

COURSE OVERVIEW ME0662
Flowserve Pump: Maintenance & Troubleshooting

Course Title

Flowserve Pump: Maintenance & Troubleshooting

Course Date/Venue

Session 1: May 12-16, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
 Session 2: November 02-06, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE



Course Reference

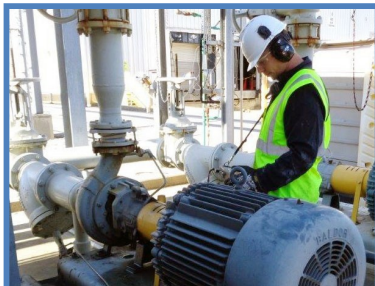
ME0662



Course Duration/Credits

Five days/3.0 CEUs/30 PDHs

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.

Centrifugal pumps have been used in industry for a hundred and fifty years or more. They are used to convert the energy from the pump driver to kinetic and potential energy into the fluid, via the impeller.



This course is designed to provide the participants with an up-to-date knowledge on pumps maintenance and overhauling. It covers the operation and maintenance of Flowserve booster pump; the various types of pumps and the principle of operation, seals and lubrication and the major components of Flowserve booster pumps.



The course will also cover the application of methods, general recommendations and lubrication management; the quantity and quality of Flowserve booster pump lubrication; the Flowserve booster pump mechanical seals and performance; the assessment of flowserve booster pump; and the operation and maintenance that includes inspection and testing, troubleshooting turbine pump problems, do's and don't's of booster pump, best practices in operation and maintenance, booster pump failure analysis and predictive maintenance.

Course Objectives

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

- Operate and maintain flowserve booster pump in a professional manner
- Identify various types of pump and discuss the principle of operation, seals and lubrication and major components of Flowserve booster pump
- Apply the methods, general recommendations and lubrication management and recognize the quantity and quality of Flowserve booster pump lubrication
- Discuss Flowserve booster pump mechanical seals and performance
- Assess, operate, maintain and troubleshoot Flowserve booster pump efficiently

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 flow serve MOL pumps maintenance and overhauling for maintenance team.

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 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: -

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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.

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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. Andrew Ladwig is a **Senior Process & Mechanical Engineer** with over **25 years** of extensive experience within the **Oil & Gas, Refinery, Petrochemical & Power** industries. His expertise widely covers in the areas of **Ammonia Manufacturing & Process Troubleshooting, Distillation Towers, Crude Oil Distillation, Fundamentals of Distillation** for Engineers, **Distillation Operation and Troubleshooting, Advanced Distillation Troubleshooting, Distillation Technology, Vacuum Distillation, Ammonia Storage & Loading Systems, Ammonia Plant Operation, Troubleshooting & Optimization, Ammonia Recovery, Ammonia Plant Safety, Hazard of Ammonia Handling, Storage & Shipping, Operational Excellence in Ammonia Plants, Fertilizer Storage Management (Ammonia & Urea), Fertilizer Manufacturing Process Technology, Sulphur Recovery, Phenol Recovery & Extraction, Wax Sweating & Blending, Petrochemical & Fertilizer Plants, Nitrogen Fertilizer Production, Petroleum Industry Process Engineering, Refining Process & Petroleum Products, Refinery Planning & Economics, Safe Refinery Operations, Hydrotreating & Hydro-processing, Separators in Oil & Gas Industry, Gas Testing & Energy Isolations, Gas Liquor Separation, Industrial Liquid Mixing, Wax Bleachers, Extractors, Fractionation, Operation & Control of Distillation, Process of Crude ATM & Vacuum Distillation Unit, Water Purification, Water Transport & Distribution, Steam & Electricity, Flame Arrestors, Coal Processing, Environmental Emission Control, R&D of Wax Blending, Wax Molding/Slabbing, Industrial Drying, Principles, Selection & Design, Process Safety Design, Certified Process Plant Operations, Control & Troubleshooting, Operator Responsibilities, Storage Tanks Operations & Measurements, Tank Design, Construction, Inspection & Maintenance, Atmospheric Tanks, Process Plant Troubleshooting & Engineering Problem Solving, Process Plant Performance, Efficiency & Optimization, Continuous Improvement & Benchmarking, Process Troubleshooting Techniques, Oil & Gas Operation/Introduction to Surface Facilities, Pressure Vessel Operation, Plant & Equipment Integrity, Process Equipment Performance & Troubleshooting, Plant Startup & Shutdown, Startup & Shutdown the Plant While Handling Abnormal Conditions, Flare & Relief System, Process Gas Plant Start-up, Commissioning & Problem Solving, Process Liquid and Process Handling & Measuring Equipment. Further, he is also well-versed in **Compressors & Turbines** Operation, Maintenance & Troubleshooting, **Heat Exchanger** Overhaul & Testing Techniques, Balancing of **Rotating Machinery (BRM)**, **Pipe Stress** Analysis, **Valves & Actuators** Technology, Inspect & Maintain **Safeguarding Vent & Relief System**, Certified Inspectors for **Vehicle & Equipment**, Optimizing **Equipment Maintenance** & Replacement Decisions, Certified Maintenance Planner (**CMP**), Certified Planning and Scheduling Professional (**AACE-PSP**), **Material Cataloguing**, Specifications, Handling & Storage, **Steam Trap** Design, Operation, Maintenance & Troubleshooting, **Steam Trapping & Control, Column, Pump** Technology, **Pump** Selection & Installation, **Centrifugal Pumps** Troubleshooting, **Pumps** Design, Selection & Operation, **Pump & Exchangers**, Troubleshooting & Design, **Rotating Equipment** Operation & Troubleshooting, **Control & ESD** System, **Detailed Engineering Drawings**, Codes & Standards, **Budget** Preparation, Allocation & Cost Control, Root Cause Analysis (**RCA**), **Production Optimization**, Permit to Work (**PTW**), Project Engineering, **Data** Analysis, **Process Hazard** Analysis (**PHA**), **HAZOP** Study, Sampling & Analysis, **Training** Analysis, **Job** Analysis Techniques, Storage & Handling of **Toxic Chemicals & Hazardous Materials, Hazardous Material** Classification & Storage/Disposal, **Dangerous Goods**, Environmental Management System (**EMS**), Supply Chain, Purchasing, Procurement, **Logistics** Management & **Transport & Warehousing & Inventory, Risk** Monitoring Authorized Gas Tester (**AGT**), Confined Space Entry (**CSE**), Personal Protective Equipment (**PPE**), Fire & Gas, First Aid and Occupational Health & Safety.**

During his career life, Mr. Ladwig has gained his practical experience through his various significant positions and dedication as the **Mechanical Engineer, Project Engineer, Reliability & Maintenance Engineer, Maintenance Support Engineer, Process Engineer, HSE Supervisor, Warehouse Manager, Quality Manager, Business Analyst, Senior Process Controller, Process Controller, Safety Officer, Mechanical Technician, Senior Lecturer** and **Senior Consultant/Trainer** for various companies such as the Sasol Ltd., Sasol Wax, Sasol Synfuels, just to name a few.

Mr. Ladwig has a **Bachelor's** degree in **Chemical Engineering** and a **Diploma in Mechanical Engineering**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management (ILM)** and has delivered various trainings, workshops, seminars, courses and conferences internationally.

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	<i>Registration & Coffee</i>
0800 – 0815	<i>Welcome & Introduction</i>
0815 – 0830	PRE-TEST
0830 – 0930	Pump Types
0930 – 0945	<i>Break</i>
0945 – 1100	Flowserve Booster Pump Principle of Operation
1110 – 1230	Flowserve Booster Pump Principle of Operation (cont'd)
1230 – 1345	<i>Break</i>
1245 – 1420	Seals & Lubrication Overview
1420 – 1430	Recap
1430	<i>Lunch & End of Day One</i>

Day 2

0730 – 0930	Flowserve Booster Pump Major Components <i>Impellers • Piping Distribution System • Driving & Couplings</i>
0930 – 0945	<i>Break</i>
0945 – 1100	Flowserve Booster Pump Major Components (cont'd) <i>Instrumentation & Control • Variation of Flowserve Booster Pump</i>
1100 – 1215	Flowserve Booster Pump Lubrication <i>Methods of Lubrication • Quantity of Lubrication</i>
1215 – 1230	<i>Break</i>
1230 – 1420	Flowserve Booster Pump Lubrication (cont'd) <i>Quality of Lubrication • Lubrication Management • General Recommendations</i>
1420 – 1430	Recap
1430	<i>Lunch & End of Day Two</i>

Day 3

0730 – 0930	Flowserve Booster Pump Mechanical Seals <i>Seal Leakage • Dynamic Secondary Seal • Static Secondary Seal</i>
0930 – 0945	<i>Break</i>
0945 – 1100	Flowserve Booster Pump Mechanical Seals (cont'd) <i>Seal Covers • Construction of Mechanical Seals • Mechanical Seals Piping Plans</i>
1100 – 1215	Flowserve Booster Pump Performance <i>Performance Curves</i>
1215 – 1230	<i>Break</i>
1230 – 1420	Assessment of Flowserve Booster Pump
1420 – 1430	Recap
1430	<i>Lunch & End of Day Three</i>

Day 4

0730 – 0930	Flowserve Booster Pump Operation <i>Start & Stop Procedures • Cavitations</i>
0930 – 0945	<i>Break</i>
0945 – 1100	Flowserve Booster Pump Operation (cont'd) <i>Priming • Spare Booster Pump Operation</i>

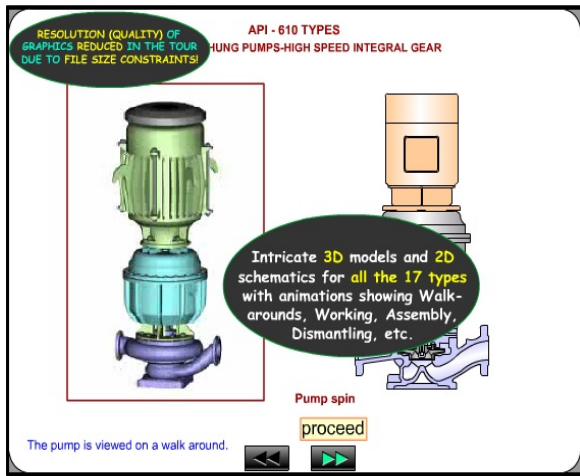
1100 – 1215	Flowserve Booster Pump Maintenance <i>Inspection & Testing • Basic Turbine Pump Spares • Troubleshooting Turbine Pump Problems</i>
1215 – 1230	<i>Break</i>
1230 – 1420	Flowserve Booster Pump Maintenance (cont'd) <i>Maintenance Chart • Do's & Don'ts of Booster Pump</i>
1420 – 1430	Recap
1430	<i>Lunch & End of Day Four</i>

Day 5

0730 – 0930	Flowserve Booster Pump Operation (cont'd) <i>Best Practices in Operation & Maintenance of Booster Pump</i>
0930 – 0945	<i>Break</i>
0945 – 1100	Flowserve Booster Pump Maintenance(cont'd) <i>Booster Pump Failure Analysis</i>
1100 – 1215	Flowserve Booster Pump Maintenance (cont'd) <i>Predictive Maintenance of Booster Pump</i>
1215 – 1230	<i>Break</i>
1230 – 1345	Flowserve Booster Pump Maintenance (cont'd) <i>Predictive Maintenance of Booster Pump (cont'd)</i>
1345 – 1400	Course Conclusion
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 sessions 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 simulator “Centrifugal Pumps and Troubleshooting Guide 3.0”.



Centrifugal Pumps and Troubleshooting Guide 3.0

Course Coordinator

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