

# FACT SHEET (LIVE COURSE)

## Principles | Operation | Selection of Centrifugal Pumps



**Centrifugal Pumps: Classification, components, selection, operating principles, installation, operation, and maintenance.**

### Who Should Attend?

Students, technicians, designers, freelancers, and engineers involved in the selection, purchase, installation, operation, and maintenance of centrifugal pumps.

**Previous knowledge of this subject is not required to attend the course**

### Training Objectives

The main objective of this course is to provide participants with the theoretical and practical skills and knowledge required for projects, based on experience and engineering best practices, to select, install, operate, and maintain centrifugal pumps.

### Methodology

Instructor-led training course in adult learning format with discussions, individual exercises and simplified case studies, providing practical knowledge to implement in the field.

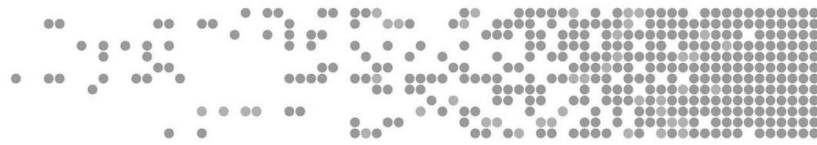
### Duration

The duration of this training course is **12 hours**, divided into several sessions to facilitate the Learning process.

### What to expect?

Acquire basic knowledge of centrifugal pumps:

- Components
- Selection criteria
- Mechanical seals
- Electric motors
- System curve, series and parallel operation
- Factory testing procedure
- Installation and general aspects of predictive maintenance (vibrations)



## Contents

### Introduction

What is a centrifugal pump?  
Applications  
Characteristics

### Pump Classification

Positive displacement pumps and centrifugal pumps  
API 610 pumps  
ANSI vs. API 610 pumps  
Pitot pumps

### Theoretical Principles of Centrifugal Pumps

Velocity Triangle  
Centrifugal Pump Curve  
System Curve. Available NPSH(a)  
Series and Parallel Operation

### Internal Components of Centrifugal Pumps

Rotor: shaft, impellers, wear rings, balance piston  
Casing  
Mechanical seals  
Material selection for centrifugal pumps  
API 610 12th Ed. Data Sheet Registration

### Drivers

Electric motors  
Steam turbines  
Gas turbines

### Accessories

Instrumentation  
Couplings  
Baseplate  
Lubrication system, oil mist, and oil recovery units

### Factory Testing

NPSHr  
Performance  
Mechanical  
Preservation

### Installation and Start-up

Foundation  
Piping connection  
Commissioning: alignment and flushing  
Start-up

### Case studies:

Identification of pump types  
Pump type selection  
Interpretation of pump curves  
Material selection



## Instructor

Mechanical Engineer with over 30 years of experience in rotating machinery: selection, development, installation, commissioning, failure analysis, and upgrades of pumps, turbines, and compressors.

Responsible for leading a team of engineers in charge of equipment selection and procurement for projects in Europe and the Middle East. Key clients include: REPSOL, TÜPRAS, CEPSA, GALP, ADNOC, ARAMCO, TOTAL, EXXON, KNPC, BAPCO, CHEVRON, QATAR ENERGY, SASA, SOCAR, PETROPERÚ, YPF.

Extensive experience as a trainer and technical advisor, with courses delivered to university students, maintenance technicians, engineers, and managers.

## Tailored Training

The most effective training is one that satisfies the needs of each company's business focus and deliverables. **We adapt our training programs to each specific requirement, offering bespoke solutions for each need.** The result, 100% tailored programs, developed to maximize the time investment and deliver tangible and intangible returns to the work teams.

After an assessment phase, a tailored training plan is designed jointly with the client. This plan is specifically tailored to meet the client's needs, focusing on effectively enhancing the capabilities of the work team. **We provide practical, dynamic and hands-on training,** making available the best instructors in each subject.

## Arveng Training

Arveng Training has developed effective and practical solutions for today's industrial challenges by delivering specific, high-quality engineering courses utilizing three different approaches: classroom, online, and tailored training. We are proud to have taught more than 500 classroom courses, 1800 online courses, and over 200 in-company sessions. Our training activities have benefitted over 6000 professionals, our greatest accomplishment of all.

**We consider our students' time to be of utmost importance.** For this reason, all our courses have been designed with the main objective of quickly improving the professional skills of the participants through our expert instructors in different disciplines. **We stimulate creativity, innovation, and initiative to make the participants inquisitive, bringing good engineering practices and lessons learned to the field, that benefits their professional lives in the long term.**

## Our Company

Arveng Training & Engineering SL is a leading company providing Training and Engineering services based in Madrid, Spain. Our mission and vision are to be a leading training and engineering services company, providing our clients with the best in the sector. We are a team of highly motivated, talented, highly qualified professionals with over 20 years of experience. We aim to exceed expectations by offering efficient, innovative, cost-effective, and transparent services.

Established in July 2010, mainly oriented to the industrial sector, from the very beginning Arveng has always worked with closeness, responsibility, and commitment in all areas of activity.

Through experience gained by partaking in multidisciplinary engineering projects in sectors such as Petrochemical, Energy Generation, and Industrial, we provide answers and solutions to concrete requirements, making the effort to build long-lasting and mutually beneficial relationships.