

# Smith Engineering - services

## System design

All systems are custom designed to make water a true utility for your process. CAD flow schematics allow for accurate identification and design of your system.

## Installation and training

- CAD plumbing schematics
- CAD electrical schematics
- GE Fanuc, Omron, Allen Bradley and Idec Ladder diagrams
- System start up and installation
- On-site installation supervision
- On-site operator training
- Instruction manuals

## System service

At Smith Engineering service is the most important aspect of our business. A large percentage of our business comes from repeat customers and "word-of-mouth" referrals. We believe quality systems and service attract and maintain customer loyalty.

## System maintenance

- Filter replacement
- Membrane maintenance
- Exchange tank replacement
- On-site Cation, Anion and Chelate resin regeneration
- On-site waste stream neutralization
- System sanitization
- Technical assistance
- On-site trouble shooting
- Meter and instrument calibration
- System upgrades
- Resin and media replacement
- Maintenance contracts

## System monitoring and testing

- On line monitoring for:
  - Resistivity
  - Conductivity
  - pH
  - Silica
  - TOC
  - Total residue
  - Particulates
  - Hardness
  - Chlorine
- Analytical laboratory referrals
- Smith Engineering remote system monitoring

## System controls

- Programmable logic controllers (PLCs)
- Data acquisition
- Status display panels
- Custom control panels
- Pneumatic valve control
- Motor starters
- Disconnects
- Remote monitoring

*Skid mounted deionizer/ultrafilter system-biomedical application*



*Batch type metal precipitation system-zinc removal application*



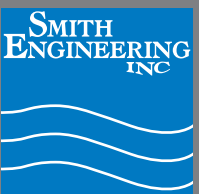
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*High temp closed loop carbon/deionization system-printed circuit board wash application*

Industrial  
 water  
 purification,  
 conditioning  
 and waste  
 treatment  
 solutions.

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# Smith Engineering-Water treatment systems

## Exchange Deionization (DI) Systems

Exchange DI tanks use cation and anion resins to remove ionic impurities from water. These systems can be designed to use one or more of the following technologies: Carbon Filtration, U.V. Sterilization and TOC reduction, Ultrafiltration, MicroFiltration, Reverse Osmosis, Ozonation, Sanitary Plumbing Designs, and Semi-Automatic System Sanitization. The exchange DI service allows you to have deionized water without the use of concentrated acids or bases.

Our service policy (in the metro area) for delivery of exchange tanks is as follows: if we receive your call for an exchange in the morning, the exchange will be completed in the afternoon. If we receive your call in the afternoon, the exchange will be completed the following morning of the next working day. Special circumstances may dictate that an exchange be made sooner. Exchange deionization system options:

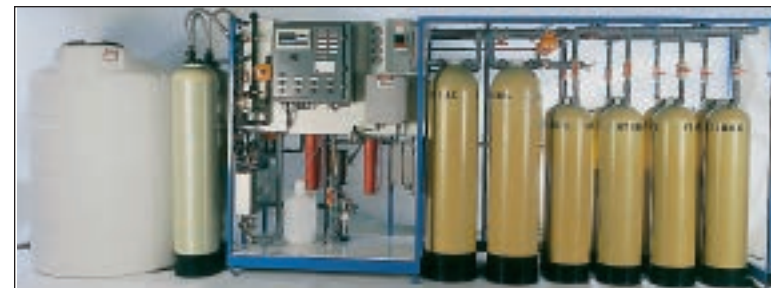
- Dedicated tanks
- Two bed deionizers
- Mixed bed deionizers
- Weak base deionizers
- Freshly regenerated tanks
- Reverse osmosis pre-treatment
- Standby tanks
- Automatic switchover systems
- Smith Engineering computer linking
- Piping: PVC, CPVC, Sani-Tech, polypropylene, Teflon, Halar, PVDF and stainless steel

Our exchange DI systems are custom designed to meet the following water quality requirements: (This is only a partial list)

- Resistivity-other ionic standards (ohms-cm)
- TOC (Total Organic Carbon) (ppb)
- Silica (ppb)
- Particulates (particles/liter)
- Bacteria (CFU/ml)
- Endotoxins (EU/ml)
- Trace metals

Reverse Osmosis System-semiconductor application

High temp closed loop carbon/deionization system-printed circuit board wash application



## In-house Deionization (DI) systems

In-house deionization systems allow our customers to regenerate their own tanks. These systems can be designed to meet the same water quality requirements as standard exchange deionization systems. Chemicals such as HCl and NaOH are used to regenerate the cation and anion resins. The in-house systems offer operating cost savings over exchange DI systems. In-house systems are custom designed to meet individual safety requirements and also offer the following options:

- Manual, semi-automatic and automatic systems
- Single, duplexed and multiple unit systems
- Softening, deionizing, dealkalization and metal removal
- Reverse Osmosis pre-treatment
- Waste stream treatment and neutralization
- Custom skids
- Custom system controls (such as PLCs and display panels)

## Closed Loop Deionization (DI) systems

Closed loop deionization systems can use exchange and in-house deionization to deionize your water. Closed loop systems can be designed to meet the same water quality requirements as standard exchange deionization systems. These systems purify your water for use, return the process water for purification, and reuse the water. Closed loop systems become cost effective if the used or returned water quality is purer than the incoming city water quality. These systems can also become effective for some specific waste treatment considerations. Operating costs are based on your ongoing process conditions. Basic system options:

- Flow rates up to 500 GPM
- On-site cation, anion and chelate resins regeneration
- In-line heaters and heat exchangers
- Hot systems
- Open frame skids and custom skids (upon request)
- Reverse osmosis systems
- Enclosed plastic and metal cabinets
- Smith Aqua-System recirculating deionizer for printed circuit board assembly
- Custom controls (such as PLCs and display panels)

Open frame mounted deionizer/ultrafilter system-biomedical application



## Ultrafiltration Systems

- Hollow fiber and membrane type
- Molecular weight cutoffs from 1,000 MW to 100,000 MW
- Applications vary from pyrogen removal to oil/water separation

## Waste Treatment Systems

- pH adjustment
- Metal removal
- Precipitation and sludge pressing
- Sludge drying
- Ion exchange
- Acid re-use
- Manual and automatic systems
- Reclaim/re-use systems

## Cooling Tower/Boiler Treatment Systems

- Water softening and dealkalization
- Chemical feed and bleed systems
- Tower fill, bleed-off and controls
- Service and maintenance contracts

## Water Pre-Treatment Systems

- Water softening systems
- Carbon filtration systems (chlorine removal and organic reduction)
- Iron filtration systems
  - Manganese Greensand
  - Birm
  - Oxidation and filtration
- Standard filtration
- Chemical treatment

## Reverse Osmosis Systems

Reverse Osmosis (RO) is capable of the highest filtration possible. RO offers a cost effective way to remove ionic and organic impurities without the need for regeneration chemicals. Membranes are available to meet a wide range of purification applications. These systems can meet varied water quality requirements through the use of many technologies. Standard options:

- Water reclamation
- Single pass systems
- Two pass systems
- pH adjustment
- Degasification
- System pre-treatment
- System post treatment (example-final loop polishing)
- Custom control systems
- Custom skid units
- Waste treatment

Enclosed deionizer/ultrafilter system-biomedical application



Automated closed loop carbon/deionization system-printed circuit board wash application

## Exchange Deionizer Tank Sizes

