

Some alternate technologies for
high purity boiler feed water
treatment

1. Short Packed bed Ion Exchange
2. Granular Micro Media Filtration



1000 (220 m³/hr) Ultrapure water treatment system at nuclear power station – operating 14 years



TYPICAL INDUSTRIAL WATER TREATMENT SYSTEM

to produce high purity demineralized water



FILTRATION

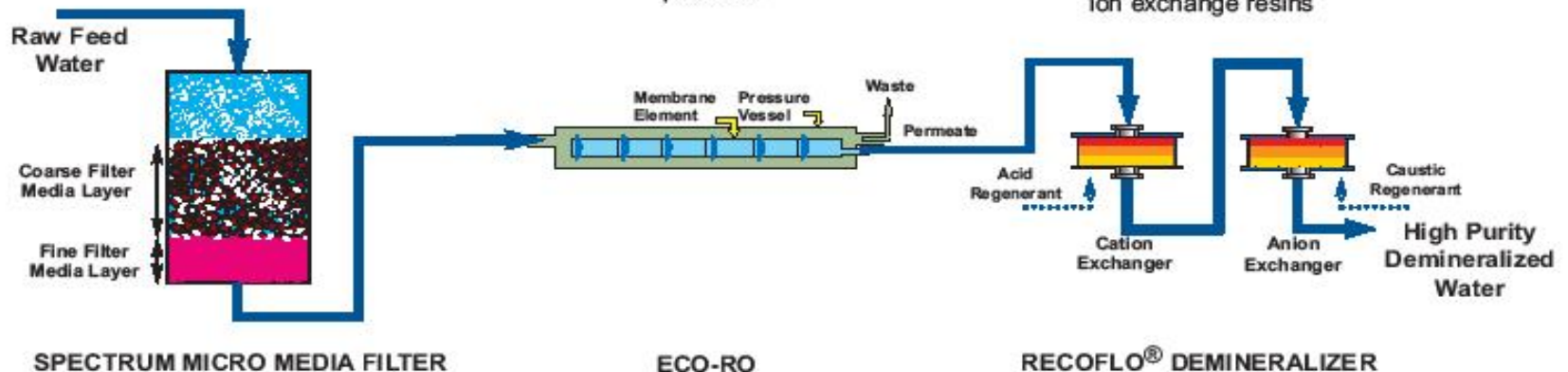
Removal of undissolved, suspended solids by filtration through particulate media

REVERSE OSMOSIS

Removal of the majority of dissolved materials by reverse osmosis membranes under pressure

ION EXCHANGE POLISHER

Removal of the remainder of dissolved solids using regenerable ion exchange resins



Short Packed Bed Ion Exchange Systems

High purity water....

without mixed resin beds.....

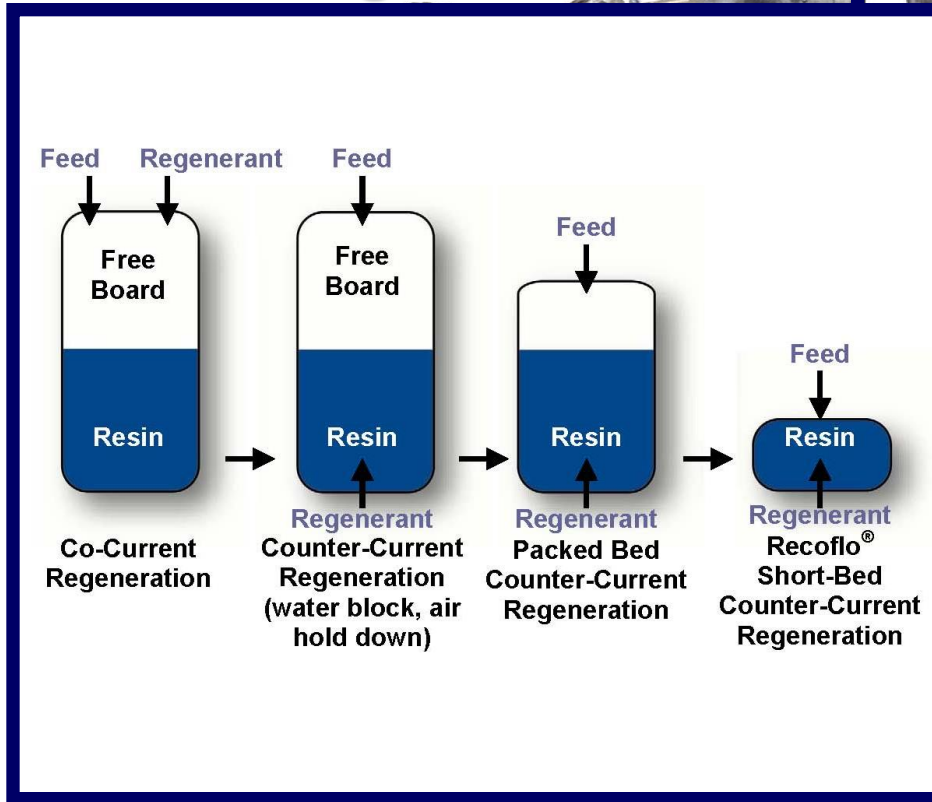
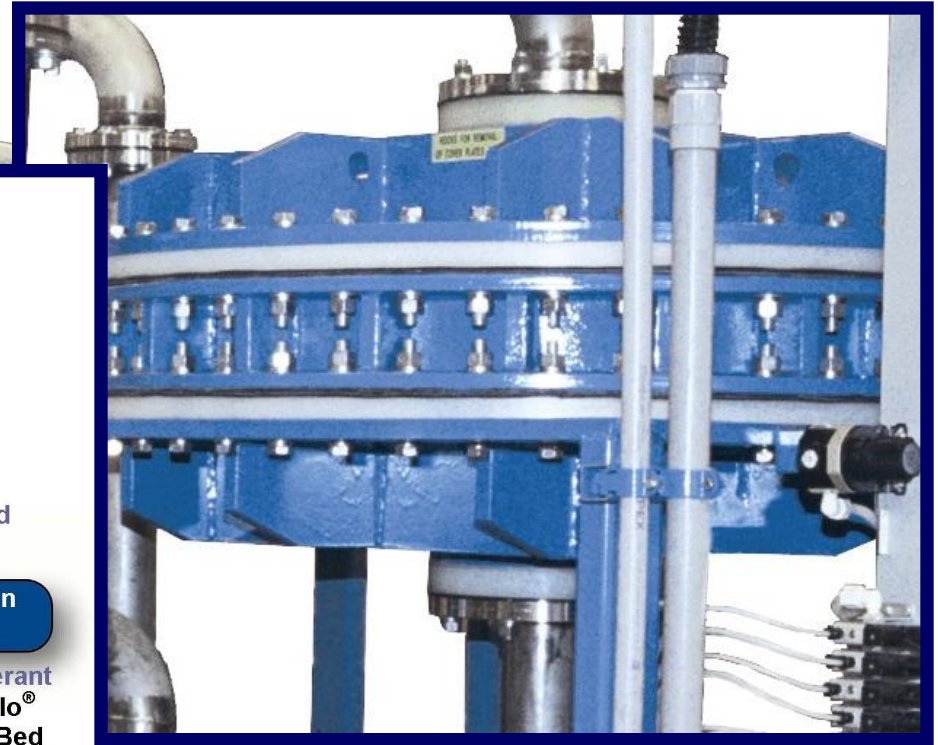
without membranes

Conventional vs Recoflo[®]



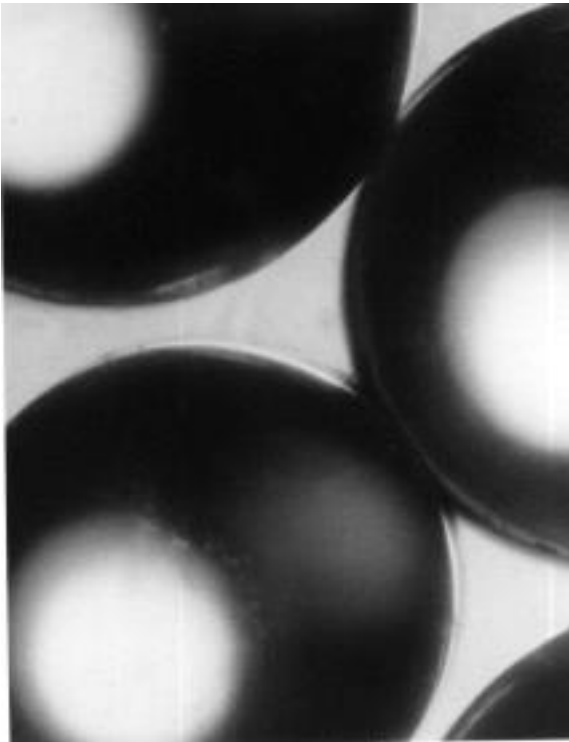
Recoflo[®] Features

Short Bed Height

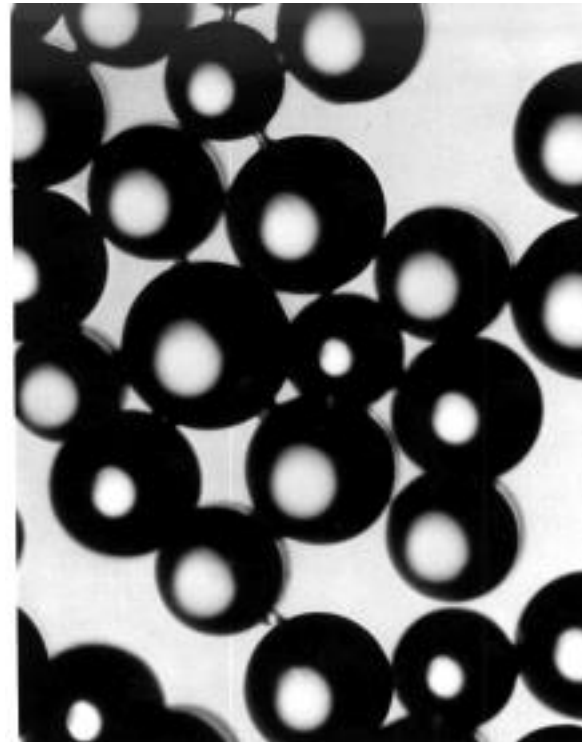


Ion Exchange Resins

Conventional



RecoPur[®]



Polisher after Reverse Osmosis

- More robust than electro dialysis
- Less pretreatment required (single pass RO)
- No cleaning required
- Auto response to variations in feed
- Will not foul during upset condition
- Very low chemical consumption
- Neutral waste
- Easy on-site maintenance



250 m³/hr RO polisher
2 m X 4 m footprint
2 m high



Considerations	Short Packed Bed Ion Exchange (Recoflo™)
Equipment	Modular & Skid mounted with 50% less space Capability of producing high purity water, without the need for a Mixed Bed Polisher
Installation	Performed in days Resin preloaded, Factory tested, Plug & Play
Reliability	Compensates for Feed Water Quality Self diagnostics
Operating Costs	Less: Chemicals, Resin, Waste and Labor
Environmental	Produces small volumes of easily manageable wastes
Serviceability	Short cycle times - Facilitates Troubleshooting

Granular Micro Media Filtration

*Membrane quality filtration ...
without the membranes*



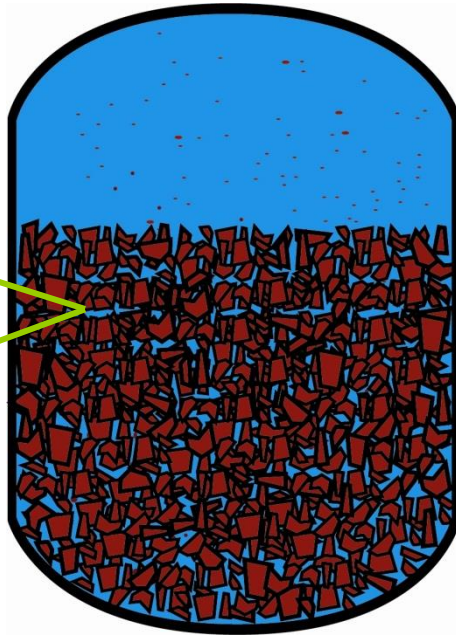
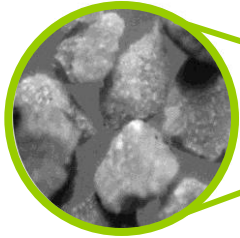
Spectrum Micro Media Filter™



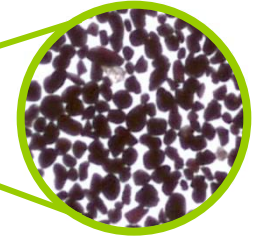
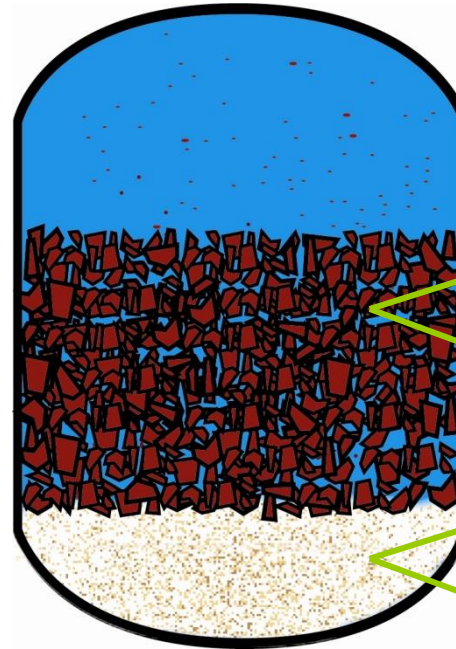
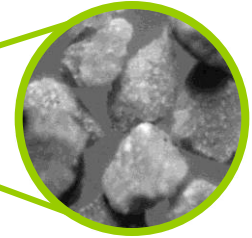
Key Design Difference

Conventional Media Filter vs. Spectrum Micro Media Filter™

**Media Particle Size:
600-800 microns
(20-30 mesh)**

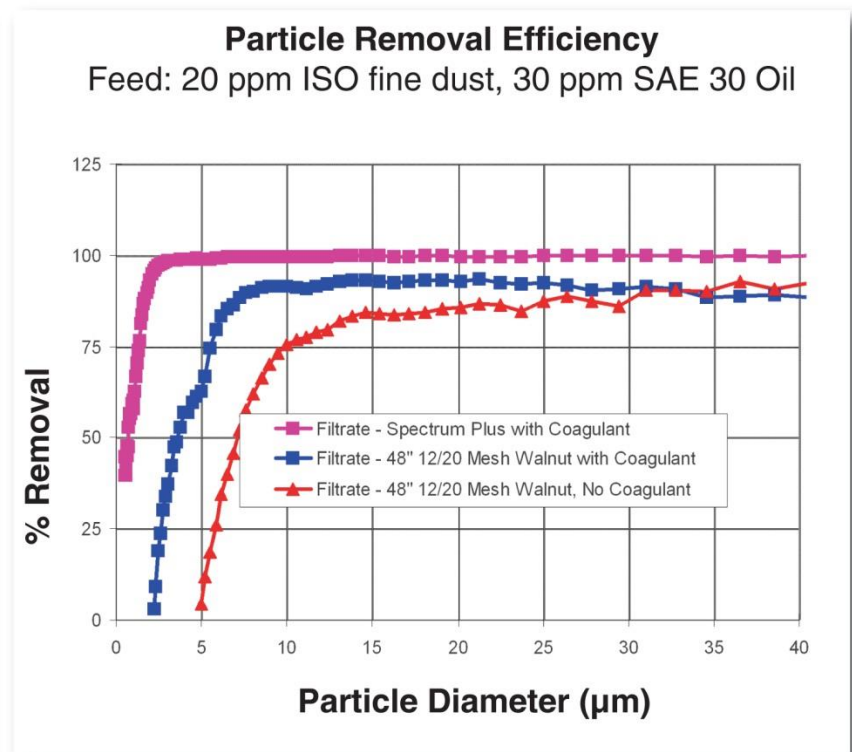
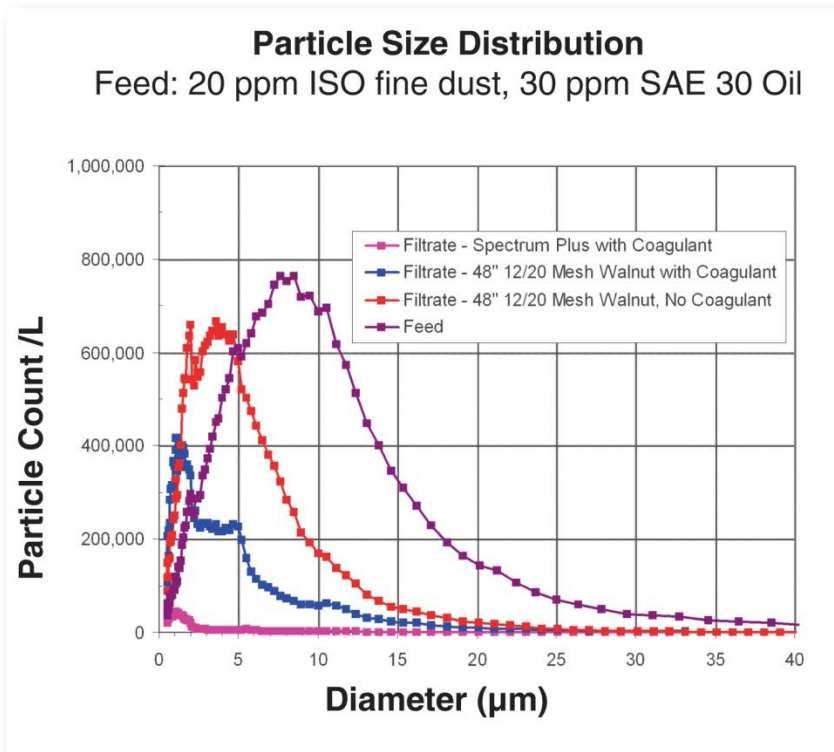


**Media Particle Size:
600-800 micron (20-30
mesh)**



**Micro Media Particle
Size: 100-180 micron
(80-150 mesh)**

Superior Performance





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