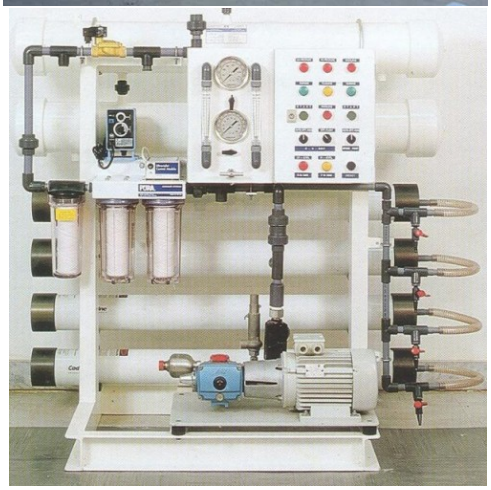
Treatment for Reverse Osmosis (RO) Plant



YOU WILL LEARN HOW TO:

To impart an understanding of the types of contaminants present in raw waters how these vary from source to source and the impact of these contaminants upon the nature of the water and how it can be used and treated.

To provide a sound working knowledge of both conventional and advanced treatment processes for the treatment of water from various sources and brings it to the standards suited for drinking purpose.

To prove methods to use the testing results to understand how the plant is operating and to optimize the operation and or troubleshoot problems.

WHO SHOULD ATTEND:

- Maintenance engineers, technicians and staff
- Plant engineers
- Operation, maintenance, inspection and repair managers,

The Workshop

This unique volume provides a comprehensive overview of all the major aspects of modern drinking water systems in the western European context. it not only covers the theoretical principles, but also the historical background and practical aspects of design and operation, legislation, planning and finance of drinking water supply in its social and economic context. The principles and practices are illustrated using experiences from the Netherlands .the Dutch drinking water supply is well known for its multiple barrier systems and high technical standards. The Dutch therefore readily drink tap water and do not see the need to buy bottled water or in-house filters, with their drawbacks on national economics public health and the environment . this illustrative overview can be used as a reference for other countries and regions. Bringing water from its sources to a desirable drinking state requires a thorough understanding of the principles and practices of drinking water characterization and the knowledge of both the commonly used conventional technologies and some of the newer more advanced treatment technologies. This course meets this need.

Practical Sessions

This is a practical, hands on workshop enabling you to work through practical exercises which reinforce the concepts discussed.

The Program

Module (01)basic water chemistry
1.1 the water molecule
1.2 units of concentrations used in water treatment
1.3 percentage
1.4 expressing concentrations as CACO3
1.5 examples of calculation
1.6 water ionization and Ph Scale
1.7 acid-base calculations
1.8 buffer solutions
1.9 electrolytes and the concept of equilibrium
1.10 solubility of gases in water and henrys law
1.11 water conductivity
1.12 cation conductivity
1.13 natural water cycle and carbonate system
1.14 alkalinity
1.15 examples and calculations
1.16 saturation index
1.17 chemical injection

Module(02) clarification
2.1 description of the process
2.1.1 coagulants
2.1.1 Flocculation
2.1.2 non-ionic and anionic flocculants
2.1.3 jar test and optimal parameters determination
2.2 coagulator clarifier
2.2.1 process description
2.2.2 design considerations and calculations
2.3 cold lime softing clarifier
2.3.1 process description
2.3.2 chemicals dose calculation
2.3.3 design consideration and calculation
2.4 lamella clarifier
2.4.1 process description
2.4.2 chemicals dose calculation
2.4.3 design consideration and calculation oil removal

Module (03) filtration
3.1 fundamentals
3.1.1 occlusion
3.1.2 adsorption
3.1.3 reduction and the removal of chlorine
3.2 gravity filters
3.2.1 process and operation overview
3.2.2 vessel configuration
3.2.3 design calculation
3.3 pressure filters
3.3.1 process and operation overview
3.3.2 vessel configuration
3.3.3 design calculation
3.4 activated carbon filters
3.4.1 process and operation overview
3.4.2 vessel configuration
3.4.3 design calculations
3.5 greensand filter, iron and manganese removal
3.5.1 process and operation overview
3.5.2 vessel configuration
3.5.3 design calculation

Module(04) degasification
4.1 gas solubility and reaction with water
4.2 effect of ph
4.3 effect of temperature
4.4 system configuration
4.5 equipment deign parameters

Module (05) ion exchange chemistry and demineralization
5.1 introduction and description
5.2 addition polymerization
5.3 structure of ion exchange resins
5.4 chemical specifications and tests
5.5 ion exchange capacity (and determination)
5.6 ion exchange equilibrium
5.7 softening
5.8 demineralization
5.9 co-flow multistage process
5.10 counter flow systems
5.11 combined cycle single stage remunerably(mixed bed h +oh-cycle)
5.12 effects of cation leakage an anion performance
5.13 condensate polishing mixed beds
5.14 dealkalization
5.15 calculation examples
5.16 operation and regeneration

Module (06) revers osmosis
6.1 osmosis and its cause
6.2 osmosis and osmotic pressure
6.3 revers osmosis
6.4 advantages and disadvantages of reverse osmosis
6.5 membrane materials
6.6 membrane modules
5.7 spiral wound membranes
6.8 single pass RO system process and operation overview
6.9 double pass ro system
6.10 membrane fouling and prevention
6.11 scale control

Module(07) electrol deionization (EDI)
7.1 fundamentals
7.2 theory of operation
7.3 edl vs. conventional mixed bed deionization
7.4process and operationa overview
7.5application and design parameters

Module(08) corrosion
8.introduction to electrochemistry
8.2electrode potentials and Nernst equation
8.3galvanic series
8.4components of electrochemical corrosion
8.5typea of corrosion
8.6corrosion inhibitors
8.7cathodic protection

Module(09) water analysis
9.1conventional analysis (titrations)
9.1.1chloride,hardness,alkalinity,acidity,
9.1.2using excel in chemical analysis
9.2 spectrophotometers
9.2.2 silica phosphate hydrazine ammonia
9.2.3 using excel in standard calibration curves