



Mechanical Engineering

MSF Desalination Plant Operation & Performance Ratio Calculations

Course Introduction

Desalination technologies play a big role in supplying fresh water especially in Gulf area where shortage of Fresh water supplies is present. In this short course emphasize is directed towards multistage flash desalination

systems. The attendees will have the opportunity to be exposed to the recent developments in this area. Desalination technologies are overviewed, effect of the different operational parameters on multi –stage flash systems (MSF) are given. Design, operation and maintenance of MSF are presented. Full and part load operations are illustrated in connection with control systems.

Target Audience

- Automotive Engineer
- Boiler Engineer
- Ceramics Engineer
- Equipment Engineer
- High-Pressure Engineer
- Marine Engineer
- Mechanical Design Engineer
- Mechanical Engineer
- Naval Architect
- Pipeline Engineer
- Power Engineer
- Rotating Equipment Engineer
- Senior Mechanical Engineer
- Turbine Engineer
- Validation Engineer

Learning Objectives

- To enable attendees to understand the desalination technologies available
- To give the thermal and mechanical background of multistage flash systems
- To layout the theories for thermal as well as the mechanical sizing
- To illustrate the operation and troubleshooting of multistage desalination
- To give the maintenance schedules used for such plant

Course Outline

• 01 DAY ONE

MODULE (01) INTRODUCTION TO DESALINATION TECHNOLOGIES:

- 1.1 Multistage Flash (MSF)
- 1.2 Once through and recirculation systems
- 1.3 Applications from Operating Plants around the world
- 1.4 Multi Effect Distillation (MEF)
- 1.5 Vapor Compression
- 1.6 Reverse Osmosis (RO)
- 1.7 Electrodialysis Systems (ED)

• 02 DAY TWO

MODULE (02) HEAT BALANCE AND ENERGY EVALUATIONS OF MSF SYSTEMS

- 2.1 Evaporation Flashing Theories
- 2.2 Single and Multistage Flash Analysis
- 2.3 Heat and Mass Balance Calculations
- 2.4 Thermal and Mechanical Design Details
- 2.5 Once through and recirculation systems
- 2.6 Applications from Operating Plants around the world

• 03 DAY THREE

MODULE (03) MULTI STAGE PLANTS COMPONENTS AND EQUIPMENTS

- 3.1 Stage Designs
- 3.2 Brine Heaters
- 3.3 Measuring Instruments
- 3.4 Valves
- 3.5 Pumps
- 3.6 Auxiliaries System
- 3.7 Material Selection

• 04 DAY FOUR

MODULE (04) OPERATION AND MAINTENANCE STRATEGIES OF MULTI STAGE FLASH SYSTEMS

- 4.1 Steady State Operation
- 4.2 Part Load Operation
- 4.3 Control and Dynamic Performance Analysis
- 4.4 Optimize Operation Process
- 4.5 Preventive Maintenance
- 4.6 Predictive Maintenance
- 4.7 Conditioning Monitoring Schedules for MSF

• 05 DAY FIVE

MODULE (05) MULTI STAGE SYSTEMS IN COGENERATION PLANTS

- 5.1 Gas Turbine Systems combined to MSF
- 5.2 Steam Turbines with MSF
- 5.3 Cycle and System Thermal Analysis
- 5.4 Economy Aspects of Cogeneration Desalination

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
May 11, 2025	May 15, 2025	5 days	4250.00 \$	Bahrain - Manama
Aug. 4, 2025	Aug. 8, 2025	5 days	4950.00 \$	Ireland - Galway
Nov. 10, 2025	Nov. 14, 2025	5 days	4250.00 \$	UAE - Dubai
Nov. 2, 2025	Nov. 6, 2025	5 days	4250.00 \$	Oman - Muscat