SpectraPure®
INNOVATORS IN WATER TECHNOLOGY

Using and Configuring SpectraPure De-Ionization Cartridges

SpectraPure has an extensive line of DI cartridges and bulk resins, mixed and layered, for application-specific uses.

Most de-ionizing (DI) cartridges are a mixture of Anion and Cation resin in specific-to-the-application ratios. Cation resin holds a preponderance of H+ ions on its surface while Anion resin holds a similar quantity of OH- ions. When positive-charged impurities, i.e. Sodium, (Na+) are exposed to Cation resin, the impurities will "stick" to the resin, knocking off an H+ ion to travel on downstream. Likewise, a negative-charged ion, i.e. Chloride, (Cl-) will "stick" to Anion resin, knocking off an OH- ion. If the resin mixture ratio is correct, the H+ and OH- ions will combine to recreate H20 molecules that will combine with the rest of the already-pure water that travels through the resin beds. Too much active Anion resin and the water will have a higher-than-neutral pH. Too much active Cation and the water will be lower-than-neutral pH.

Almost all resins can be provided as Color-Indicating and Non-Indicating. This refers to a change in color of some portion of the resin in response to resin consumption/expiration. Color indication is typically used as a less expensive alternative to electronic water quality monitors such as inline or hand-held TDS meters. No further distinction will be made in this discussion.

The most common DI cartridge is the Mixed-Bed. Different ratios are used for different applications, but most of the Mixed-Bed resin we formulate is made especially for Reverse Osmosis water. Mixed-Bed carts can be used solo, as a pair, or after a specialty cartridge.

Special cartridges include the All-Anion Silica-Free (DI-SF-CI-10) and the half-Anion / half-Cation Ammonia-Remover (DI-AR-CI-10). This pair has been used for years (since 2000) in our SP2000 RO/DI system. A Mixed-Bed can also be positioned after a Silica-Free cartridge.

The SilicaBuster was the logical improvement over the above combination. It is 1/3 Anion and 2/3 Mixed-Bed with the water meeting the Anion first and then passing through the Mixed-Bed. For a single cartridge system, this one is hard to beat for aquarists' concerns.

We have developed a unique and proprietary cartridge called the MaxCap DI. It can be found in our five-stage MaxCap RO/DI system. This cartridge has a much-improved capacity over a typical Mixed-Bed, but is not designed for single cartridge systems; a SilicaBuster or Mixed-Bed cartridge should ALWAYS follow it. This combination will produce more and purer water than two Mixed-Bed cartridges in series.

Sometimes, for larger commercial systems, we may have a 20-inch cartridge full of Anion (DI-SF-CI-20) followed by one or two 20-inch Mixed-Bed cartridges. Other combinations are possible after consulting with our Engineering Staff.

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Possible Configurations:

Single Stage:

Mixed-Bed (indicating and non-indicating)
-Or-
Silica Buster (indicating and non-indicating)

When to change:
In general, when the TDS meter indicates a greater than 001 reading, it is time to change your single stage DI filter. Alternatively, when your color changing DI cartridge has nearly completed changing color (75-80%), it is time to change your single stage DI filter.

Dual Stage:

MaxCap – SilicaBuster
-Or-
MaxCap – Mixed-Bed

When to change:
When the TDS after the MaxCap reads half of the TDS before the MaxCap, replace the MaxCap. When the TDS after the second DI indicates a greater than 001 reading, it is time to change that DI filter. Alternatively, when the color changing DI cartridge has nearly completed changing color (75-80%), it is time to change that DI filter.

Mixed-Bed – Mixed-Bed (For special applications, this configuration may be used.)

When to change:
When #1 becomes exhausted (either by color change or by a TDS meter's probe located between the cartridges), move #2 to #1 and put a new cart in #2.

Legacy Configuration:

SilicaFree – Ammonia Removal

When to change:
The SF will change color, replace after 75-80% change. The AR should use a TDS meter to indicate a greater than 001 reading, or you can monitor the half of the cartridge that changes color.

Three Stages:

A third stage is seldom used, unless there is a severe CO2 problem, then a SilicaFree can be put in front of a Dual Stage configuration.

When to change:
The SF will change color, replace after 75-80% change. For the remaining two stages, monitor as indicated above.

Four Stages:

MaxCap – MaxCap – SilicaBuster – SilicaBuster
-Or-
MaxCap – MaxCap – Mixed-Bed – Mixed-Bed

When to Change:
When #1 becomes exhausted, move #2 to #1 and put a new cart in #2. Likewise for #3 and #4.

Four Stage Laboratory Systems:

MB/ULTOC – MB/ULTOC – MB/UPC – MB/ORG

When to change:
Use a lab-quality resistivity meter. When the resistivity drops below a specified set point (as determined by the user), all four cartridges should be replaced. If the resistivity is above the set point but substances such as organics exceed specifications, replace the ORG and ULTOC cartridges. Call Tech Support for assistance.

Legacy Configuration:

SilicaFree – SilicaFree – Am. Removal – Am. Removal

When to change:
When #1 becomes exhausted, move #2 to #1 and put a new cart in #2. Likewise for #3 and #4.