	<b>Review of API 936 Body of Knowledge</b>
1230 – 1330	Lunch
1330 – 1500	<b>Laboratory Testing Procedures</b> Terms & Definitions • Test Methods (E.G., C704, CCS, PLC, Density) & Related Calculations • Material Qualification • Testing Equipment, Sample Preparation Techniques, Dimensional Requirements for Test Specimens
1500 – 1515	Break
1515 – 1645	<b>Laboratory Testing Procedures (cont'd)</b> Various Materials Utilized (For Example, Plastic, Ceramic Fiber, Anchor, Metal Fiber, Corrosion, Coatings, Etc.) • Curing & Firing Procedures • Acceptance/Rejection Criteria • Responsibilities of Personnel & Documentation Requirements
1645 – 1700	<b>Distribute Homework &amp; Recap</b>
1700	End of Day One

**Day 2**

0730 – 0830	<b>Review of Day 1 &amp; Homework Answers</b>
0830 – 0930	<b>Applicator &amp; Material Qualification</b> Installation Methods (E.G., Gunning, Casting, Ramming & Hand Packing) • Sampling & Sample Preparation Procedures • Terms & Definitions
0930 – 0945	Break
0945 – 1215	<b>Applicator &amp; Material Qualification (cont'd)</b> Procedures for Determining Optimal Water Content & Mixing • Applicable Formulation & Manufacturing Information • Applicable Knowledge of Equipment & Qualification Process
1215 – 1230	<b>Administer Quiz</b>
1230 – 1330	Lunch
1330 – 1515	<b>Applicator &amp; Material Qualification (cont'd)</b> Applicable Test Panel/Mock-Up Requirements • Applicable Environmental Controls
1515 – 1530	Break
1530 – 1630	<b>Applicator &amp; Material Qualification (cont'd)</b> Surface Preparation Requirements • Responsibilities of Personnel & Documentation Requirements
1630 – 1645	<b>Administer Quiz</b>
1645 – 1700	<b>Distribute Homework &amp; Recap</b>
1700	End of Day Two





**Day 3**

0730 – 0830	<b>Review of Day 2 &amp; Homework Answers</b>
0830 – 0930	<b>Installation</b> Terms & Definitions • Responsibilities of Personnel & Documentation Requirements • Knowledge of Detailed Execution Plan Including Design Details & Quality Standards
0930 – 0945	Break
0945 – 1215	<b>Installation (cont'd)</b> Packaging & Storage Requirements • Surface Preparation & Cleanliness Requirements • Anchor: Welding, Layouts, Patterns, Materials • Frequency & Methods of Production Sampling: Gunning, Casting, Hand Packing
1215 – 1230	<b>Administer Quiz</b>
1230 – 1330	Lunch
1330 – 1515	<b>Installation (cont'd)</b> Water Addition: Quantity & Temperature, Mixing Procedures • Fiber Addition: Percentage, Material, Mixing • Installation Environmental Controls (Minimum & Maximum Temperatures) • Guniting Procedures & Equipment, Including Variables that Affect Guniting Quality (I.E., Air Pressure, Humidity, Temperature, Aging, Water Pressure, Water Purity, Additives)
1515 – 1530	Break
1530 – 1630	<b>Installation (cont'd)</b> Knowledge of Flash Set • Casting Procedures & Equipment (E.G., Air Vibrator, Vibrator Frequency, Vibrator Sizing, Forming, Setup) • Ramming/Hand Packed Procedures & Equipment
1630 – 1645	<b>Administer Quiz</b>
1645 – 1700	<b>Distribute Homework &amp; Recap</b>
1700	End of Day Three

**Day 4**

0730 – 0830	<b>Review of Day 3 &amp; Homework Answers</b>
0830 – 0930	<b>Inspection</b> Terminology, Job Specifications, Application Standards • Inspection & Data Collection Procedures • Lining Design & Installation Requirements
0930 – 0945	Break
0945 – 1215	<b>Inspection (cont'd)</b> Visual & Non-Destructive Test Methods & Qualification Testing Methods • Application/Limitation for Various Inspection Techniques (For Example, Hammer Testing, Sonic Testing, Radiography, Core Sampling, Portable Abrasion Testing) • Material Verification & Traceability
1215 – 1230	<b>Administer Quiz</b>
1230 – 1330	Lunch
1330 – 1515	<b>Inspection (cont'd)</b> Acceptance & Rejection Criteria • Repair Procedures • Curing & Dry Out Procedures
1515 – 1530	Break
1530 – 1630	<b>Inspection (cont'd)</b> Inspectors' & Contractors' Responsibilities • Record Keeping Systems & Requirements
1630 – 1645	<b>Administer Quiz</b>
1645 – 1700	<b>Distribute Homework &amp; Recap</b>
1700	End of Day Four





**Day 5**

0730 – 0830	<b>Review of Day 4 &amp; Homework Answers</b>
0830 – 1000	<b>Post-Installation</b> Terms & Definitions • Responsibilities of Personnel & Documentation Requirements • Knowledge of Dryout Requirements • Sealing Requirements (For Example, Water Mist, Covering, Membrane, Curing)
1000 – 1015	Break
1015 – 1215	<b>Post-Installation (cont'd)</b> Application & Time Limits for Applying Membrane Curing Compounds • Environmental Conditions Required For Curing
1215 – 1230	<b>Administer Quiz</b>
1230 – 1330	Lunch
1330 – 1515	<b>Post-Installation (cont'd)</b> Heating Equipment, Methods & Procedures (E.G., Gas Fired Burner, Stress Relieving Heating Elements) • Placement of Temperature Sensing Probes
1515 - 1530	Break
1530 - 1615	<b>Post-Installation (cont'd)</b> Knowledge of Manufacturer's Recommended Heatup & Cool Down Schedules • Heating Rates for Various Classes of Refractories • Lining Integrity Inspection Te
1615 – 1630	<b>POST-TEST</b>
1630 – 1645	<b>Course Conclusion</b>
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**

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



**Course Coordinator**

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