



SERVICES AND SOLUTIONS

Flowserve Educational Services Course Catalog



Experience In Motion

Welcome to Flowserve Educational Services

Flowserve Educational Services provides companies around the world with a wide range of innovative programs focused on helping plant operators, reliability engineers and maintenance personnel deepen their understanding of pumping systems. Training programs from Flowserve are ideal for organizations aiming to achieve:

- Maximized plant asset availability and equipment reliability
- Increased mean time between repair (MTBR)
- Workforce development for increasing proficiency in the installation, maintenance, and repair of pumping equipment and systems

Flexible Programs to Meet Any Need

Whether customers require basic training or customized programs, Flowserve offers an unparalleled global network of training experts and facilities to accommodate any request. Customers can choose the location, course content, and program formats that optimize the use of human and financial resources and deliver the most effective results.

Learning Resource Centers (LRC)

Flowserve has committed to the construction and support of the pumping industry's largest and most sophisticated network of Learning Resource Centers. These state-of-the-art facilities ensure participants receive a balanced combination of hands-on training and operating theory.

On-site Customer Training

Flowserve Educational Services provides the design, development, and delivery of training tailored specifically around the people, equipment and processes at a customer's location. Unlike off-the-shelf solutions, trainers and instructional designers deliver individualized instruction on the concepts, processes and equipment needed to maximize employee performance in the customer's environment. To optimize the learning experience, on-site training is supported by use of remote hydraulic lab technology and portable acrylic pump systems.

Our Instructors

Some of the most respected experts in pumps, valves, and seals are on our instructional team, with more than 100 years of combined experience in all aspects of flow control, in every industry from water treatment to aerospace. Because of this breadth of experience, our trainers have dealt with many of the specific engineering, operational or mechanical problems you've experienced, and in most cases are able to recreate and then solve those problems in our unique, hands-on power labs. Whether it's at the Flowserve Learning Resource Center in Irving, Texas, at Flowserve locations around the world or on-site at your location, our instructors are dedicated to sharing their knowledge with you.

Proficiency

Flowserve proficiency recognizes that you have completed a specific training course and have attained a level of competence with the material. It also allows for a progression to higher proficiency levels as your expertise grows. Flowserve proficiency is offered in pumps, mechanical seals and pumping system analysis. The closed-book proficiency exams are given on the morning following the last class day. They contain about 60 questions and can take up to four hours. You must attain a grade of 80 percent to achieve proficiency at each level. Flowserve proficiency documents are presented to and remain with you. The documentation states the level of proficiency you have attained and the number of formal training hours dedicated to each class.

Educational Credits

For classes offered at Flowserve Learning Resource Centers, their successful completion and an 80% and above score on the exams will earn the participant Continuous Educational Units (CEU) or Professional Development Hours (PDH), respectively.

The educational credit certificate will be issued by McNeese State University.

Please read the following information before registering for any classes!

Available Course Offerings

Depending upon the role of the student, Flowserve offers courses ranging from those for the generalist to those who have obtained engineering degrees. A comprehensive catalog of technical and maintenance courses provides plant engineers, operators, reliability experts and maintenance technicians with the training they need on the equipment they use every day — on location or at Flowserve Learning Resource Centers.

Course Registration Process

1. Course Registration

For registrations, please visit:
academy.flowserve.com

- 1 Select the course you are interested in from the Course tab.
- 2 Select the location, date and number of attendees.
- 3 Click on **Purchase Now** and complete the checkout process.

Email assistance: esg@flowserve.com

2. Get Organized

Carefully review the course descriptions, which can also be obtained on our website in a more detailed format. If you review courses on the website, note that some are specifically designed for engineering, operations and maintenance personnel. Since some of the courses are similar, you may want to discuss your requirements with one of our training coordinators or staff members.



3. Verify the Prerequisites

Some courses have prerequisites listed in the Course Description. Please review them carefully. You must also have written and spoken command of the English language, unless an alternate language is listed.

4. Make Travel Arrangements

Once your registration is processed, you will receive an email notification of your class enrollment and location, along with pertinent travel details to and from that location.

Since accommodations fill up quickly during the spring and fall, we recommend that you book your hotel and airline reservations as early as possible. When making travel arrangements, please factor in your travel time to and from the airport to our training facility for departures and arrivals. Please check with your local training facility for information regarding departure arrangements. We appreciate your flexibility and recommend that you plan to remain at the course site until at least 4 p.m. If possible, please purchase refundable tickets, since course schedules sometimes change.

Learning Resource Center Locations and Contact Information

Dallas Learning Resource Center

4343 West Royal Lane
Suite 106
Irving, TX 75063 USA
Toll Free: +1 800 446 0401
Telephone: +1 972 915 1600

China Learning Resource Center

FSG Suzhou Manufacturing Plant
No. 26 Lisheng Road, Suzhou Industrial Park
Suzhou 215021, Jiangsu Province, P.R. China
Phone: +86 512 6255 2388
Fax: +86 512 6255 3702

Desio Learning Resource Center

Via Rossini, 90/92
20832 Desio (MB) Italy
Phone: +39 0362 612535
Fax: +39 0362 303396

Singapore Learning Resource Center

Flowserve Private Limited
10 Tuas Loop
Singapore 637345
Phone: +65 6771 0600, +65 6771 0632

LRC Cancellation Policy

If you need to cancel or reschedule your training, please call Educational Services at (800) 446-0401.

1. Cancellations or reschedules received with 15 business days or more before the scheduled class start date (weekends are not included) will be charged a 15% cancellation fee.*
2. Cancellations or reschedules received with 14 business days or less before the scheduled class start date (weekends are not included) will be charged a 25% cancellation fee* unless they are within 24 hours of the start time.
3. Cancellations or reschedules received with 24 hours of the scheduled class start time will be charged 100% of the registration cost.* In addition, students who do not show up for training will be charged 100% of the registration cost as well.*

* All fees with an asterisk (*) above do not qualify for a refund of the balance of the registration fee. If a student cancels and there is a balance due, the balance can ONLY be transferred to an upcoming course date or used as a credit for online training.

Payment and Cancellation Policy

Course payments should be made at the time of registration by credit card, company check or purchase order (purchase order number required).



BETWEEN BEARINGS PUMP REPAIR (BBPR) — INTERMEDIATE LEVEL

Course Description

An Intermediate Level course for maintenance staff.

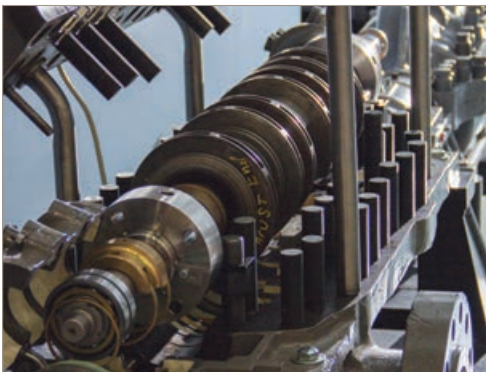
This course instructs participants on the proper procedures for the preparation, rigging, disassembly, inspection and failure analysis of between bearings centrifugal pumps. The pumps addressed include both horizontally and radially split pumps, i.e., BB1 through BB5 style of equipment.

Participants will practice disassembly of between bearings pumps and use inspection and failure analysis techniques that will enable them to diagnose, predict and prevent common problems associated with these pumps. They will also be instructed in the proper installation of mechanical seals, rotor assemblies and various bearing arrangements.

Class time is divided into 40% classroom-based lecture and 60% hands-on lab activities.

Audience

This course is for mechanics, millwrights and others who are responsible for maintaining between bearings pumps.



Course Objectives

During the course, the participants will:

- Discuss field and shop inspection of the pump and system components
- Practice disassembly and inspection procedures and best practices
- Document and analyze information gathered during disassembly and inspection
- Identify and discuss elimination of failure modes
- Review industry standards for component NDE and repair techniques
- Practice bearing and seal removal and installation
- Discuss industry standards and criteria for component balancing
- Reassemble pumps, with an emphasis on measuring and recoding critical dimensions and runouts

Prerequisites

Participants should be familiar with mechanical drawings and the use of hand tools and measurement devices. It is recommended that they have basic math skills and a knowledge of safe work practices. Completion of [Engineered Overhung Pump Repair](#) is helpful, but not required.

Personal Protective Equipment

Students are required to bring their own safety toe shoes. Safety glasses and gloves will be provided, but students may bring their own if desired.

Course Length

4 days.

CENTRIFUGAL PUMP FUNDAMENTALS (CPF) — INTERMEDIATE LEVEL

Course Description

An Intermediate Level course for engineers and experienced reliability staff. This course provides an in-depth understanding of centrifugal pump fundamentals. The course is designed to provide a detailed explanation of how a centrifugal pump is constructed and operated to achieve maximum reliability. Selecting the right pump for a specific application and identification of problems associated with pump operation are determined through the use of pump curves and hydraulic calculations.

Specific topics include:

- Introduction to Pump Terms and Definitions
- Basic Hydraulics
- Net Positive Suction Head (NPSH), Recirculation, Cavitation and Suction Conditions
- Specific Speed, Suction Specific Speed
- Performance Curves and Variable Operation
- Viscosity
- Centrifugal Pump Classification and Types
- Bearings and Lubrication

Audience

This course is intended for individuals in the following fields: applications engineering, reliability engineering and rotating equipment engineering. Other experienced personnel requiring knowledge of the design and operation of centrifugal pumps will find this course helpful.



Course Objectives

Upon completion of this course, the participants will be able to:

- Understand how a centrifugal pump works
- Understand the term “head” and how to calculate total system head
- Be able to identify various pump types and components
- Understand pump curves and generate a pump curve from data collected at the pump
- Understand the hydraulic loads created by a pump
- Become familiar with affinity laws and how to apply them correctly
- Become familiar with NPSH calculations and the effect suction conditions have on pump performance
- Be able to conduct the following calculations:
 - Total system head and Affinity Laws
 - NPSH available (NPSHA) for the system
 - Brake horsepower requirement
 - Viscosity corrections
 - Suction speed and suction specific speed
- Become familiar with viscosity, specific gravity, and temperature and their effect on pump performance and selection
- Become familiar with basic vibration and how it relates to pump performance

Prerequisites

It is recommended that participants have a bachelor's or associate's degree and a basic math background. **PMSB** and **PMSP** are the recommended prerequisites for other personnel.

Course Length

3 to 5 days. Varies by location.



CHEMICAL PROCESS PUMP REPAIR (CPR) — BASICS LEVEL

Course Description

A Basics Level course for maintenance staff. This course will provide participants with the knowledge and skills needed to repair and maintain ASME and ISO overhung chemical process pumps and understand the basics of pumps, pumping systems and mechanical seal design. The course is comprised of approximately 50% classroom and 50% laboratory time. Concepts and theories are taught in a classroom setting and then reinforced with hands-on exercises. Participants will use static displays and operational pumps to perform pump and seal settings. Working in a team, they will assemble, disassemble and document a variety of operational pumps and mechanical seals. Seminar texts and demonstrations are generic to all vendors' hardware.

Audience

This course is for mechanics, millwrights and others who are responsible for maintaining ASME and ISO chemical process pumps.

Course Objectives

Upon completion of this course, the participants will be able to:

- Describe how centrifugal pumps operate and why they fail
- Describe basic hydraulics and its impact on pump performance
- Describe pump and system interaction
- Explain the basic functions of mechanical seals, how they work and why they fail
- Demonstrate accurate reading of precision measurement tools
- Accurately interpret mechanical seal assembly drawings
- Properly disassemble and inspect ASME and ISO chemical process pumps
- Accurately measure critical pump dimensions using precision instruments
- Demonstrate proper bearing removal and installation

Prerequisites

It is recommended that participants have basic hands-on skills and some experience with rotating equipment.

Personal Protective Equipment

Students are required to bring their own safety toe shoes. Safety glasses and gloves will be provided, but students may bring their own if desired.

Course Length

2 to 4 days. Varies by location.



ENGINEERED OVERHUNG PUMP REPAIR (EOPR) — BASICS LEVEL

Course Description

A Basics Level course for maintenance staff. This course will provide participants with the knowledge and skills needed to evaluate failure modes and repair API 610 overhung process pumps. The course is comprised of approximately 40% classroom and 60% laboratory time. Concepts and theories are taught in a classroom setting and then reinforced with hands-on exercises. Working in teams, participants will disassemble, inspect and determine failure modes for a variety of API 610 overhung pumps. Classroom texts and equipment are generic to all OEMs' hardware.

Audience

This course is for mechanics, millwrights and others who are responsible for maintaining API 610 overhung process pumps.

Course Objectives

During the course, the participants will:

- Discuss field and shop inspection of the pump and system components
- Practice disassembly and inspection procedures and best practices
- Document and analyze information gathered during disassembly and inspection
- Identify and discuss elimination of failure modes
- Review industry standards for component NDE and repair techniques
- Practice bearing and seal removal and installation
- Discuss industry standards and criteria for component balancing
- Reassemble pumps, with an emphasis on measuring and recoding critical dimensions and runouts

Prerequisites

Participants should be familiar with mechanical drawings and the use of hand tools and measurement devices. It is recommended that they have basic math skills and a knowledge of safe work practices.

Personal Protective Equipment

Students are required to bring their own safety toe shoes. Safety glasses and gloves will be provided, but students may bring their own if desired.

Course Length

3 days.



MECHANICAL SEAL FUNDAMENTALS (MSF) — INTERMEDIATE LEVEL

Course Description

An Intermediate Level course for engineers, technicians, and experienced operators and maintenance staff. This course explains the basic need for mechanical seal systems and the theory behind how they work. Emphasis is placed not only on the operation of mechanical seals, but also on the environment where they operate (pump or other equipment) and the support systems that help them survive. Additional topics include materials of construction, fluid properties that affect seal selection, seal specifications and reading seal drawings.

This course includes class time and laboratory exercises. Students will assemble and disassemble pumps and seals as well as operate pumps and monitor performance. Both team and individual hands-on exercises are included.

Audience

This course is intended for maintenance and engineering personnel that require a detailed explanation of mechanical seal design, operation and maintenance. Engineers and other reliability staff will find this to be a foundational class for understanding complex problems relating to mechanical seals and sealing systems.



Course Objectives

Upon completion of this course, the participants will be able to:

- Describe basic construction of a pump and its purpose
- Describe the function of a seal within a pump
- Discuss construction and design of various mechanical seals and outline performance factors
- Describe fluid principles and concepts relating to seal operations
- Differentiate among various seal designs and configurations and describe operations and appropriate applications
- Understand various API/ANSI Piping Plans and select appropriate plans based upon application and seal design
- Discuss benefits and limitations of seal construction materials according to application
- Utilize a seal assembly drawing to locate key components and measurements
- Perform equipment condition checks and install a mechanical seal

Prerequisites

There are no prerequisites for this course, but it is recommended students have a basic understanding of centrifugal pumps. PMSB is helpful for those new to centrifugal pumps.

Course Length

3 to 5 days. Varies by location.



OVERVIEW OF MECHANICALLY SEALED PUMPS (OMSP) — BASICS LEVEL

Course Description

A Basics Level class for maintenance personnel, plant engineers, and specialists. Participants will learn the basic pump and mechanical seal principles, including components and functions. A practical training approach provides participants operating practices, creating the foundation for safe and reliable pump and mechanical seal operation.

Audience

This course is intended for maintenance personnel, plant operators and engineers, reliability specialists and engineers requiring a basic knowledge of mechanically sealed pumps.

Participants should have direct involvement or responsibility for pump installation, operation, troubleshooting or maintenance.

Course Objectives

Upon completion of the course, participants will have been taught the skills to:

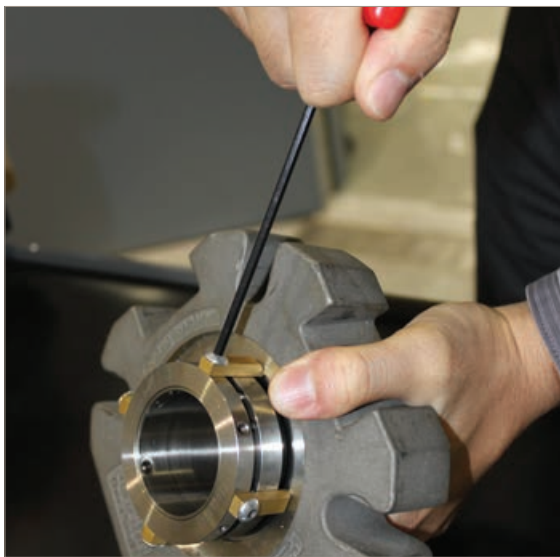
- Discuss centrifugal pump components and their failure modes
- Review mechanical seal principles and their functions
- Experience pump and seal failures with hands-on review of failed components
- Use a Flowserve unique clear acrylic pump to view cavitation and the effects of off-peak operation

Prerequisites

There are no prerequisites for this class.

Course Length

2 days.



PUMP AND MECHANICAL SEAL BASICS — BASICS LEVEL

Course Description

A Basic Level course for operators, maintenance staff and engineers. This two-day course provides participants with the knowledge and skills needed to understand the basics of pumps and mechanical seals. The course curriculum is designed to offer basic explanations of pump and mechanical seal parts and demonstrate how they function together to achieve maximum reliability.

Concepts and theory are taught in a classroom setting and then reinforced with hands-on exercises using portable laboratories.

Specific topics include:

- Introduction to pump terms and definitions
- Construction of a pump and the function of each part
- Basic hydraulics, head and flow
- Performance curves
- Net positive suction head (NPSH) and cavitation
- Single mechanical seals
- Dual mechanical seals
- Basic systems
- Basic troubleshooting



Audience

This course is intended for individuals starting their careers in the following fields: pump maintenance, pump operations, reliability engineering or rotating equipment engineering. Other personnel requiring knowledge or a refresher on the basics of pumps and mechanical seals will benefit from this training.

Course Objectives

Upon completion of this course, the participants will be able to:

- Demonstrate a basic understanding of how a centrifugal pump works
- Explain pressures within a centrifugal pump and how mechanical seals are affected by pump operation
- Identify mechanical seal piping plans, explain their purpose and describe when each is used
- Review troubleshooting processes for determining mechanical seal failure causes

Prerequisites

It is recommended that participants have basic hands-on skills and some experience with rotating equipment.

Course Length

2 Days



PUMP AND MECHANICAL SEAL PRINCIPLES (PMSB) — INTERMEDIATE LEVEL

Course Description

An Intermediate Level course for engineers, technicians, and experienced operators and maintenance staff.

This course provides participants with the knowledge and skills needed to understand the basics of pumps, pumping systems and mechanical seals. The course curriculum is centered on pump and mechanical seal design, operation and maintenance, and is made up of approximately 60% classroom and 40% laboratory time. Concepts and theory are taught in a classroom setting and then reinforced with hands-on exercises in the laboratories. Participants utilize the laboratories (static displays and operational pumps) to perform pump and seal settings through learning experiments. Working in teams, attendees will be involved in interactive discussions while they assemble, disassemble, test, and document a variety of operational pumps and mechanical seals.

When combined with **PMSR** this course forms an excellent curriculum for pump engineers and technicians.

Audience

Facility personnel who require basic understanding of centrifugal pumps, pumping systems hydraulics and mechanical seals are encouraged to attend this course. Specifically, millwrights, mechanics, machinery technicians, engineers and maintenance supervisors, as well as experienced operators, will benefit from this training. Participants should have direct involvement or responsibility for pump and mechanical seal installation, operation, troubleshooting or maintenance.



Course Objectives

Upon completion of this course, the participants will be able to:

- Identify and describe basic centrifugal pump design
- Identify and describe the basics of pumping system hydraulics
- Identify classic cavitation, recirculation and Net Positive Suction Head (NPSH)
- Describe acceptable and preferred regions of pump operation, including minimum flow, best efficiency point and runout
- Describe impeller design as it relates to specific speed and suction specific speed
- Describe pump and system interaction
- Identify and describe centrifugal pump types and designs
- Identify and describe basic seal configurations
- Describe how a mechanical seal operates
- Describe the limitations of single mechanical seals
- Identify and describe common mechanical seal piping plans

Prerequisites

PMSB or hands-on skills and some experience with rotating equipment. Basic math skills are helpful.

Course Length

3 to 4 days. Varies by location.



PUMP AND MECHANICAL SEAL RELIABILITY (PMSR) — INTERMEDIATE LEVEL

Course Description

An Intermediate Level course for engineers, technicians, and experienced operators and maintenance staff. This course gives participants a better understanding of the interrelated functions of the centrifugal pump, mechanical seal and complete pumping system. Participants learn how to find and address causes of poor pump and seal reliability. Course curriculum centers on pump and seal troubleshooting and solutions. Concepts and theory are taught in a classroom setting and then reinforced with hands-on exercises in laboratories. This course is 60% classroom and 40% laboratory time. Participants use our laboratories' pumps to perform exercises that demonstrate the principles presented in the classroom. Working in teams, all are involved in interactive discussions while they analyze and document findings from the operation of laboratory equipment. When combined with **RCA** this class forms an excellent curriculum for reliability staff.

Audience

This course builds upon information presented in **PMSP**.

The target audiences are experienced operations and maintenance personnel and entry-level engineering staff with one to three years of plant experience.

Course Objectives

Upon completion of this course, the participants will be able to:

- Explain how the interrelationship of centrifugal pumps, mechanical seals and process systems affect equipment reliability
- Evaluate symptoms to determine causes of failures associated with centrifugal pumps and mechanical seals
- Identify practical corrective procedures that can improve centrifugal pump and mechanical seal reliability

Prerequisites

PMSP is a suggested prerequisite for this course for maintenance and operations personnel. **CPF** and **MSF** are suggested prerequisites for reliability and engineering personnel.

Course Length

3 to 5 days. Varies by location.



PUMP AND SEAL OPERATOR TRAINING (PSOT) — BASICS LEVEL

Course Description

A Basics Level course for operators, craftsmen, and entry-level engineers and technicians. The purpose of this program is to teach principles and procedures that will optimize pump and seal life through proper operation. Participants will identify causes of rotating equipment failure through operation and discuss methods to make corrections.

Participants will interpret the sights and sounds of potential failure and identify corrective actions. They will review proper start-up and shutdown procedures and identify the purposes and functions of critical pump and seal components.

Audience

All people or supervisors involved with the routine operation of mechanically sealed equipment. Others who would benefit include engineers responsible for the reliability of mechanical seals and pumps.



Course Objectives

Upon completion of this course, the participants will be able to:

- Explain how centrifugal pumps and mechanical seals operate
- Identify causes of rotating equipment failure through improper operation
- Describe the function and operation of auxiliary equipment
- Describe proper start-up and shutdown of equipment
- Describe troubleshooting procedures which identify and correct potential rotating equipment damage or failure

Prerequisites

It is recommended that participants have some experience with rotating equipment.

Course Length

1 day (8 hours).

PUMP SYSTEM ANALYSIS (PSA) — ADVANCED LEVEL

Course Description

An Advanced Level course for engineers and experienced maintenance and reliability staff. This course provides a comprehensive analysis of pump performance in relation to upstream and downstream operations. Students will review pump hydraulics and apply these fundamentals to evaluate the efficacy of equipment fluid conveyance and interrelated unit reliability.

Audience

This course is intended for engineers; rotating equipment specialists; individuals involved in pump sales and service; and experienced plant maintenance and operational personnel who have a desire to better understand pumping systems and the ways those systems can be improved.

Course Objectives

Upon completion of this course, the participants will be able to:

Upon completion of this course, participants will be able to:

- Compare calculated system head to desired pump performance
- Understand the factors influencing system reliability and equipment health
- Assess operating practices against best industry practices
- Evaluate pump selections for a corresponding application

Specific topics include:

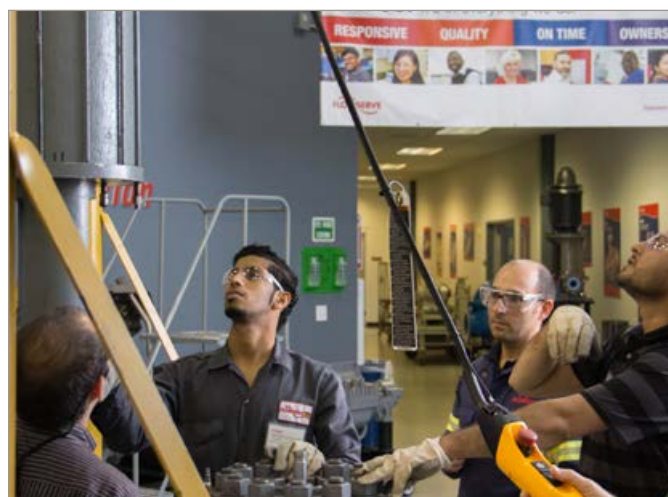
- Calculating total dynamic head and NPSH
- Reviewing system head curves for in-line and branch-line systems
- Comparing parallel vs. series operations
- Variable speed control vs. valve throttling
- Pump selection recommendations

Prerequisites

It is recommended that participants have already completed **Centrifugal Pump Fundamentals (CPF)** and have a minimum of three years of experience within on-site reliability or a rotating equipment specialty. Basic engineering math skills are recommended.

Course Length

3 to 5 days. Varies by location.



ROOT CAUSE ANALYSIS (RCA) — INTERMEDIATE LEVEL

Course Description

An Intermediate Level course for engineers, technicians and reliability staff. This course provides an in-depth understanding of root cause-mapping techniques. The course is designed to provide detailed comprehension of how to perform RCA to achieve the maximum bottom-line results, the resolution of identified causes.

Specific topics include:

- Introduction to and Purpose of Root Cause Analysis (RCA)
- Elements of Root Cause Analysis
- Define the Problem
- Investigate Causes
- Execute the Solution
- Centrifugal Pump Failure Analysis and Troubleshooting
- Mechanical Seal Failure Analysis and Troubleshooting
- Case Studies — used to exercise the skill and knowledge of troubleshooting and RCA

When combined with **PMSR** this class forms an excellent curriculum for reliability staff.

Audience

This course is intended for senior maintenance personnel, reliability engineers, rotating equipment engineers/specialists and management personnel requiring knowledge of identifying the causes of centrifugal pump and mechanical seal failures.

Course Objectives

The objective of this course is to teach the participant how to identify, analyze and eliminate a problem. Participants will have the requisite skills and knowledge necessary to correctly select, accurately analyze and obtain resolution to undesirable events. They will understand how to perform all the facets of a complete and accurate Root Cause Analysis using cause-mapping techniques.

Upon completion of this course, the participants will be able to:

- Recognize, identify and describe a “problem”
- Gather relevant and discard non-relevant information
- Evaluate and analyze the problem symptoms and information to arrive at the root cause of a problem
- Define solutions to correct the problem

Prerequisites

There are no prerequisites for this class; however, students new to centrifugal pumps will benefit from **PMSB** or **PMSF**.

Course Length

3 to 5 days. Varies by location.



Essentials: Site-Specific Information for Dallas, Texas



Dallas Learning Resource Center

The Dallas Learning Resource Center is located in the heart of the Dallas/Fort Worth Metroplex. This convenient location is within minutes of the Dallas/Fort Worth International Airport.

Address

Dallas Learning Resource Center

4343 West Royal Lane
Suite 106
Irving, Texas 75063
Phone: +800 446 0401
Fax: +972 915 1600

Flight Arrangements

You are responsible for your own airfare and flight arrangements. Since most classes begin at 8 a.m., please consider arriving one day prior to your class. If you're flying out of the Dallas/Fort Worth area on the last day of class, please make sure your flight reservations are for a departure no earlier than 4 p.m.

Attire

The proper dress code for Flowserve students is business casual/casual. Jeans, Dockers or casual pants and shirts are acceptable for men; slacks or jeans are fine for women. To ensure your safety in the labs, please refrain from wearing shorts, tank tops or open-toed shoes. Students will need to bring safety toe shoes for **Between Bearings Pump Repair (BBPR), Chemical Process Pump Repair (CPPR) and Engineered Overhung Pump Repair (EOPR).**

Meals

We provide lunch for full-day classes; you are responsible for all other meals.

Hotel Arrangements

You are responsible for your hotel reservations and expenses. Unless you are planning to stay at the hotel on Friday night, plan on checking out before arriving at the training center Friday morning. For the convenience of our Dallas trainees, we have made arrangements with the Marriott Dallas/Fort Worth Airport to receive a discounted rate. If you decide to book with this hotel, please call 1-800-228-9290 to make a reservation. A minimum of three (3) nights must apply. The main address is:

8440 Freeport Parkway
Irving, Texas 75063 USA
Phone: +972 929 8800
Fax: +972 929 6501
Toll-Free: +888 489 2647
Reservations: +800 228 9290

Arrival at DFW Airport

Upon arrival at DFW Airport, please proceed to Baggage Claim. The Marriott has a shuttle that departs and arrives on the sidewalk outside of Baggage Claim.



Arrival at Love Field Airport

If you choose to fly into Love Field Airport, you must arrange for a taxi or rental car.

Essentials: Site-Specific Information for McNeese



McNeese Learning Resource Center

The McNeese State University is a satellite facility for students local to the Lake Charles, Louisiana, area.

Address

McNeese University

The College of Engineering & Engineering Technology
 ETL 111
 Beauregard Dr.
 Lake Charles, Louisiana 70609
 Phone: +337 475 5875
 Fax: +337 475 5237

Part of the University of Louisiana system, McNeese State University offers best practices and maintenance training programs to Flowserve customers, distributors and employees in the Lake Charles, Louisiana, area. The College of Engineering & Engineering Technology is one of six colleges within the university. It consists of two departments: Engineering and Engineering Technology. Both Engineering and Engineering Technology programs are nationally accredited by the Accreditation Board for Engineering and Technology (ABET) Inc.

The Institute for Industry Education Collaboration (IIEC)

The Institute for Industry Education Collaboration provides a framework for McNeese State University to organize and expand existing industry-university collaborations to “enhance economic development and cultural growth in this region and beyond.” As the liaison between industry and higher education, the IIEC seeks to establish relationships with a strong emphasis on economic development.

The IIEC in collaboration with Flowserve has brought Flowserve-specific courses to the Gulf Coast Flowserve satellite training site. At this training facility, practicing engineers and technicians will receive specialized hands-on training in pumps, valves and seals.

For registration and course information, please contact Educational Services at the Flowserve Irving, Texas, facility.



MCNEESE
 STATE UNIVERSITY
 Institute for Industry-
 Education Collaboration



Essentials: Site-Specific Information for Desio



Desio Learning Resource Center

Based on the applied learning principles that drove the design of the Learning Resource Center in Dallas, Texas, the LRC in Desio-Milan, Italy, also offers best practices and maintenance training programs to Flowserve customers, distributors and employees. The LRC specializes in hands-on training in pumps, valves and seals for engineers, operators, craftsmen and other plant professionals.

The Desio LRC is equipped with:

- One classroom which can conveniently host 24 people
- One static/power lab
- Test loop and control room

Address

Desio Learning Resource Center

Via Rossini, 90/92 • 20832 Desio (MB), Italy
 Telephone Number: +39 0362 612535
 Fax: +39 0362 303396

Transportation

The Desio LRC is located just 30 minutes from the Milan Main Station or approximately 40 minutes by car from either Milan Malpensa Airport or Linate Airport.

Taxi

Flowserve recommends:

Autonoleggio Viganò

Special fair rates have been negotiated.
 Email address: autonoleggiovigano@libero.it

Airports

Milan Malpensa Airport
 Linate Airport
 Orio Al Serio Airport

Hotels

Flowserve recommends:

Hotel Royal Falcone Monza

Special rates have been negotiated.
 C.so Milano 5, 20900 Monza (MB)
 Phone: +39 039 2300187
 Fax: +39 039 2300129
 Website: <http://www.royalfalcone.com/english/>

Attire

The proper dress code for Flowserve students is business casual/casual. Jeans, Dockers or casual pants and shirts are acceptable for men; slacks or jeans are fine for women. To ensure your safety in the labs, please refrain from wearing shorts, tank tops or open-toed shoes. Students will need to bring safety toe shoes for **Chemical Process Pump Repair (CPPR)**, **Engineered Overhung Pump Repair (EOPR)** and **Between Bearings Pump Repair (BBPR)**.



Essentials: Site-Specific Information for China



China Learning Resource Center

The Suzhou Learning Resource Center is located in the Flowserve Suzhou facility that includes three buildings, with a ground area of 14 000 square meters. This learning environment is supplemented with spacious classrooms and state-of-the-art laboratories where real-world equipment models are utilized to assist in the visualization of situations found in daily work environments through hands-on experience.

The LRC is equipped with:

- Two classrooms that can accommodate 12 and 18 participants, respectively
- Cutaway pump and mechanical seal models
- Innovative power lab stations that provide a wide variety of experiments, including:
 - Pumps in series or parallel operation
 - Vibrations
 - Cavitation
 - Submergence
 - NPSH considerations
 - API piping plan set-ups

Address

Suzhou Learning Resource Center

FSG Suzhou Manufacturing Plant
No. 26 Lisheng Road, Suzhou Industrial Park
Suzhou 215021, Jiangsu Province, P.R. China
Phone: +86 512 6255 2388
Fax: +86 512 6255 3702

Weather and Attire

Suzhou is a historical tourist city famous for its gardens, handcraft embroideries, silks and other traditional delicacies. It offers distinctive seasonal changes. Temperatures vary by season from -2°C in the winter to an average of 32°C in the summer.

The proper dress code for Flowserve students is business casual/casual. Jeans, Dockers or casual pants and shirts are acceptable for men; slacks or jeans are fine for women. To ensure your safety in the labs, please refrain from wearing shorts, tank tops or open-toed shoes. Students will need to bring safety toe shoes for **Chemical Process Pump Repair (CPPR)**, **Engineered Overhung Pump Repair (EOPR)** and **Between Bearings Pump Repair (BBPR)**.

Hotels

Suzhou offers a wide range of hotels with various ratings. Flowserve recommends:

Grand Metro Park (Suzhou) Hotel (4 stars)
1355 Jijinh Avenue, Suzhou Industrial Park, 210521
Phone: +86 512 62800666; Fax: +86 512 62920777
www.metroparkhotels.com/suzhou

A special Flowserve rate is available when registering at this hotel.

Airports and Transportation

Suzhou is one of the major cities in the Yangtze River Delta and is located in the heart of many traffic routes. It can be reached conveniently by buses, railways, etc. A subway train is under construction and will be available in 2014. If you are traveling via air, the following airports are suggested for your convenience:

- Shanghai Hongqiao Airport (1.5-hour drive to Suzhou, mostly for domestic trips and overseas trips to Japan and Korea)
- Shanghai Pudong Airport (2.5-hour drive to Suzhou, mostly for overseas trips)
- Wuxi Airport (1-hour drive to Suzhou, for domestic trips only)

Airport shuttles to Suzhou are also available. Pickup services at a special Flowserve rate are available to hotel registrants.

Daily transportation from the Grand Metro Park Hotel to the LRC is provided.

Essentials: Site-Specific Information for Latin America



Latin America Learning Resource Center

Based on the applied learning principles that drove the design of the Learning Resource Center in Dallas, Texas, the LRC in São Caetano do Sul - São Paulo, Brazil, also offers best practices and maintenance training programs to Flowserve customers, distributors and employees in Latin America.

The LRC specializes in hands-on training in pumps and seals for engineers, operators and other plant professionals. The São Caetano do Sul LRC is equipped with:

- A classroom that can conveniently host 15 people
- One static/power lab

Address

Latin America Learning Resource Center

Rua Tocantins, 128

CEP-09580-130 - São Caetano do Sul - São Paulo - Brazil

Phone: +55 11 2169-6338

Fax: +55 11 2169-6329

Airports and Transportation

The São Caetano do Sul LRC is located 75 minutes by car from the Andre Franco Montoro International Airport (Old Guarulhos International Airport) and approximately 30 minutes by car from the Congonhas Airport (the Downtown Airport with local inbound/outbound flights and also includes some flights to/from Argentina).

Hotels

São Paulo offers a wide range of hotels with various ratings. Flowserve recommends:

Hotel Mercury São Caetano do Sul (4 stars)
(10 minutes by taxi to the LRC)

Hotel Mercury Santo Andre (4 stars)
(15 minutes by taxi to the LRC)
Website: www.mercure.com.br

Hotel IBIS Santo Andre (3 stars)
(15 minutes by taxi to the LRC)
Website: www.ibis.com.br

Attire

The proper dress code for Flowserve students is business casual/casual. Jeans, Dockers or casual pants and shirts are acceptable for men; slacks or jeans are fine for women. To ensure your safety in the labs, please refrain from wearing shorts, tank tops or open-toed shoes.



Essentials: Site-Specific Information for Mexico



Mexico Learning Resource Center

Located in Tlaxcala, Mexico, the Learning Resource Center is the location where training and laboratory exercises are conducted.

The Mexico LRC has developed several technical and maintenance courses that enhance participants' knowledge of fluid management systems and rotational equipment. The lab exercises provide participants an opportunity to work with equipment they will encounter in similar work environments.

Our trainers have several years of experience working in fields relevant to the training and will be a valuable resource to our participants. At the end of the training, the participants will undergo field and written testing in order to be appropriately certified.

Safety

During laboratory exercises, participants must always wear their personal safety equipment (safety glasses, earplugs and shoes). You must not drive any equipment without the trainer's instructions. In the event of an evacuation, participants must meet at assigned meeting points in each classroom.

Address

Mexico Learning Resource Center

Manzana 3, Lotes 2, 4, 6 y 8
Parque Industrial Xiloxotla, Tlaxcala
Santa Isabel Xiloxotla, Tlaxcala, México 90180

Contact Information

Noé Altamirano
Human Resources and Official Coordinator
Phone: +52 246 46 5 2616
Mobile: +52 246 49 080 19
Email: naltamirano@flowserve.com

Airport and Transportation

The Flowserve LRC is located in the Flowserve facility in Tlaxcala, Mexico. If you arrive at Mexico City International Airport, you will need to take the Mexico - Puebla highway and then Puebla - Tlaxcala highway to the Tlaxcala LRC, located about two hours from the airport.

While at training, Flowserve provides transportation from the LRC to the hotel and back. You will be picked up at the hotel lobby at 7:30 every morning. Please be punctual.

Hotels

Flowserve recommends:

Hotel Mision San Francisco (5 stars)
(10 minutes from the LRC)
Plaza de la Constitución Num. 17
Col. Centro Tlaxcala, Tlax. (Centro Histórico de la Cd. de Tlaxcala)
Phone: +52 246 46 2 60 22
www.hotelesmision.com

Hotel Mision Atlihuetzia (5 stars)
(20 minutes from the LRC)
Carretera Tlaxcala – Apizaco Km 10
Santa Maria Atlihuetzia, Tlaxcala
Phone: +52 246 46 1 0000
www.hotelesmision.com

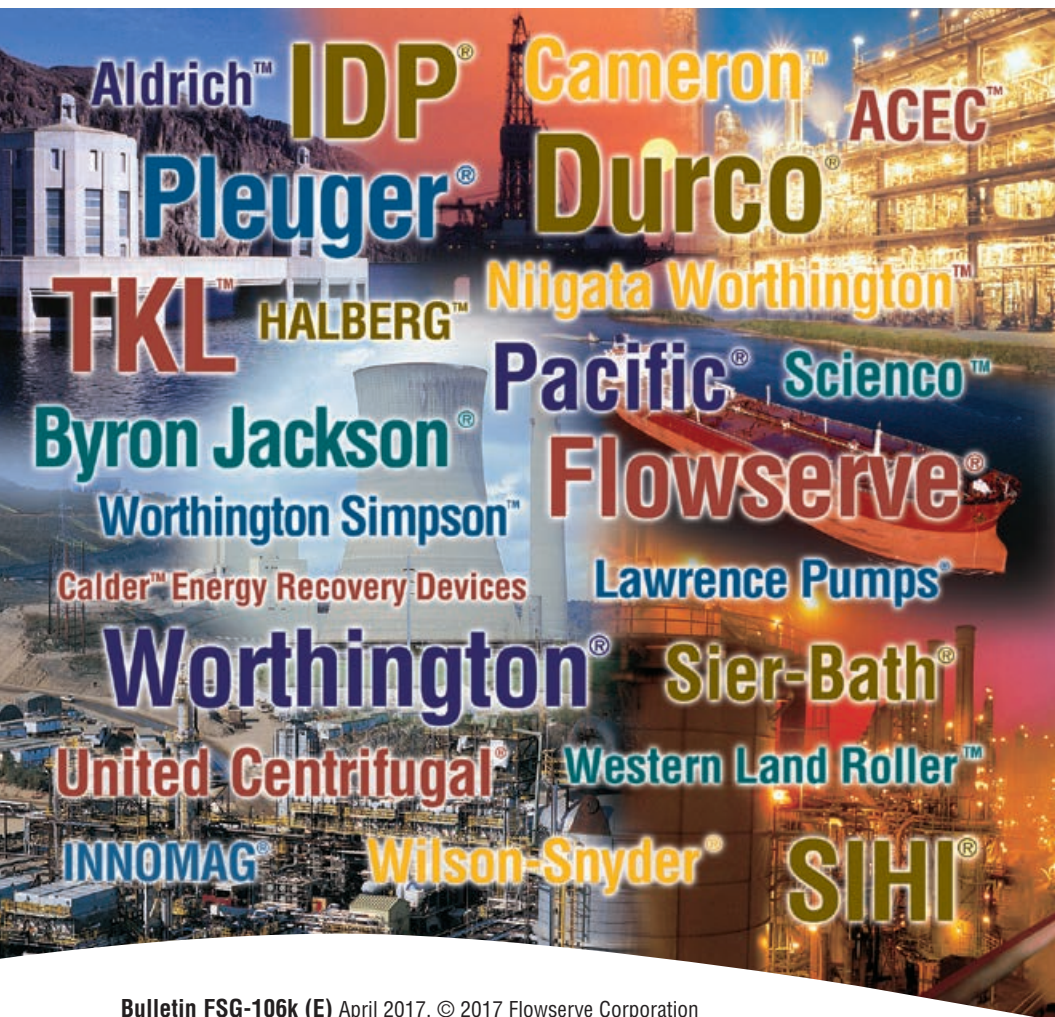
Schedule

Training is conducted during the week from Monday to Friday. The training starts at 8 a.m. every morning and ends at 5 p.m. Lunch will be served at 1 p.m. every afternoon at the Flowserve facility.

Medical Services

In case of illness, please contact the local human resources or LRC personnel immediately. You will be directed to our on-site medical doctor for a checkup.





Dallas Learning Resource Center

4343 West Royal Lane
Suite 106
Irving, TX 75063 USA
Toll Free: +1 800 446 0401
Telephone: +1 972 915 1600

Desio Learning Resource Center

Via Rossini, 90/92
20832 Desio (MB) Italy
Phone: +39 0362 612535
Fax: +39 0362 303396

Singapore Learning Resource Center

Flowserve Private Limited
10 Tuas Loop
Singapore 637345
Phone: +65 6771 0600, +65 6771 0632

Chemical Processing Technology Center

Flowserve Lab
81 Jurong Island Highway
Singapore 627837

China Learning Resource Center

FSG Suzhou Manufacturing Plant
No. 26 Lisheng Road, Suzhou Industrial Park
Suzhou 215021, Jiangsu Province, P.R. China
Phone: +86 512 6255 2388
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Latin America Learning Resource Center

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Mexico Learning Resource Center

Manzana 3, Lotes 2, 4, 6 y 8
Parque Industrial Xiloxotla, Tlaxcala
Santa Isabel Xiloxotla,
Tlaxcala, México 90180

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To find your local Flowserve representative:

For more information about Flowserve Corporation,
visit www.flowserve.com or call +1 937 890 5839.