



# THE CHEMICAL ENGINEERING MAJOR

## Chemical Cleaning in Process, Upstream and Downstream Operation

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# Chemical Cleaning in Process, Upstream and Downstream Operation

## Who Should Attend?

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- Engineers, operators and lab chemists who deals with Materials and Corrosion Control

## Methodology:

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This interactive Training will be highly interactive, with opportunities to advance your opinions and ideas and will include;

- Lectures
- Workshop & Work Presentation
- Case Studies and Practical Exercise
- Videos and General Discussions

## Certificate:

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**BTS** attendance certificate will be issued to all attendees completing minimum of 80% of the total course duration.

## Objectives:

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An advanced course to develop the engineers and operators deals with Materials and Corrosion Control about:

- Identifying Operating Problems.
- Introduction to Chemical Cleaning.
- Specifying Corrosion Inhibitor Programs.
- Chemical Cleaning Methods.
- Specifying Scale Inhibitor Programs.
- Application of High-Pressure Water Jetting.
- Specifying Biocide Programs.
- Specifying Emulsion Control Programs.
- Specifying Oxygen Scavenger Programs.
- Applications and Implications of Miscellaneous Chemical
- Treatments.
- Principles of Chemical Cleaning.
- Specifying Chemical Treatments For Hydrotesting /Lay Up And
- Mothballing.
- Special Chemical Cleaning Problems.
- Chemical cleaning Case Histories.
- Safety Measures and Precautions.
- Acidizing of Producing And Injection Wells.

## Contents:

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- Identifying operating problems:
- Types and locations of operating problems in wet multiphase systems.
- Types and locations of operating problems in wet crude oil systems.
- Types and locations of operating problems in wet gas systems.
- Types and locations of operating problems in brine handling systems.
- Introduction to chemical cleaning:
- What is chemical cleaning.
- Why is chemical cleaning used.
- When do you do chemical cleaning.
- Optimum frequency considers total fouling-related expense.
- Type of foulant varies with process.
- Advantages and disadvantages of chemical cleaning.
- Specifying corrosion inhibitor programs:
- Organic corrosion inhibitors: function, types, mechanisms for film formation, and formulations.
- Recommending corrosion inhibitor programs.
- Evaluating corrosion inhibitor performance.
- Chemical cleaning methods:
- Pre-commission cleaning.
- Cleaning boilers requires preparation to minimize risks.
- Several methods for cleaning towers.
- Specifying scale inhibitor programs:
- Function of scale inhibitor formulations.
- Recommending scale inhibitor programs.
- Evaluating scale inhibitor performance.
- Application of high-pressure water jetting:

- How high-pressure water jetting works.
- Advantages and disadvantages of high-pressure water jetting.
- HPJ cleaning can be used for various equipment.
- Nozzle design is function of energy and application.
- Type of foulant determines pressure required.
- Specifying biocide programs:
  - Biocide formulations.
  - Recommending biocide programs.
  - Evaluating biocide performance.
  - Criteria and guidelines for recommending biocide programs.
  - Criteria, guidelines, and data base for evaluating biocide performance.
- Specifying emulsion control programs:
  - Function of de-emulsifier formulations.
  - Recommending emulsion control programs.
  - Evaluating emulsion control programs.
  - Criteria and guidelines for recommending emulsion control programs.
  - Guidelines for evaluating emulsion control programs.
- Specifying oxygen scavenger programs:
  - Oxygen scavengers: mechanisms, function, formulations, and factors that affect reaction rates.
  - Recommending oxygen scavenger programs.
  - Dissolved oxygen test.
  - Criteria and guidelines for recommending oxygen scavenger programs.
- Applications and implications of miscellaneous chemical treatments:
- Applications and implications of usage of Di-Glycol Amine processes.

- Applications and implications of usage of antifoaming agents in processes.
- Applications and implications of usage of acid corrosion inhibitors in processes.
- Principles of chemical cleaning:
- Determining foulant solubilities.
- Selecting the appropriate chemicals.
- Chemical application techniques are varied.
- Calculating chemical requirements.
- Specifying chemical treatments for hydro-testing/lay up and mothballing:
- Determining the chemical treatments required for hydrotested / laid-up facilities.
- Determining the chemical treatments required for facilities scheduled to be mothballed.
- Determining whether chemicals to be discharged are environmentally acceptable.
- Special chemical cleaning problems:
- Factors that influence corrosion rates.
- Inhibitors that require special handling.
- Equipment and design-related problems and solutions.
- Chemical cleaning case histories:
- Lube and seal oil piping preoperational cleaning.
- Preoperational cleaning of boilers and steam generators.
- Post-operational cleaning of steam generator.
- Condenser and cooler cleaning is simple procedure.
- Chemical cleaning of flash evaporators.
- Cleaning reverse osmosis (ro) and electrodialysis (ed) units.

- Chemical cleaning of crude preheat exchangers.
- Furnace cleaning depends on type.
- Chemical technique for gas freeing towers.
- Safety measures and precautions:
- Major hazards in chemical cleaning/preventive procedures.
- Safety concerns in cleaning projects.
- Release of hydrogen sulfide and other gases.
- General precautions for high-pressure jetting.
- Acidizing of producing and injection wells:
- Why is acidizing done and Acid types.
- Treatment and formation types.
- Scale removal in production flowlines and tubulars.
- Treatments for removing organic deposits.
- Limited use of additives.
- Corrosion inhibition in damage removal treatments.
- Evolution of inhibitors to meet needs.
- Use of inhibitor aids.
- Selecting inhibitors.
- How much corrosion protection do you need?.