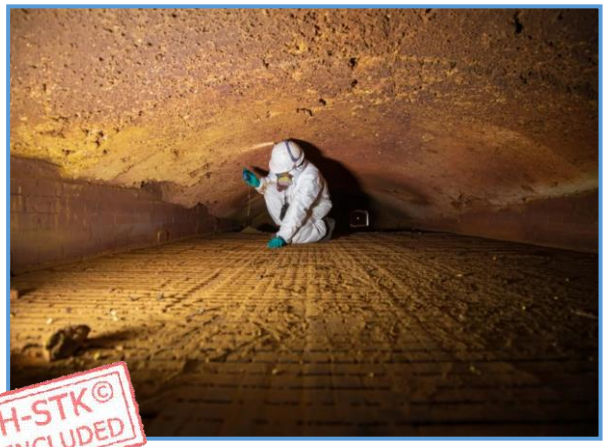
COURSE OVERVIEW FE0115
API 982: Refractory Inspector
(API Exam Preparation Training)

Course Title
API 982: Refractory Inspector *(API Exam Preparation Training)*

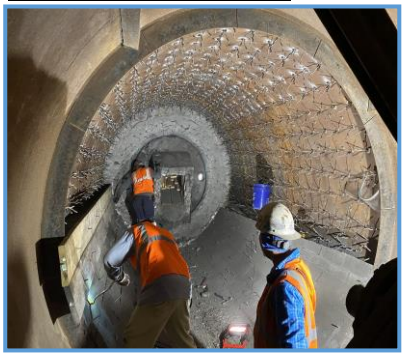


Course Date/Venue
September 14-18, 2025/Al Khobar Meeting Room, Hilton Garden Inn, Al Khobar, KSA
Exam Window: TBA
Exam Venue : Abu Dhabi, Dubai, Al-Khobar, Jeddah, Kuwait, Amman, Beirut, Cairo, Manama & Muscat. Participant has the option to attend at any of the above cities
Exam Registration Closing Date: TBA

Course Reference
FE0115

Course Duration/Credits
Five days (40 hours)/4.0 CEUs/40 PDHs

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 course is designed to provide participants with a detailed and up-to-date overview of Refractory Inspection in accordance with API 982. It covers the classification of refractory materials; the importance of refractory lining in refining and petrochemical industries; the API RP 982 standards, API RP 560 standards and API RP 935 standards; the types of refractory materials and their selection criteria; the refractory installation and inspection safety; the purpose of API TR 977 and the importance of erosion resistance in refining applications; the selection of monolithic refractories for different applications; and the impact of formulation on performance and durability.

Further, the course will also discuss the common damage mechanisms in refractory linings, best practices for installation of monolithic refractories, thermal expansion under load (TEUL) and creep resistance of refractory materials; the non-destructive testing (NDT) methods for refractory inspection covering visual inspection techniques, ultrasonic testing for refractory thickness measurement, infrared thermography for detecting hot spots and acoustic emission testing for crack detection; and the refractory applications in refining and petrochemicals and performance evaluation of refractory systems.

During this interactive course, participants will learn the inspection techniques for different types of refractory linings, refractory testing standards and laboratory evaluation and best practices for refractory maintenance and repair; the refractory in FCC units, reformers and furnaces, incinerators and thermal oxidizers and challenges in high-temperature environments; the advanced refractory installation methods, failure analysis and troubleshooting of refractories; the comparison of API refractory standards and the application of API 560, 982, 935 and related standards; the refractory materials for high-performance applications and refractory in energy efficiency and heat loss reduction; the documentation and quality assurance in refractory inspection; and the refractory performance optimization strategies.

Course Objectives

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

- Get prepared for the next API 982 exam and have enough knowledge and skills to pass such exam in order to get the API 982 certification
- Classify refractory materials and discuss the importance of refractory lining in refining and petrochemical industries
- Discuss API RP 982 standards, API RP 560 standards, and API RP 935 standards
- Identify the types of refractory materials and their selection criteria and apply refractory installation and inspection safety
- Discuss the purpose of API TR 977 and the importance of erosion resistance in refining applications
- Select monolithic refractories for different applications and identify the impact of formulation on performance and durability
- Recognize the common damage mechanisms in refractory linings, best practices for installation of monolithic refractories, thermal expansion under load (TEUL) and creep resistance of refractory materials
- Carryout non-destructive testing (NDT) methods for refractory inspection covering visual inspection techniques, ultrasonic testing for refractory thickness measurement, infrared thermography for detecting hot spots and acoustic emission testing for crack detection
- Employ refractory applications in refining and petrochemicals and performance evaluation of refractory systems
- Apply inspection techniques for different types of refractory linings, refractory testing standards and laboratory evaluation and best practices for refractory maintenance and repair
- Inspect refractory in FCC units, reformers and furnaces, incinerators and thermal oxidizers and challenges in high-temperature environments
- Carryout advanced refractory installation methods and failure analysis and troubleshooting of refractories
- Compare API refractory standards and the application of API 560, 982, 935 and related standards
- Discuss refractory materials for high-performance applications and define the role of refractory in energy efficiency and heat loss reduction
- Implement documentation and quality assurance in refractory inspection and refractory performance optimization strategies

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 an overview of all significant aspects and considerations of refractory inspection in accordance with API 982 standard for refractory inspectors, materials engineers, quality control/quality assurance engineers, project managers, operations personnel, contractors and subcontractors and other technical staff.

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.

Exam Eligibility & Structure

Exam Candidates shall have the following minimum pre-requisites:-

Education	Years of Experience	Experience Required
Technical role (Dishonorable discharge disqualifies credit)		
2-year degree or certificate in engineering or technology or 2 years of military service in a technical role (Dishonorable discharge disqualifies credit)	3 years	General refractory[a] experience, of which 2 years must be in inspection or supervision of inspection of refractory[b].
High school diploma or no formal education	5 years	General refractory[a] experience, of which 3 years must be in inspection or supervision of inspection of refractory[b].
[a]Specific Experience in Refractory Inspection Activities — Refers to the quality control elements related to refractory workmanship and/or materials. Alternatively, supervision of refractory installation where the quality control of refractory is under that person's responsibility.		
[b]General Refractory Experience — Refers to installation activities related to refractory work. This may include, but is not limited to, hands-on experience and engineering design.		

Required Codes & Standards

Listed below are the effective editions of the publications required for the next API-982, Refractory Inspector Certification Examination. **Each participant must purchase these documents separately and have them available for use during the class as their cost is not included in the course fees**:-

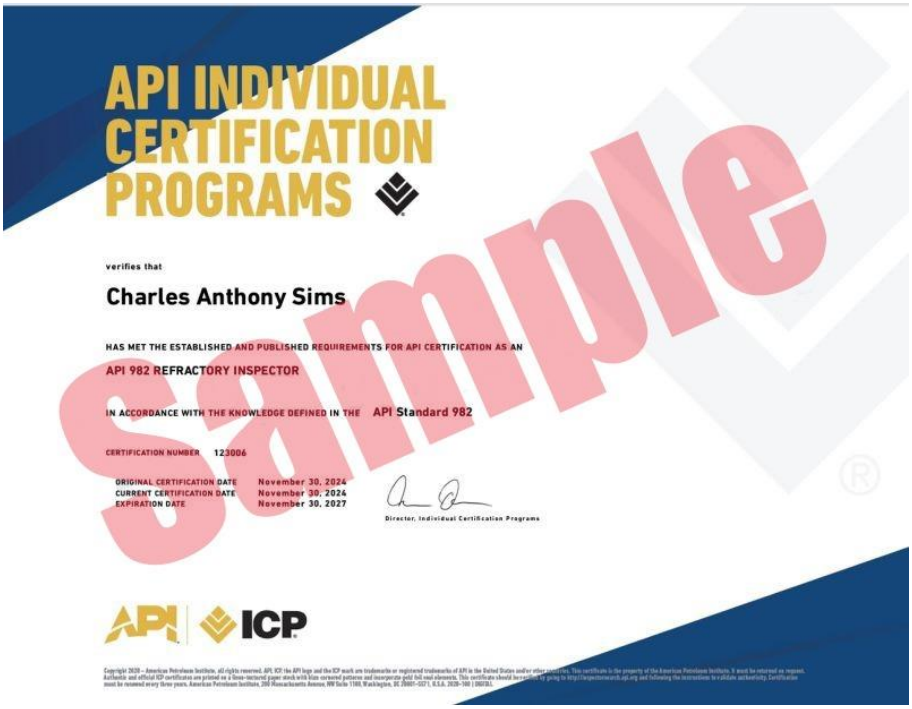
API Publications

- **API RP 982,** *Inspection and Assessment of Refractory Linings,* **1st edition, October 2023**
- **API Standard 560,** *Fired Heaters for General Refinery Service*, **5th edition, February 2016 with Addendum 1 (May 2021)**, Section 11 only
- **API Publication 935,** *Thermal Conductivity Measurement Study of Refractory Castables,* **1st edition, September 1999**
- **API Technical Report 977,** *ASTM C704 Test Variability Reduced to Allow Further Optimization of Erosion-resistant Refractories for Critical Oil Refining Applications*, **1st edition, February 2018**
- **API Technical Report 978**, *Monolithic Refractories: Manufacture, Properties, and Selection*, **1st edition, March 2019**
- **API Technical Report 979**, *Applications of Refractory Lining Materials*, **1st edition, October 2018**
- **API Technical Report 980**, *Monolithic Refractories: Installation and Dryout*, **1st edition, April 2018**
- **API Technical Report 981**, *Thermal Expansion Under Load and Creep of Refractories - An Evaluation and Comparison of Testing Methods*, **1st edition, March 2021**

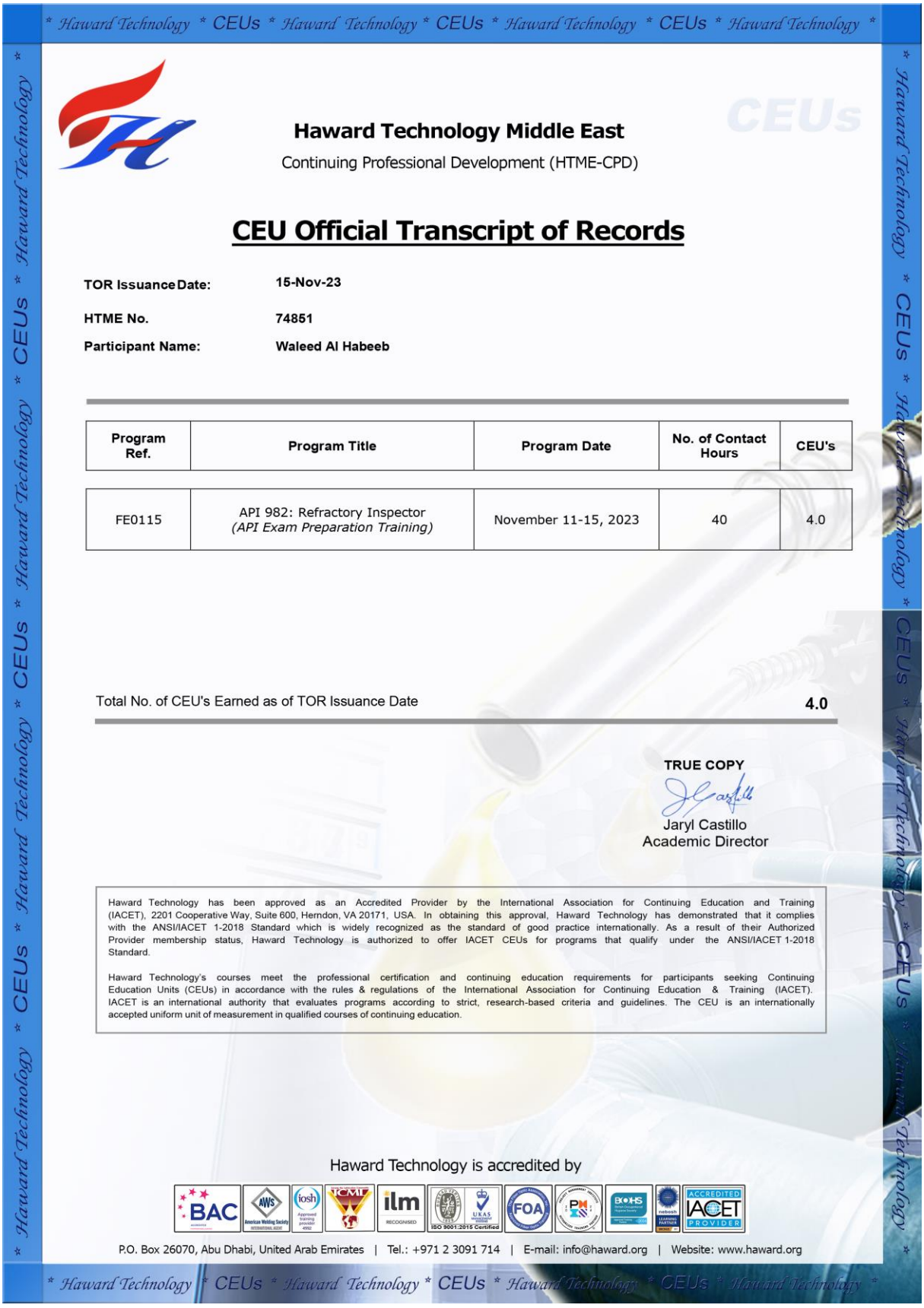
Note: **API and ASME publications are copyrighted material. Photocopies of API and ASME publications are not permitted.**

API Certificate(s)

(1) API-982 certificate will be issued to participants who have successfully passed the API-982 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: 15-Nov-23

HTME No. 74851

Participant Name: Waleed Al Habeeb

Program Ref.	Program Title	Program Date	No. of Contact Hours	CEU's
FE0115	API 982: Refractory Inspector *(API Exam Preparation Training)*	November 11-15, 2023	40	4.0

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

TRUE COPY

Jaryl Castillo
Academic Director

Haward Technology has been approved as an Accredited Provider by the International Association for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this approval, Haward Technology has demonstrated that it complies with the ANSI/IACET 1-2018 Standard which is widely recognized as the standard of good practice internationally. As a result of their Authorized 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) in accordance with the rules & regulations of the International Association 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 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:-

- 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. 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 **Refractory Inspection**, **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**'**s** and **Bachelor**'**s** degree in **Engineering** from the **North Texas University** and **University of Dallas** respectively. He is **certified** as an **API 936 Refractory Personnel, a Certified API 982 Refractory Inspector** 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

US$ 7,500 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Exam Fees

US$ 970 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: ***Sunday, 14th of September 2025***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0900	***PRE-TEST***
0900 – 0930	***Introduction to Refractories & their Applications*** *Definition and Classification of Refractory Materials • Importance of Refractory Lining in Refining and Petrochemical Industries • High-Temperature Applications and Challenges • Overview of Monolithic versus Brick Refractories*
0930 – 1000	***API RP 982 - Inspection & Assessment of Refractory Linings*** *Purpose and Scope of API RP 982 • Key Definitions and Terminologies • General Guidelines for Refractory Inspection • Assessment of Refractory Damage and Degradation*
1000 – 1015	*Break*
1015 – 1045	***API Standard 560 – Fired Heaters for General Refinery Service (Section 11)*** *Overview of API 560 and Its Relevance to Refractory Linings • Inspection and Maintenance Requirements for Fired Heaters • Material Selection for Refractory Linings in Heaters • Common Refractory Issues in Fired Heaters*
1045 – 1230	***API Publication 935 - Thermal Conductivity Measurement of Refractory Castables*** *Introduction to Thermal Conductivity in Refractory Selection • Key Findings from API 935 Publication • Methods for Measuring Thermal Conductivity • Impact of Thermal Conductivity on Refractory Performance*
1230 – 1330	*Lunch*
1330 – 1500	***Types of Refractory Materials & Their Selection Criteria*** *Acidic, Basic, and Neutral Refractories • Factors Affecting Refractory Selection (Temperature, Chemical Exposure, Mechanical Stress) • Importance of Thermal Shock Resistance and Creep Resistance • Case Studies on Refractory Selection for Refinery Applications*
1500 – 1515	*Break*
1515 – 1645	***Refractory Installation & Inspection Safety*** *PPE and Safety Measures for Refractory Work • Handling and Storage of Refractory Materials • Hazards in Refractory Installation and Inspection • Safety Standards and Best Practices in the Industry*
1645 – 1700	***Distribute Homework & Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1700	*End of Day One*

Day 2: ***Monday, 15th of September 2025***

0730 – 0800	***Review of Day 1 & Homework Answers***
0800 – 0830	***API TR 977 - ASTM C704 Test Variability for Erosion Resistance*** *Purpose of API TR 977 • Importance of Erosion Resistance in Refining Applications • ASTM C704 Testing Procedures and Variability Considerations • Optimization of Erosion-Resistant Refractories*

0830 - 0930	***API TR 978 - Monolithic Refractories: Manufacture, Properties & Selection*** *Introduction to Monolithic Refractory Manufacturing • Properties of Castables, Plastics, Ramming Mixes, Gunning Mixes • Selection of Monolithic Refractories for Different Applications • Impact of Formulation on Performance and Durability*
0930 – 0945	*Break*
0945 – 1230	***Common Damage Mechanisms in Refractory Linings*** *Thermal Shock and Spalling • Erosion and Abrasion • Chemical Attack and Corrosion • Mechanical Failure and Creep Deformation*
1230 – 1330	*Lunch*
1330 – 1515	***API TR 980 - Monolithic Refractories: Installation & Dryout*** *Best Practices for Installation of Monolithic Refractories • Curing and Dryout Procedures • Factors Affecting Dryout Performance • Case Studies on Failed Refractory Installations*
1515 – 1530	*Break*
1530 – 1600	***API TR 981 - Thermal Expansion & Creep of Refractories*** *Basics of Thermal Expansion Under Load (TEUL) • Creep Resistance of Refractory Materials • Comparison of Testing Methods • Evaluation of Performance Based on API TR 981 Studies*
1600 - 1645	***Non-Destructive Testing (NDT) Methods for Refractory Inspection*** *Visual Inspection Techniques • Ultrasonic Testing for Refractory Thickness Measurement • Infrared Thermography for Detecting Hot Spots • Acoustic Emission Testing for Crack Detection*
1645 – 1700	***Distribute Homework & Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1700	*End of Day Two*

Day 3: ***Tuesday, 16th September 2025***

0730 – 0800	***Review of Day 2 & Homework Answers***
0800 - 0830	***API TR 979 - Applications of Refractory Lining Materials*** *Overview of Refractory Applications in Refining and Petrochemicals • Case Studies of Different Refractory Lining Materials • Performance Evaluation of Refractory Systems • Material Failures and Lessons Learned*
0830 - 0930	***Inspection Techniques for Different Types of Refractory Linings*** *Inspection of Castable Refractories • Inspection of Brick Refractory Linings • Inspection of Ceramic Fiber Linings • Inspection Criteria for Different Failure Modes*
0930 – 0945	*Break*
0945 – 1130	***Refractory Testing Standards & Laboratory Evaluation*** *ASTM and API Standards for Refractory Testing • Compressive Strength and Flexural Strength Testing • Thermal Conductivity and Expansion Testing • Erosion Resistance and Slag Resistance Testing*
1130 - 1230	***Best Practices for Refractory Maintenance & Repair*** *Routine Maintenance of Refractory Linings • Repair Techniques for Common Refractory Damages • Use of Refractory Anchors and Patching Methods • Importance of Proper Shutdown Procedures*
1230 – 1330	*Lunch*
1330 – 1515	***Case Studies on Refractory Failures*** *Analysis of Real-World Refractory Failures • Root Cause Analysis Techniques • Lessons Learned from Major Refinery Incidents • Strategies for Improving Refractory Life Cycle*

1515 – 1530	*Break*
1530 – 1645	***Refractory Lining Inspection in High-Temperature Units*** *Inspection of Refractory in FCC Units • Inspection in Reformers and Furnaces • Inspection of Incinerators and Thermal Oxidizers • Inspection Challenges in High-Temperature Environments*
1645 – 1700	***Distribute Homework & Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1700	*End of Day Three*

Day 4: Wednesday, 17th of September 2025

0730 – 0800	***Review of Day 3 & Homework Answers***
0800 – 0930	***Advanced Refractory Installation Methods*** *Gunning and Shotcreting Techniques • Vibrating Castables and Self-Flowing Castables • Use of Refractory Anchors and Expansion Joints • Quality Control Measures During Installation*
0930 – 0945	*Break*
0945 – 1130	***Failure Analysis & Troubleshooting of Refractories*** *Identifying Root Causes of Refractory Failures • Troubleshooting Techniques for Common Issues • Preventive Measures to Avoid Premature Failures • Documentation and Reporting of Refractory Failures*
1130 - 1230	***API Refractory Standards: Comparison & Applications*** *Comparison of API Refractory Standards • Application of API 560, 982, 935, and Related Standards • Integration of Standards in Inspection and Maintenance Programs • Compliance with Industry Regulations and Best Practices*
1230 – 1330	*Lunch*
1330 – 1515	***Refractory Materials for High-Performance Applications*** *Refractories for Hydrogen Reformers • Refractories for Ethylene Crackers • Refractories for Catalytic Cracking Units • Case Studies of High-Performance Applications*
1515 – 1530	*Break*
1530 – 1630	***Role of Refractory in Energy Efficiency & Heat Loss Reduction*** *Heat Transfer in Refractory Systems • Insulating vs. Dense Refractories • Reducing Heat Loss through Effective Refractory Design • Economic Benefits of Refractory Optimization*
1645 – 1700	***Distribute Homework & Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1700	*End of Day Four*

Day 5: Thursday, 18th of September 2025

0730 – 0830	***Review of Day 4 & Homework Answers***
0830 – 1000	***Documentation & Quality Assurance in Refractory Inspection*** *Importance of Record-Keeping in Refractory Inspection • API Requirements for Documentation • Quality Assurance Programs for Refractory Installations • Inspection Reports and Compliance Checklists*
1000 - 1015	*Break*
1130 – 1230	***Hands-On Inspection of Refractory Lining*** *Field Inspection Techniques • Using Inspection Tools and Equipment • Identifying Common Defects in Refractory Linings • Hands-On Exercises and Demonstrations*

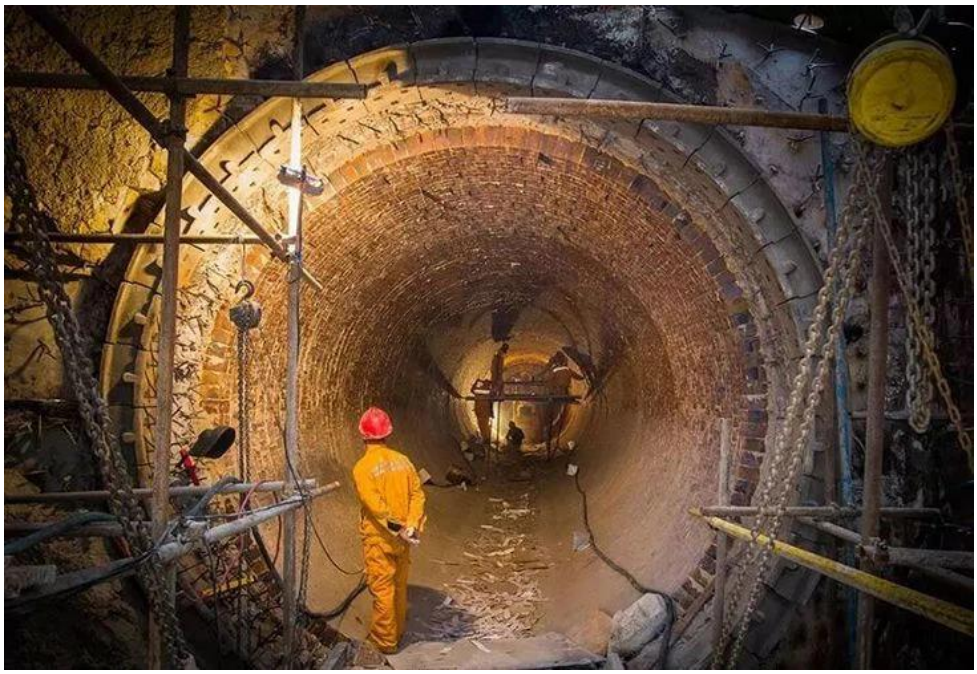
1230 – 1330	*Lunch*
1330 – 1515	***Mock Refractory Inspection & Report Writing*** *Conducting a Complete Refractory Inspection • Preparing an Inspection Report • Identifying Corrective Actions • Review and Discussion of Findings*
1515 - 1530	*Break*
1530 - 1615	***Refractory Performance Optimization Strategies*** *Improving Refractory Durability and Lifespan • Selection of Advanced Materials for Specific Applications • Optimizing Installation Techniques for Better Performance • Reducing Downtime Through Proactive Maintenance*
1615 – 1630	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Cou that were Covered During the Course*
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 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

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