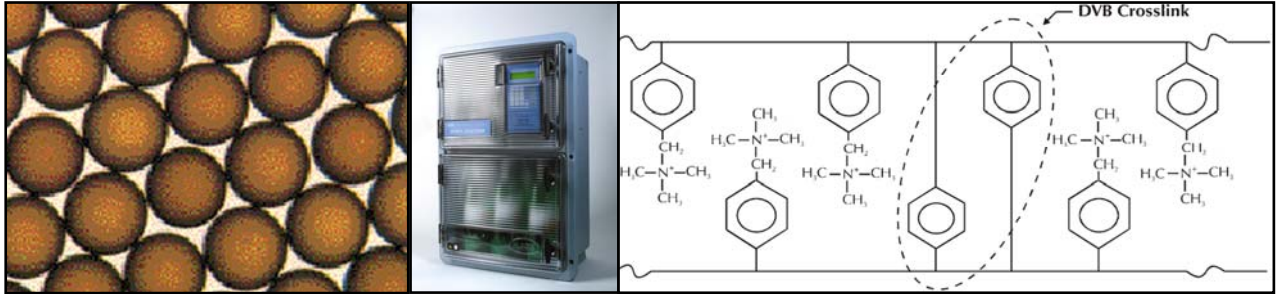


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High Purity Water Treatment Course 1

High Purity Water from Ion Exchange

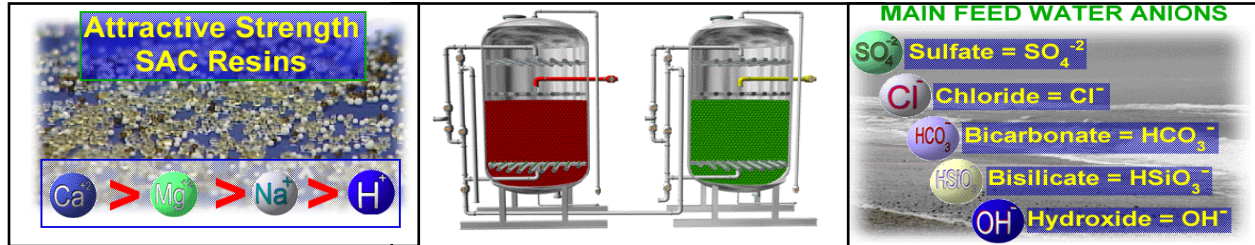
1. Characteristics
2. Processes
3. Total Oxidizable Carbon (TOC)
4. Particles
5. Conductivity/Resistivity
6. Microbiology
7. Silica

Sectional Exam

8. Ion Exchange Principles
9. Decarbonation & Degasification: Principles
10. Decarbonation & Degasification: Equipment
11. Reverse Osmosis Impacts on Ion Exchange
12. Resins: Structure & Manufacture
13. Resins: Functional Groups
14. Resins: Selectivity

Sectional Exam

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High Purity Water Treatment Course 2

Ion Exchange Operation

- 15. Weak Acid Cations: Normal Service
- 16. Weak Base Anions: Normal Service
- 17. Strong Acid Cations: Normal Service
- 18. Strong Base Anions: Normal Service
- 19. Strong Base Anions: Organics & Silica Removal
- 20. Dual Beds (C & A): Normal Service

Sectional Exam

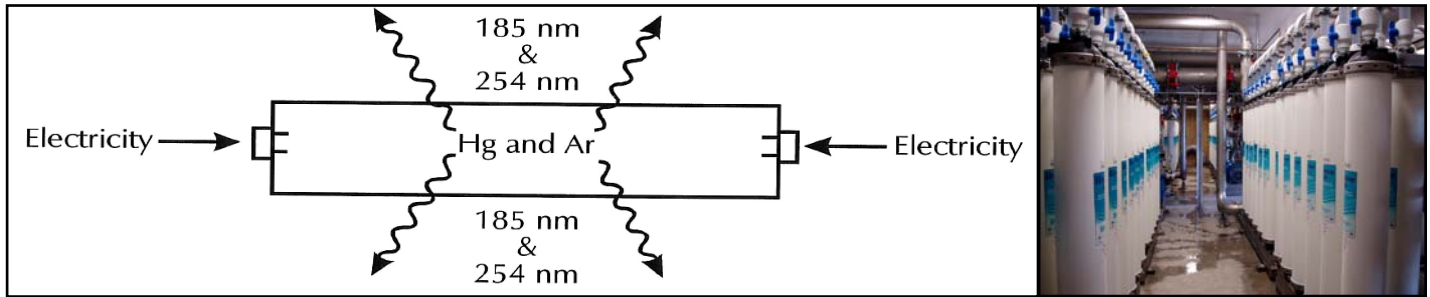
- 21. Weak/Strong Combinations: Normal Service
- 22. Sodium-Cycle Softening
- 23. Chloride-Cycle Dealkalizing
- 24. Mixed Beds: Principles
- 25. Mixed Beds: Normal Service
- 26. Full-Train Deionization: Cation/Anion Mixed Bed

Sectional Exam

- 27. Cation Regeneration: Principles
- 28. Cation Regeneration: Procedures
- 29. Anion Regeneration: Principles
- 30. Anion Regeneration: Procedures
- 31. C & A Concurrent Regeneration: Principles
- 32. Mixed-Bed Regeneration: Principles
- 33. Mixed-Bed Regeneration: Procedures

Sectional Exam

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Courtesy: Hydraulautics

High Purity Water Treatment Course 3

Maintaining High Purity

- 34 Overview
- 35 Piping: Dead Legs/Flow Rates/Materials
- 36 Ultraviolet Irradiation: Principles
- 37 Ultraviolet Irradiation: 254 nm
- 38 Ultraviolet Irradiation: 185 nm
- 39 Other Disinfectants: Ozone, Hydrogen Peroxide, Heat

Sectional Exam

- 40 Principles
- 41 Equipment: Micro-, Ultra-, & Hyperfiltration
- 42 Piping & Storage
- 43 Polishing, Disinfection & Final Filtration

Sectional Exam

Final Exam

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Advanced High Purity Water Treatment Course 1

Feed Water & Pretreatment

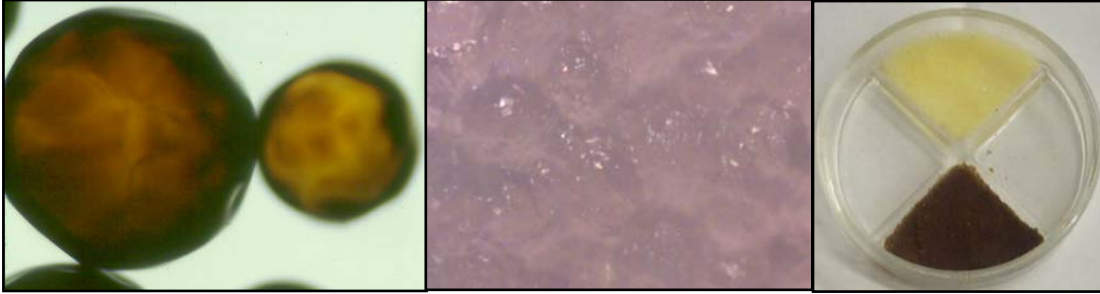
1. Overview of Laboratory Analysis I
2. Overview of Laboratory Analysis II
3. Silica
4. Organics
5. Particles
6. Microbiology
7. Ions

Sectional Exam

8. Raw Water
9. Backflow Prevention I
10. Backflow Prevention II
11. Backflow Prevention III
12. Pumps I
13. Pumps II
14. Pumps III

Sectional Exam

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Courtesy: Ionpure

Courtesy: Ionpure

Advanced High Purity Water Treatment Course 2

Ion Exchange Troubleshooting

- 15. Feedwater Analysis
- 16. Ion Exchange Capacity: Feedwater Calculations
- 17. Ion Exchange Capacity: Resin Calculations
- 18. Ion Exchange Capacity: Feedwater Changes
- 19. Resin Problems
- 20. Resin Analysis
- 21. Resin Replacement

Sectional Exam

- 22. Overview of Regeneration Problems
- 23. Cation Regeneration Troubleshooting
- 24. Anion Regeneration Troubleshooting
- 25. Mixed-Bed Regeneration Troubleshooting I
- 26. Mixed-Bed Regeneration Troubleshooting II

Sectional Exam

High Purity Water Treatment Specialist Program



Courtesy: Aquafine

Courtesy: Sumitomo

Courtesy: Public Service Co of NM

Advanced High Purity Water Treatment Course 3

Post Ion Exchange

- 27. Ultraviolet Irradiation I
- 28. Ultraviolet Irradiation II
- 29. Final Filtration I
- 30. Final Filtration II
- 31. Periodic Sanitization I
- 32. Periodic Sanitization II
- 33. Waste Neutralization I
- 34. Waste Neutralization II
- 35. Waste Neutralization III
- 36. Waste Solvents I
- 37. Waste Solvents II
- 38. Heavy Metals I
- 39. Heavy Metals II

Sectional Exam

- 40. Gases I
- 41. Gases II
- 42. Bulk Chemicals I
- 43. Bulk Chemicals II

Sectional Exam

Final Exam