COURSE OVERVIEW PE0201
Hot Oil System Startup, Shutdown, Normal Operations and Troubleshooting

Course Title
Hot Oil System Startup, Shutdown, Normal Operations and Troubleshooting

Course Date/Venue
Session 1: April 07-11, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
Session 2: August 31-September 04, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Course Reference
PE0201

Course Duration/Credits
Five days/3.0 CEUs/30 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 Hot Oil System Startup, Shutdown, Normal Operations and Troubleshooting. It covers the importance of hot oil systems in petroleum operations; the applications in heating processes, reactors, and distillation units; the components of a hot oil system and heat transfer fluids (HTF) and their properties; the heat transfer mechanisms, efficiency considerations and safety considerations in hot oil systems; and the routine inspection and preventive maintenance as well as pre-startup inspection and system readiness checks.

Further, the course will also discuss the startup procedure for hot oil systems; the heat transfer fluid circulation and flow control; the normal operating conditions and performance monitoring; the energy efficiency and optimization in hot oil systems; the process control and automation, normal shutdown procedures, emergency shutdown procedures and safety response; troubleshooting hot oil pump failures and identifying fluid degradation and contamination issues; the heat exchanger fouling and performance issues; and identifying and addressing pipe and valve leaks.

During this interactive course, participants will learn to diagnose overheating and hot spots in the system; address low heat transfer efficiency and identify and resolve pressurization problems; apply process optimization for improved reliability; interpret regulatory compliance and environmental considerations; troubleshoot common hot oil system issues; and apply maintenance planning and best practices.

Course Objectives

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

- Apply and gain an in-depth knowledge on hot oil system startup, shutdown, normal operations and troubleshooting
- Discuss the importance of hot oil systems in petroleum operations and the applications in heating processes, reactors, and distillation units
- Identify the components of a hot oil system and heat transfer fluids (HTF) and their properties
- Explain heat transfer mechanisms, efficiency considerations and safety considerations in hot oil systems
- Carryout routine inspection and preventive maintenance as well as pre-startup inspection and system readiness checks
- Employ startup procedure for hot oil systems and illustrate heat transfer fluid circulation and flow control
- Apply normal operating conditions and performance monitoring including energy efficiency and optimization in hot oil systems
- Illustrate process control and automation, normal shutdown procedures, emergency shutdown procedures and safety response
- Troubleshoot hot oil pump failures and identify fluid degradation and contamination issues and heat exchanger fouling and performance issues
- Identify and address pipe and valve leaks and diagnose overheating and hot spots in the system
- Address low heat transfer efficiency and identify and resolve pressurization problems
- Apply process optimization for improved reliability and discuss regulatory compliance and environmental considerations
- Troubleshoot common hot oil system issues and apply maintenance planning and best practices

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 hot oil system startup, shutdown, normal operations and troubleshooting for, operators and technicians, maintenance personnel, engineers (process, mechanical, or electrical), safety officers or HSE (health, safety, and environment) personnel, supervisors and managers, quality assurance/control personnel, contractors or third-party service providers, training coordinators and other technical staff.

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.

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. Kyle Bester is a **Process Engineer and Senior HSE Consultant** with extensive years of practical experience within the **Oil & Gas**, **Power & Water Utilities** and other **Energy** sectors. His expertise includes **Troubleshooting Gas Processing**, **Ammonia Manufacturing & Process Troubleshooting**, **Ammonia Storage & Loading** Systems, **Ammonia Plant** Operation, Troubleshooting & Optimization, **Gas Removal**, **Amine Regeneration**, **Amine & Gas** Dehydration, **Molecular Sieves**, **NGL Recovery**, **LPG Distillation**, **Gas Processing**, **Furnaces**, **Waste Heat Recovery**, **Process** Troubleshooting, **Gas** Compression & Expansion, **Process Liquid**, **Process Handling** & **Measuring Equipment**, **Gas Dehydration**, **Gas Separation**, **Distillation Processes**, Safety in Industrial Plants, **Rigging** Safety Rules, Machinery & Hydraulic **Lifting Equipment**, Handling **Hazardous Chemicals**, Spill Containment, **Fire** Protection, **Fire** Precautions, **Incidents & Accidents** Reporting, **HSEQ** Audits & Inspection, **HAZOP & HAZID**, **HAZMAT & HAZCOM** Storage & Disposal, As Low as Reasonably Practicable (**ALARP**), Process Hazard Analysis (**PHA**), Process Safety Management (**PSM**), **Hazardous Materials & Chemicals** Handling, **Pollution Control**, **Environment, Health & Safety** Management, **Process Risk** Analysis, Effective Tool Box Talks, Construction Sites Safety, **HSSE Management** System, **HSSE Audit & Inspection**, **HSEQ Procedures**, **Authorized Gas** Testing, **Confined Space Entry & Rescue**, **Risk** Management, **Quantitative & Qualitative Risk** Assessment, **Working at Height**, **Firefighting** Techniques, **Fire** & **Gas** Detection System, **Fire Fighter & Fire** Rescue, **Fire Risk** Assessment, **HSE Industrial Practices**, **Manual Handling**, **Rigging Safety Rules**, **Machinery & Hydraulic Lifting Equipment**, **Warehouse Incidents & Accidents Reporting**, **Incident & Accident Investigation**, **Emergency Planning**, **Emergency Response & Crisis** Management Operations, **Waste Management** Monitoring, **Root Cause Analysis**, Hazard & Risk Assessment, Task Risk Assessment (**TRA**), **Incident Command**, Job Safety Analysis (**JSA**), Behavioral Based Safety (**BBS**), **Fall Protection** and **Work Permit & First Aid**. He is currently the **Part Owner & Manager** of Extreme Water SA wherein he manages, re-designed and commissioned a water and wastewater treatment plants.

During his career life, Mr. Bester has gained his practical and field experience through his various significant positions and dedication as the **Project Manager**, **Asset Manager**, **Manager**, **Water Engineer**, **HSE Advisor**, **Safety Engineer**, **Supervisor**, **Team Leader**, **Analyst**, **Process Technician**, **Landscape Designer** and **Senior Instructor/Trainer** for various international companies, infrastructures, water and wastewater treatment plants from New Zealand, UK, Samoa, Zimbabwe and South Africa, just to name a few.

Mr. Bester holds a **Diploma** in **Wastewater Treatment** and a **National Certificate** in **Wastewater & Water Treatment**. Further, he is a **Certified Instructor/Trainer**, an **Approved Chemical Handler** and has delivered numerous courses, trainings, conferences, seminars and workshops internationally.

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$ 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.

Accommodation

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

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the workshop 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 – 0930	***Introduction to Hot Oil Systems*** *Definition & Importance of Hot Oil Systems in Petroleum Operations • Applications in Heating Processes, Reactors, & Distillation Units • Comparison with other Heating Methods (Steam, Electrical, etc.) • Hot Oil System Applications*
0930 – 0945	*Break*
0945 – 1030	***Components of a Hot Oil System*** *Hot Oil Heaters & Fired Heat Exchangers • Pumps & Circulation Systems • Expansion Tanks & Pressure Relief Systems • Control Valves & Instrumentation*
1030 – 1130	***Heat Transfer Fluids (HTF) & Their Properties*** *Types of Heat Transfer Fluids (Synthetic versus Mineral-Based) • Thermal Stability & Degradation Risks • Impact of Temperature & Pressure on Fluid Performance • Selection Criteria for Different Operating Conditions*
1130 – 1215	***Design & Operating Principles of Hot Oil Systems*** *Heat Transfer Mechanisms & Efficiency Considerations • Temperature & flow Control in Closed-Loop Systems • System Expansion & Pressure Compensation Principles • Insulation & Heat Retention Strategies*
1215 – 1230	*Break*
1230 – 1330	***Safety Considerations in Hot Oil Systems*** *Fire Hazards & Prevention Measures • Pressure Relief & Over-Temperature Protection • Personal Protective Equipment (PPE) & Handling Precautions • Safety Regulations & Industry Best Practices*

1330 – 1420	***Routine Inspection & Preventive Maintenance Overview*** *Importance of Preventive Maintenance • Daily, Weekly, & Monthly Inspection Schedules • Early Detection of Leaks & Thermal Degradation • Role of Condition Monitoring & Predictive Maintenance*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day One*

Day 2

0730 – 0830	***Pre-Startup Inspection & System Readiness Checks*** *Verifying Fluid Levels in Expansion Tanks • Checking Pump Operation & Pressure Settings • Inspecting Heat Exchangers & System Integrity • Ensuring Proper Valve Alignment & Instrument Calibration*
0830 – 0930	***Startup Procedure for Hot Oil Systems*** *Step-by-Step Startup Sequence • Gradual Temperature Increase & Thermal Expansion Management • Pump Priming & Flow Stabilization • System Pressure & Temperature Monitoring*
0930 – 0945	*Break*
0945 – 1100	***Heat Transfer Fluid Circulation & Flow Control*** *Maintaining Proper Fluid Velocity & Heat Distribution • Preventing Stagnant Zones & Thermal Degradation • Managing Differential Pressure in Heat Exchangers • Troubleshooting Flow Rate Imbalances*
1100 – 1215	***Normal Operating Conditions & Performance Monitoring*** *Monitoring Temperature & Pressure Trends • Ensuring Consistent Heat Transfer Efficiency • Identifying Early Signs of System Inefficiencies • Data Logging & Trend Analysis for Predictive Maintenance*
1215 – 1230	*Break*
1230 – 1330	***Energy Efficiency & Optimization in Hot Oil Systems*** *Heat Recovery & System Insulation Strategies • Minimizing Heat Losses in Pipelines & Storage Tanks • Process Control Adjustments for Energy Savings • Case Studies on System Optimization in Operations*
1330 – 1420	***Process Control & Automation in Hot Oil Systems*** *Use of Distributed Control Systems (DCS) for Monitoring • Remote Control & Automated Safety Shutdowns • PID Controllers for Temperature & Flow Regulation • Alarm Handling & Operator Response Procedures*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Two*

Day 3

0730 – 0830	***Normal Shutdown Procedures for Hot Oil Systems*** *Controlled Temperature Reduction Before Shutdown • Gradual Pressure Release & Pump Deceleration • Securing Expansion Tanks & Fluid Containment • Lockout/Tagout (LOTO) Procedures for Maintenance*
0830 – 0930	***Emergency Shutdown Procedures & Safety Response*** *Identifying Emergency Shutdown Scenarios • Rapid Depressurization & Temperature Control Measures • Fire & Leak Response Procedures • Restarting Procedures After Emergency Shutdown*

0930 – 0945	*Break*
0945 – 1100	***Troubleshooting Hot Oil Pump Failures*** *Identifying Symptoms of Pump Cavitation • Diagnosing Mechanical Seal Failures & Leaks • Addressing Flow Rate Inconsistencies & Blockages • Pump Maintenance & Repair Best Practices*
1100 – 1215	***Fluid Degradation & Contamination Issues*** *Causes & Symptoms of Heat Transfer Fluid Breakdown • Detecting & Mitigating Sludge Formation • Filtration & Fluid Purification Techniques • Best Practices for Fluid Sampling & Analysis*
1215 – 1230	*Break*
1230 – 1330	***Heat Exchanger Fouling & Performance Issues*** *Causes of Fouling in Hot Oil Heat Exchangers • Identifying Loss of Heat Transfer Efficiency • Cleaning & Descaling Procedures • Preventive Maintenance Strategies for Heat Exchangers*
1330 – 1420	***Identifying & Addressing Pipe & Valve Leaks*** *Detecting leaks in High-Temperature Pipelines • Effects of Thermal Expansion on Pipeline Integrity • Repair Techniques for Minor & Major Leaks • Selecting Proper Gasket & Sealing Materials*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Three*

Day 4

0730 – 0830	***Diagnosing Overheating & Hot Spots in the System*** *Causes of Localized Overheating • Effects of Excessive Temperature on System Integrity • Correcting Flow Imbalances & Pressure Variations • Case Study on Resolving Overheating Issues*
0830 – 0930	***Addressing Low Heat Transfer Efficiency*** *Identifying Underperforming Heat Exchangers • Adjusting Flow Rates & Temperature Setpoints • Using Additives & Chemical Treatments for Efficiency • Monitoring & Optimizing Heat Exchanger Effectiveness*
0930 – 0945	*Break*
0945 – 1130	***Pressure Control & Expansion Tank Issues*** *Role of Expansion Tanks in Pressure Stabilization • Identifying & Resolving Pressurization Problems • Effects of Thermal Expansion on System Performance • Best Practices for Expansion Tank Maintenance*
1130 – 1300	***Process Optimization for Improved Reliability*** *Reducing Fluid Degradation & Extending Fluid Life • Enhancing Safety through Improved Automation • Optimizing Circulation & Heat Exchanger Performance • Implementing Best Practices for Extended System Reliability*
1300 – 1315	*Break*
1315 – 1420	***Regulatory Compliance & Environmental Considerations*** *Safety & Environmental Regulations • Managing Hot Oil Disposal & Replacement Strategies • Reducing Emissions & Waste Heat Generation • Case Studies on Sustainable Hot Oil System Operation*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Four*

Day 5

0730 – 0830	***Case Studies on Advanced Troubleshooting*** *Real-World Examples of System Failures & Resolutions • Lessons Learned from Past Incidents • Best Practices for Improving system Uptime • Future Trends in Hot Oil System Technology*
0830 – 0930	***Startup & Shutdown Procedures*** *Simulating Controlled Startup of a Hot Oil System •Identifying Operational Issues During Startup • Step-by-Step Guided Shutdown Exercise • Operator Role in Emergency Shutdown Scenarios*
0930 – 0945	*Break*
0945 – 1100	***Hot Oil System Monitoring & Control*** *Using Real-Time monitoring tools • Adjusting Process Parameters for Optimal Performance • Detecting & Responding to Abnormal Conditions • Troubleshooting Pressure & Temperature Anomalies*
1100 – 1230	***Troubleshooting Common Hot Oil System Issues*** *Diagnosing Leaks & Pressure Loss • Identifying & Fixing Pump Cavitation Issues • Addressing Heat Exchanger Fouling in Real-Time Scenarios • Fluid Contamination Detection & Mitigation*
1230 – 1245	*Break*
1245 – 1345	***Maintenance Planning & Best Practices*** *Creating a Preventive Maintenance Schedule • Conducting Fluid Analysis & System Inspections • Effective Record-Keeping & Maintenance Tracking*
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Practical Sessions

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

Course Coordinator

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