Aldex OSM+ (One Step Media)

Hardness, Tannins, Fe, Mn, H_2S Removal

*Aldex OSM+ multi-component, universal, water treatment media is **specially designed for the removal of the most common contaminants found in potable water**. Aldex OSM+ is **manufactured using only ANSI/NSF/CAN 61 and 372 certified components**: a uniform particle size, strong acid, cation resin for hardness removal; a macroporous strong base, type 1 resin for removal of tannins and other anions; as well as CR 26, a novel resin able to further reduce dissolved metals and arsenic, should those species be present. There are many treatment options on the market but only Aldex OSM+ has the unique ability to offer high capacity and long life.*

Benefits of Aldex OSM+

Blended for the North American Market

Aldex OSM+, manufactured in our plant in Granby, QC, is a blended product tailored to the North American market where the vast majority of installed systems are operated using a cocurrent design.

Aldex OSM+ is comprehensive by design with the exception of under-bedding. While coarse sand or gravel is commonly used the option is left to the installer as to which under-bedding is best for support and distribution.

Similarly, since there are virtually no packed bed residential systems and very few commercial packed bed systems operating in North America, Aldex OSM+ contains no floating resin. Aldex OSM+ uses no volume-filling inert plastic bead (as many companies do) but includes ion exchange resins able to remove hardness, tannins, iron, manganese and hydrogen sulfide.

Aldex OSM+ beads

Aldex OSM+ Features

Hardness

Aldex OSM+ contains a significant percentage of a high-capacity, uniform particle size, strong acid cation softening resin, **Aldex C800 UPS**. Aldex OSM+ will provide 15,000 grains operating capacity when regenerated with 12 lbs NaCl/cu ft. The following Aldex C800 UPS technical bulletin (pages 3-4) can be used to determine the pressure drop and backwash flow rate required to achieve 40-50% bed expansion.

Metals

Aldex OSM+ incorporates a unique chelation media able to oxidize metals in solution. Those metal-oxide nano-particles are then deposited in the void volume and removed with each regeneration. Many metal-oxides bind with arsenic so if arsenite or arsenate are present in solution, the **Aldex CR 26** portion of Aldex OSM+ will remove those contaminants.

Hydrogen sulfide

The same chelation media used to oxidize metals in solution (i.e. Fe, Mn and As) is also able to oxidize and remove hydrogen sulfide. The attached **Aldex CR 26** technical bulletin (pages 5-7) can be used to properly size a system as flow rate for this component varies indirectly with iron content. That is, the higher the influent iron level, the lower the service flow rate; see the bulletin for flow rate guidelines.

continued on next page

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Aldex OSM+ (One Step Media)

Hardness, Tannins, Fe, Mn, H_2S Removal

Aldex OSM+ Features *continued*

Organics, tannins and lignins

Multiple media are included in Aldex OSM+ to address the wide range of organics found in North American waters. Organics, tannins and lignans are difficult to remove but Aldex OSM+ is designed to accomplish this task.* The primary resin used to remove organic color bodies from potable water is **Aldex NSR**, a macroporous, strong base type 1, styrenic based resin which is very effective in the capture and removal of anions in solution. The NSR technical bulletin (pages 8-9) should be used to verify backwash expansion at a given gpm flow rate.

**The removal of organics, tannins, and lignans was not evaluated in the WQA certification.*

Regeneration

All of the resins are regenerated with a standard 10% brine solution.

Working media

All components have measurable ion exchange capacity making every component a “working media”.

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Rev. ADX13595-0124

Aldex C-800 Series • Manufactured in Canada using no chlorinated solvents • Lowest TOC

C-800 UPS Water Softening Resin Sodium Form

Tested and certified by WQA according to NSF/ANSI/CAN 61 and 372, NSF/ANSI 44 and CSA B483.1. *Aldex C-800 UPS is a* ***high capacity, high quality, gel-type cation resin*** *capable of meeting the most exacting requirements of household, farm, commercial, institutional and industrial water softeners. It is supplied in the sodium form as black colored beads in 1 cubic foot bags and larger bulk packages.*

Physical Chemical Properties

Resin Composition:	Sulfonated styrene / divinylbenzene copolymer
Ionic Form as Shipped:	Sodium (Na+)
Physical Form:	Black colored beads
Moisture Content:	45 to 49.9%
Total Capacity:	1.9 meq/ml minimum 41 kilograins as $CaCO_3$ per cubic foot
Odor and Taste:	None
Specific Gravity:	1.28
Net Weight (as shipped):	50 lbs per cubic foot
Particle Size:	20 to 40 mesh - Less than 0.5% through 50 mesh

Recommended Operating Conditions

Influent pH:	No restrictions
Maximum Temperature:	250 °F
Bed Depth:	Minimum 24” Normal 36”
Service Flow Rate:	1 to 5 US GPM per cubic foot
Backwash Flow Rate:	See Fig. 2
Regenerant:	Sodium Chloride (NaCl) or Potassium Chloride (KCl)
Regenerant Strength:	5 to 15%, usually 10%
Regenerant Flow Rate:	0.3 to 1.0 US GPM per cubic foot of resin
Regenerant Contact Time:	15 to 60 minutes
Regenerant Dosage Level:	2 to 15 lb per cubic foot
Slow Rinse (Displacement) Flow Rate:	0.3 to 1.0 US GPM per cubic foot of resin
Slow Rinse Volume:	20 USG per cubic foot resin
Fast Rinse Rate:	1.0 to 5.0 US GPM per cubic foot resin
Fast Rinse Volume:	30 USG per cubic foot resin

C-800 UPS Features

No Chlorinated Solvents
The absence of chlorinated solvents in the manufacturing of Aldex C-800 UPS results in very low TOC leakage.

Very low color, taste or odor
Aldex C-800 UPS meets the requirements for paragraph 173.25 of the Food Additive Regulation of the U.S. Food and Drug Administration.

High Capacity
30,000 grains of softening capacity when regenerated with 15 lbs of NaCl per cubic foot and 20,000 grains with 6 lbs of NaCl per cubic foot ensuring high efficiency and low operating costs.

Long Life
Strong and durable beads ensure long service life.

Reliability
Aldex Chemical has over 40 years of field usage by thousands of customers demonstrate the reliability of Aldex ion exchange resins, zeolites and other water treatment media.

Safety Information

A material safety data sheet is available for Aldex C-800 UPS. Copies can be obtained from Aldex Chemical Co., LTD. Aldex C-800 UPS is not a hazardous product and is not WHMIS controlled.

Caution: Acidic and basic regenerant solutions are corrosive and should be handled in a manner that will prevent eye and skin contact. Before using strong oxidizing agents in contact with ion exchange resin, consult sources knowledgeable in the handling of these materials.

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C-800 UPS Water Softening Resin Sodium Form

C-800 UPS Operating Suggestions

Iron

Aldex C-800 UPS will remove most of the dissolved iron, can filter much of the suspended iron and may or may not remove organically bound iron from water.* When softeners are used to remove iron from the water, periodic cleaning of the bed mechanically or with a chemical iron cleaner may be necessary.

**The removal of iron was not evaluated in the WQA certification.*

Chlorine

All cation exchange resins are affected by chlorine and suffer degradation and swelling. Is its recommended that the chlorine in the water be maintained below 1.0 ppm when using Aldex C-800 UPS.

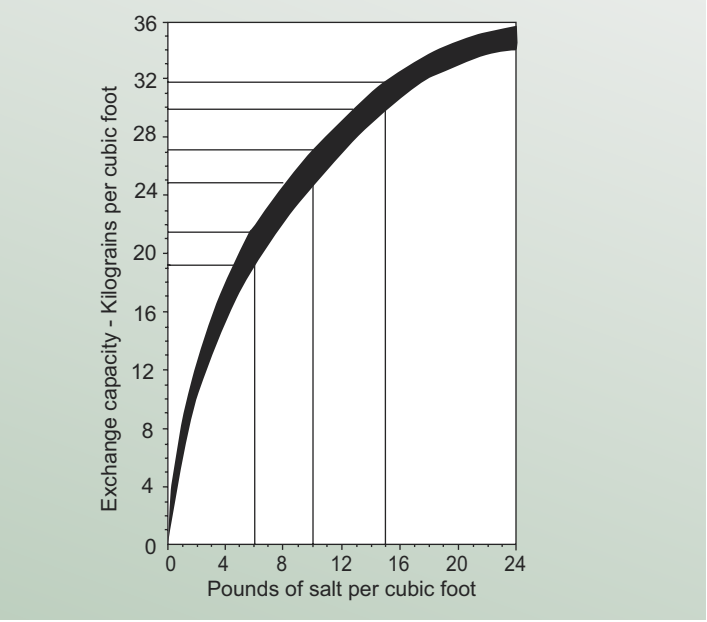

Fig. 1 Exchange capacity vs. regeneration level Sodium form C-800 UPS Cation Resin

Backwash Characteristics

Aldex C-800 UPS should be backwashed for at least 10 minutes after each service cycle in a conventionally down flow regenerated softener. To reclassify the beads and remove suspended solids from the top of the bed, the resin bed should be expanded at least 50% according to Fig. 2. For non-conventional or upflow regenerated softeners, it may not be necessary to follow the above procedure since the backwash and brine injection are incorporated in the same step.

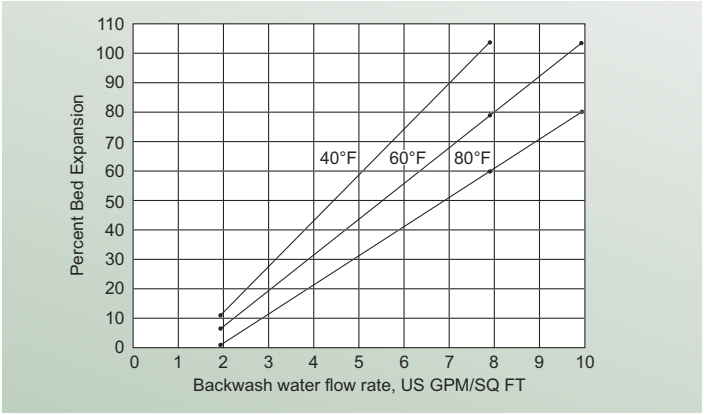

Fig. 2 Bed expansion vs. backwash flow rate for various water temperatures

Pressure Drop

Figure 3 shows the expected pressure loss per foot of bed depth as a function of flow rate at various temperatures.

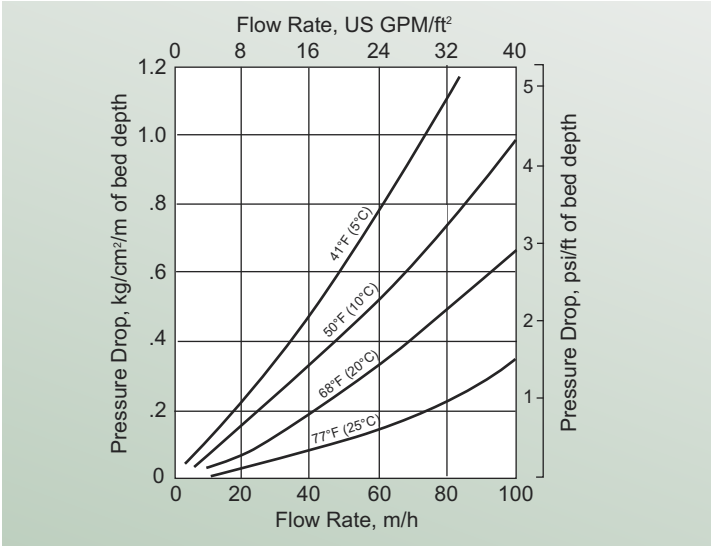

Fig. 3 Pressure Drop vs. Flow Rate

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Rev. ADX13595-0124-US

Aldex CR Series

CR 26 Iron*, Manganese*, Hydrogen Sulfide* and Arsenic* Removal Media

NSF/ANSI/CAN 61 Certified. *Aldex CR 26 is a* ***special media designed to provide excellent catalytic properties required for the removal of many contaminants from potable and non-potable aqueous streams****. Aldex CR 26 is an insoluble media that oxidizes species in solution including hydrogen sulfide, iron and manganese. Metal-oxide nano-particles are precipitated within the resin bed where they form very strong chemical bonds with arsenite (As III) and arsenate (As V). Aldex internal testing concludes Aldex CR 26 media thoroughly and effectively removes arsenic, Fe, Mn and H_2S.*

**Claims reduction verified by manufacturer internal testing only.*

Physical Chemical Properties

Physical Form:	Black, moist spherical beads
Moisture Content:	46 to 52%
Net Weight (as shipped):	800 kgs/m3, approximately
Particle size:	0.3 to 1.2 mm
>1.2 mm %	5.0 maximum
<0.3 mm %	1.0 maximum
Effective Size:	0.50 to 0.60 mm
Uniformity Coefficient:	1.7 maximum

Recommended Operating Conditions

Influent pH:	6.0 to 9.0
Dissolved oxygen:	2 mg/l or 15% greater than Iron (Fe) content
Freeboard:	30% to 50%
Free chlorine:	0.5 to 1.0 mg/l
Organic matter:	Less than 1.0 ppm
Total dissolved solids:	2500 ppm maximum
Total suspended solids:	<1 ppm

Packing

Aldex CR 26 is supplied in 1 cubic foot poly bags.

Storage

Aldex resins require proper care at all times. The resins must never be allowed to dry. Recommended storage temperature is between 65°F to 110°F.

Safety Information

A material safety data sheet is available for Aldex CR 26. Copies can be obtained from Aldex Chemical Co., LTD. Aldex CR 26 is not a hazardous product and is not WHMIS controlled.

Caution: Acidic and basic regenerant solutions are corrosive and should be handled in a manner that will prevent eye and skin contact. Before using strong oxidizing agents in contact with ion exchange resin, consult sources knowledgeable in the handling of these materials.

CR 26 Features

Chemical Free Regeneration

Aldex CR 26 does not require chemicals such as chlorine dioxide, potassium permanganate, chlorine or sodium chloride brine solution for regeneration. The oxidative chemical locked inside Aldex CR 26 beads is regenerated via the dissolved oxygen in the backwash water.

Potable and Non-Potable Water Applications

Aldex CR 26 requires less contact time and is like standard softening resins in bulk density and handling making it an ideal choice for point-of-entry (POE) systems. Aldex CR 26 can be backwashed at lower flow rates to achieve ideal bed expansion needed to remove metal-oxide precipitates generated during the service cycle. Aldex CR 26 is easy to handle versus other oxidative media and many naturally occurring zeolites.

Multiple Contaminant Removal

Aldex CR 26 was initially designed for the selective removal of iron and manganese but testing has shown the product to be ideal for multi-contaminant removal. See page 3 of this bulletin for a summary of various tests performed to date.

Expected Service Life

Due to the unique nature of Aldex CR 26 and its function as an oxidizing agent encapsulated within an ion exchange bead, a long service life of 3 to 4 years is expected.

NSF/ANSI/CAN 61 IAPMO R&T ®

Aldex CR 26 is certified by IAPMO R&T to standard NSF/ANSI/CAN 61 for materials safety only. For use restrictions, please visit www.iapmo.org.

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Aldex CR Series

CR 26 Iron*, Manganese*, Hydrogen Sulfide* and Arsenic* Removal Media

Operating Suggestions (POE Systems)

8 to 10 ppm feed iron

Bed depth:	30"
Maximum flow rate:	2.0 US GPM per cubic foot resin
Backwash velocity:	5.0 to 6.0 US GPM per square foot resin at 50°F*
Backwash time:	10 to 15 minutes
Bed expansion**:	50 to 60%
Backwash frequency:	Daily

5 to 7 ppm feed iron

Bed depth:	30"
Maximum flow rate:	2.5 US GPM per cubic foot resin
Backwash velocity:	5.0 to 6.0 US GPM per square foot resin at 50°F*
Backwash time:	10 to 15 minutes
Bed expansion**:	50 to 60%
Backwash frequency:	Daily

1 to 5 ppm feed iron

Bed depth:	30"
Maximum flow rate:	4.0 US GPM per cubic foot resin
Backwash velocity:	5.0 to 6.0 US GPM per square foot resin at 50°F*
Backwash time:	10 to 15 minutes
Bed expansion**:	50 to 60%
Backwash frequency:	Daily

*** Bed expansion needs to lift the CR 26 bed to top of the vessel.*

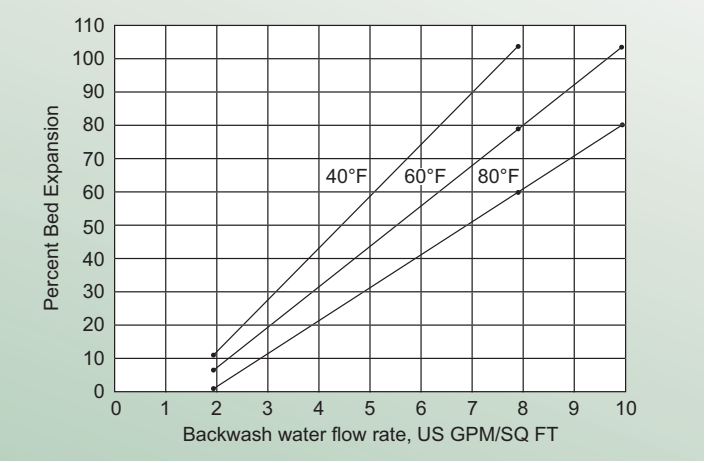

Fig. 1 Bed expansion** vs. backwash flow rate for various water temperatures

Vessel Specifications (POE Systems)

Vessel	Surface area (ft.2)	Min. Volume (CF)	Bed Depth (inches)	Backwash Expansion (%)	Backwash Flowrate (gpm)	Backwash Flowrate (gpm/ft.2)
10x54	0.546	1.5	33	55	2.9	5.3
12x48	0.785	2.0	31	50	3.9	5.0
12x52	0.785	2.0	31	60	4.4	5.6
13x54	0.923	2.5	33	55	5.1	5.5

Table 1 Calculations in the above table are based on using 50° water temperature and the Fig 1 graph above.

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**Claims reduction verified by manufacturer internal testing only.*

Aldex CR Series

CR 26 Iron*, Manganese*, Hydrogen Sulfide* and Arsenic* Removal Media

CR 26 General Guidelines

1. The media can treat water having an iron content above 10 ppm, but the process is not economical particularly for large flow rates. Hence it is recommended to remove iron by pretreating the water by aeration, followed by clarification and filtration. Aldex CR 26 shall then be used as a polishing media.
2. A small amount of chlorine between 0.5 -1.0 mg/l is acceptable. Above 1.0 mg/l should be removed before passing water through the media.
3. The treated water from Aldex CR 26 will have an iron content of <0.1 ppm.
4. Aldex CR 26 removes dissolved iron from water, which is present as ferrous iron. Iron can also exist in other forms such as bacterial iron, soluble organic iron and colloidal iron. Those forms of iron cannot be removed effectively by Aldex CR 26.
5. All sequestering agents including polyphosphates and meta-phosphates should be added after the Aldex CR 26 unit.
6. For high iron content in feed water (> 10 ppm), it is recommended to backwash the unit with treated water to avoid contamination of bottom portion of the bed.
7. The unit must be backwashed at specified flow rate for effective removal of precipitated iron and suspended solids.
8. The backwash frequency shall be every 24 to 48 hours for continuous operating unit. If the unit is operated intermittently, backwash at the end of each cycle.

Multi-Contaminant Removal – Lab data

Test 1:

- City water spiked - 10 ppm each of Fe, Mn, H2S, As III and As V.
- CR 26 column operated, effluent samples taken after several bed volumes.
- Third party testing* found Fe, Mn, H2S all non-detect; As in effluent was 29 ppb.

Test 2

- City water spiked - 10 ppm each of Fe, Mn, H2S and 100 ppb As III and As V.
- CR 26 column operated, effluent samples taken after several bed volumes.
- Third party testing* found Fe, Mn, H2S and As all non-detect.

Test 3

- City water spiked - 1 ppm each of Fe, Mn, H2S and 100 ppb As III and As V.
- CR 26 column operated, effluent samples taken after several bed volumes.
- Third party testing* found Fe, Mn, H2S and as all non-detect.

Test 4

- City water spiked – 0.5 ppm each of Fe, Mn, H2S and 100 ppb As III and As V.
- CR 26 column operated, effluent samples taken after several bed volumes.
- Third party testing* found Fe, Mn, H2S and As all non-detect.

**Third party lab testing is not in conjunction with IAPMO R&T certification. IAPMO R&T NSF/ANSI/CAN 61 designation is for materials safety only.*

Pilot plants

Aldex is actively seeking OEM's willing to install 1 cubic foot test units so we may more accurately measure performance at many installations throughout North America. If you have "problem water" and believe Aldex CR 26 may be able to address and resolve those issues, contact us at info@aldexchemical.com and we'll discuss the details of your test site.

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Rev. ADX13930-1224-US

Aldex Stong Base Anion Series

NSR Strong Base Anion Macroporous Nitrate Selective Resin

Tested and certified by WQA in according to NSF/ANSI/CAN 61 and NSF/ANSI 44. *Aldex NSR is a macroporous, strong base anion which is* ***highly selective for nitrates over sulfates****. Aldex NSR's unique functional group* ***eliminates nitrate dumping at the end of the run even in the presence of high sulfates****. Its resistance to nitrate dumping makes Aldex NSR a superior resin in nitrate removal applications. Further, the functional group used to manufacture Aldex NSR has shown a very high affinity for perchlorate, making this the resin of choice when designing non-regenerable, perchlorate remediation systems.*

Physical Chemical Properties

Polymer Structure:	S-DVB resin
Appearance:	Opaque beads
Functional Group:	tributylamine quaternized
Ionic Form as shipped:	Chloride
Total Capacity, Cl form:	0.85 to .95 eq/l
Moisture Content, Cl^- form:	51 to 57%
Mean Diameter:	600 ± 100 µm
Uniformity Coefficient (max.):	1.6 to 1.8
Specific Gravity:	1.06 to 1.08
Shipping Weight (approx.):	670 to 710 g/l (42-44 lbs/ft^3)
Temp Limit, Cl- Form:	100°C
pH limits, Stability:	0 to 14

Typical Operating Conditions

Maximum Operating Temp.:	175°F (80°C)
Resin bed Depth:	24" (600 mm) minimum
Recommended Service Flow:	1 to 4 gpm/ft3
Backwash Expansion:	50 to 70%
Backwash Expansion Flow Rate at 77ºF(25ºC):	1.6 to 2.5 gpm/ft2
Regenerant:	NaCl
Regeneration level:	8 to10 lbs/cu.ft.
Regenerant concentration:	8 to 12%
Regeneration time:	20 to 60 minutes
Slow rinse flow rate:	At regeneration flow rate
Fast rinse flow rate:	At service flow rate
Rinse Volume:	15 to 50 gal/ft3
Influent Limitations	
Free Chlorine:	Not traceable
Turbidity:	Less than 2 N.T.U
Iron and Heavy metals:	Less than 0.1 ppm

Applications

Aldex NSR is often selected when chromatographic dumping of nitrates must be avoided at all cost. Due to its unique functional group Aldex NSR will provide the highest operating capacity possible of any selective resin. Further, water processed using Aldex NSR will be able to meet EC as well as North American guidelines for potable water.

NSR Features

Very Low Color, Taste or Odor

Aldex NSR meets the requirements for paragraph 173.25 of the Food Additive Regulation of the U.S. Food and Drug Administration.

Long Life

Strong and durable beads ensure long service life.

Reliability

Aldex Chemical has over 45 years of field usage by thousands of customers demonstrates the reliability of Aldex ion exchange resins, zeolites and other water treatment media.

Safety Information

A material safety data sheet is available for Aldex NSR. Copies can be obtained from Aldex Chemical Co., LTD. Aldex NSR is not a hazardous product and is not WHMIS controlled.

Caution: Acidic and basic regenerant solutions are corrosive and should be handled in a manner that will prevent eye and skin contact. Before using strong oxidizing agents in contact with ion exchange resin, consult sources knowledgeable in the handling of these materials.

Tested and certified by WQA according to NSF/ANSI/CAN 61 and NSF/ANSI 44 for materials safety only. For use restrictions, please visit www.wqa.org.

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Aldex Strong Base Anion Series

NSR Strong Base Anion Exchange Resin

Pressure Drop

Fig. 1 shows the expected pressure loss per foot of bed depth as a function of flow rate at various temperatures.

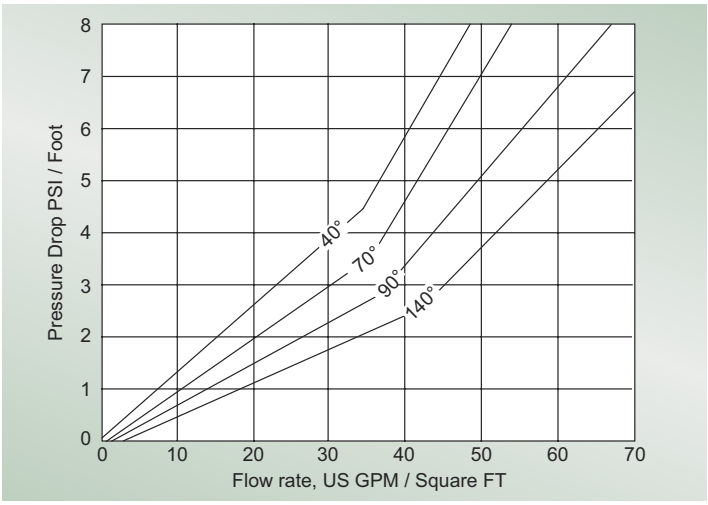

Fig. 1 Pressure Drop vs Flow Rate at various degrees Fahrenheit (F°)

Backwash Characteristics

After each cycle the resin bed should be backwashed at a rate that expands the bed 50 to 75 percent. This will remove any foreign matter and reclassify the bed. Fig. 2 shows the expansion characteristics of Aldex NSR in the chloride form.

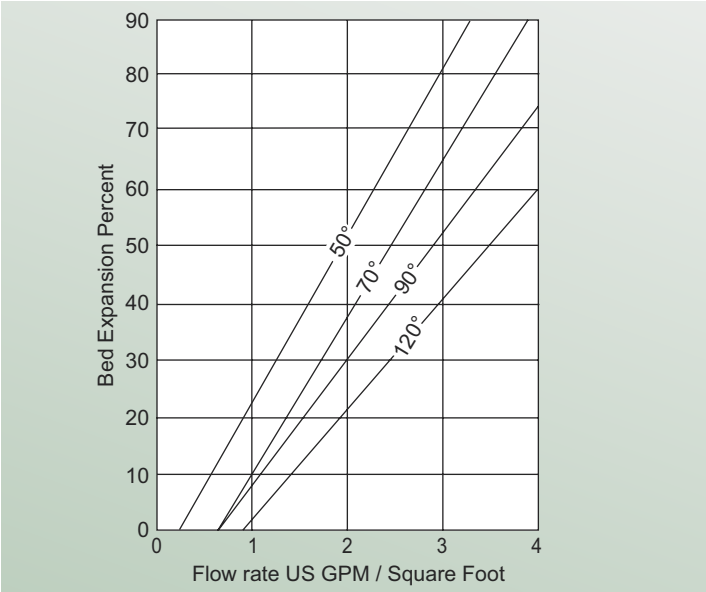

Fig. 2 Bed Expansion vs Flow Rate at various degrees Fahrenheit (F°)

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