



## Acid and Ball Cleaning in Multi Stage Flash

### **Introduction:**

The scaling or deposition on the heat exchanger tubes and tube sheets of an MSF desalination plant is a common phenomenon. Scale and sludge formation have negative impacts on heat transfer, pressure drops, as well as flow starvation and above all deterioration of distillate product water yield and quality. If the proper cleaning or de-scaling is not carried out continuously then it would greatly affect the efficiency of the plant.

This course is intended to introduce and review the current and innovations in cleaning techniques. Chemical cleaning with acid cleaning, volatile solvents, corrosive chemicals, and aqueous detergents with its advantages and safety issues and corrosive properties, On the other hand, mechanical online and offline cleaning is also considered with the advantages and disadvantages of each Technique.

### **Course contents:**

1. Different methods of cleaning in MSF
2. Different types of chemical cleaning
3. Practical overview and experience chemical cleaning
4. Requirement of thermal cleaning
5. Fouling & scales in MSF components.
6. Sponge balls in fouling and automatic ball cleaning
7. Inhibitors and methodology of acid cleaning
8. Up-to-date design and instrumentation for desalination plant
9. Mechanical integrity of desalination equipment and the effect of chemical cleaning
10. Theoretical aspects and practical experience in desalination plant and type of cleaning
11. Maintenance types, how to plan for maintenance
12. Reliability of MSF
13. Inspection method
14. Online monitoring

### **Course Objective:**

Upon completion of the course attendees will be able to:

1. To refresh theoretical aspects of MSF Acid & Ball cleaning
2. Plan and organize acid and ball cleaning
3. Understand proper operations and how to avoid foiling
4. Ability to operate MSF according to design to prolong maintenance interval
5. Determine power optimization
6. Discuss chemical cleaning of metals including different process
7. Understand monitoring technique
8. Understand and implement stage stimulation

9. Carry out maintenance activities suitable for MSF and avoid forced shutdowns
10. Understand maintenance tool selection
11. Carry out preventive maintenance, predictive maintenance and improve reliability of plant
12. Carry out all work according to safety standard

**Certificate:**

Cairo University Certificate, approved and recognized by international organizations

**Who should attend?**

All personnel involved in MSF plants

**Course includes:**

1. Hand out includes all hard and soft material of the course in nice gift
2. Transportations
3. Breakfast, coffee breaks, lunch in famous restaurants
4. Accommodations (can be discussed)

**Instructors:**

2 or three approved instructors for design, operations and maintenance

**Training**

The course will be conducted along workshop principles with formal lectures, case studies and interactive worked examples. Relevant case studies will be provided to illustrate the application of each tool in an operations environment. There will be ample opportunities for discussion and sharing experiences

**Personal Impact**

This course will give the delegate the required level of technical knowledge and skill to achieve that personal satisfaction.

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