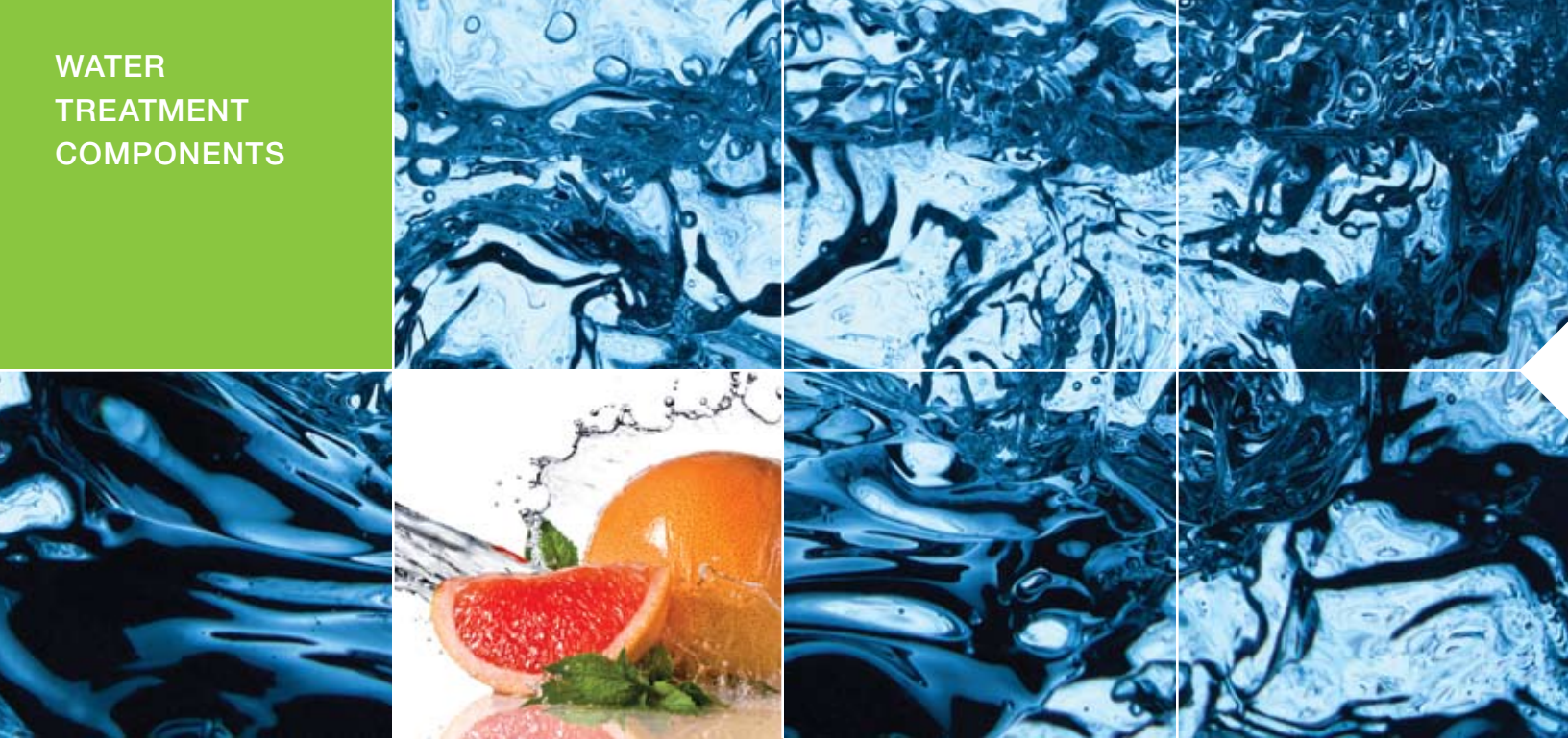
WATER
TREATMENT
COMPONENTS



Indion® 225 NaF Resin Media

INDION 225 NaF Resin Media is a strongly acidic cation exchange resin containing sulphonic acid groups. It is specially designed for the treatment of foodstuffs, beverages, potable water and water used in food processing. Its specification is in compliance with the U.S. Food and Drug Administration's (USFDA) Code of Federal Regulations (CFR) Title 21, Paragraph 173.25, for use in the treatment of foods for human consumption. The INDION 225 NaF Resin Media is also NSF Listed and WQA Gold Seal Certified under NSF/ANSI Standard 61. The resin is extremely robust and has excellent physical and chemical characteristics. It has a gel structure and is supplied in moist condition in sodium form.

Recommended Usage

After charging in the service vessel, it is highly recommended that INDION 225 NaF Resin Media be thoroughly washed with 20 bv* of water to ensure the organic leachables are well within limits. This procedure is to be done only after initial charge, or in case the service vessel is out of operation for a long period.

Packing

- LDPE bags: 1 cu. ft. (28.3 L)
- Super sack: 35 cu. ft. (991.1 L)
- Fiber drums with liner bags: 7 cu. ft. (198.2 L)

Storage

INDION 225 NaF resin beads must never be allowed to become dry. Always store resin bags in the shade.

Safety

Acid and alkali solutions used for regeneration are corrosive and should be handled in a manner that will prevent eye and skin contact. If any oxidizing agents are used, necessary safety precautions should be observed to avoid accidents and damage to the resin.

*1 bv = 1 cu. ft. per cu. ft. of resin volume.

INDION®

Distributed by

Pentair Water

WATER TREATMENT COMPONENTS

Indion® 225 NaF Resin Media

Characteristics

Appearance	Golden yellow beads
Matrix	Styrene divinylbenzene copolymer
Functional Group	Sulphonic acid
Ionic Form as Supplied	Sodium
Total Exchange Capacity	2.0 mEq/ml, min.
Moisture-Holding Capacity	43 - 50%
Shipping Weight* (approx.)	52 lb/cu. ft. (830 kg/m^3)
Particle Size Range +16 mesh -50 mesh	0.012 to 0.047 inches (0.3 to 1.2 mm) 5.0% maximum 1.0% maximum

Uniformity Coefficient	1.7 maximum
Effective Size	0.018 to 0.022 inches (0.45 to 0.55 mm)
Operating pH Range	0 to 14
Maximum Operating Temperature	284°F (140°C)
Resistance to Reducing Agents	Good
Resistance to Oxidizing Agents	Generally good, chlorine should be absent
Organic Extractives (As per USFDA 21 CFR 173.25)	1 ppm (1 mg/l) max. in deionized water 1 ppm (1 mg/l) max. in 15% v/v ethanol solution

*Weight of resin, as supplied, occupying 1 m^3 in a unit after backwashing and draining.

225 Na Co-flow – Softening Data: Determination of Operating Exchange Capacity (Cap)*

Table 1 Basic Exchange Capacity (Cap^0) at Different Regeneration Levels

Regeneration Level kg $NaCl/m^3$	Cap^0 kg $CaCO_3/m^3$
80	52.0
100	58.6
130	66.5
160	72.7

Figure 1 Basic Exchange Capacity (Cap^0)

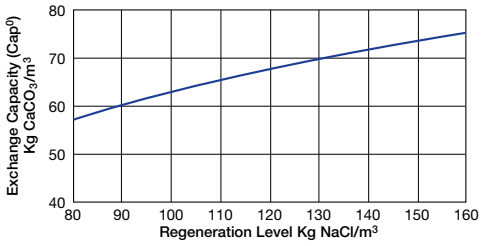


Table 2 Capacity Correction Factor A for Feed Sodium

Na/TC (%)	Factor A
0	0.96
20	1.00
40	0.92
60	0.80
80	0.61
95	0.39

Figure 2 Feed Sodium to Total Cations

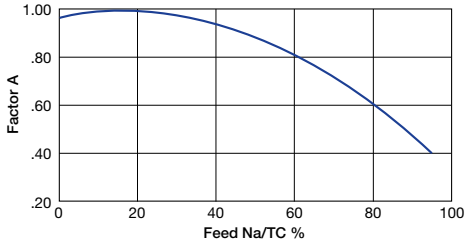


Table 3 Capacity Correction Factor B for Feed Total Hardness

Feed Total Hardness mg/l $CaCO^3$	Factor B
500	1.00
800	0.96
1000	0.93
1200	0.89

Figure 3 Feed Total Hardness

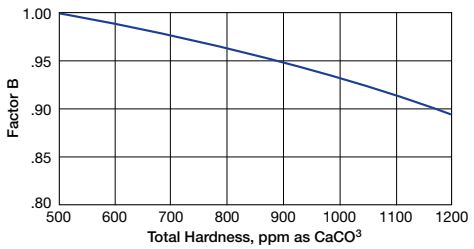
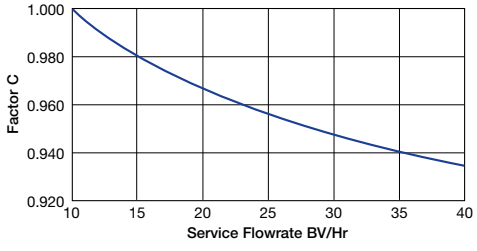


Table 4 Capacity Correction Factor C for Service Flowrate

Service Flowrate BV/h	Factor C
10	1.000
15	0.980
20	0.965
25	0.955
40	0.935

Figure 4 Service Flowrate



*Cap = Cap^0 x A x B x C

Operating Capacity

- **Co-flow regeneration**
  The operating capacity of INDION 225 in water softening is obtained by multiplying the basic capacity value from Figure 1 / Table 1 by the correction factors A to C from Figures 2 to 4 / Tables 2 to 4.
- **Countercurrent regeneration (CCR)**
  The operating capacity of INDION 225 in water softening is obtained by multiplying the basic capacity value from Figure 5 / Table 5 by the correction factors D to F from Figures 6 to 8 / Tables 6 to 8.

  The exchange capacity indicated in the above mentioned figures/table is for an injection time of 20 minutes. Higher capacity is realized with longer injection periods. A capacity gain of 10% is attained when salt sodium is injected for one hour.

Treated Water Quality

The leakage of calcium and magnesium salts from INDION 225 operating as a sodium exchanger is independent of influent hardness up to 1200 mg/l $CaCO_3$ and influent sodium. The hardness leakage from INDION 225 is as follows:

- Co-flow regeneration < 5 mg/l $CaCO_3$.
- Countercurrent regeneration < 1 mg/l $CaCO_3$.
- When operating on waters beyond the conditions specified, it is recommended to establish accurate leakage data by practical experiment.

Use of Good Quality Regenerants

All ion exchange resins are subject to fouling and blockage of active groups by precipitated iron. Hence the iron content in the feed water should be low, and the regenerant must be essentially free from iron and heavy metals. All resins are prone to oxidative attack resulting in problems such as loss of physical strength. Therefore, the regenerant should have as low a chlorine content as possible. Good quality regenerant of technically or chemically pure grade should be used to obtain best results.

225 Na CCR – Softening Data: Determination of Operating Exchange Capacity (Cap)*

Table 5
Basic Exchange Capacity (Cap^0) at Different Regeneration Levels

Regeneration Level kg $NaCl/m^3$	Cap^0 kg $CaCO_3/m^3$
80	56.0
100	63.0
130	68.5
160	75.0

Figure 5
Basic Exchange Capacity (Cap^0)

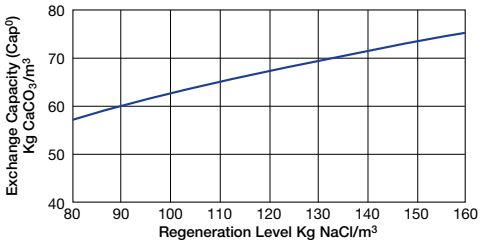


Table 6
Capacity Correction Factor D for Feed Sodium

Na/TC (%)	Factor D
0	0.96
20	1.00
40	0.92
60	0.80
80	0.61
95	0.39

Figure 6
Feed Sodium to Total Cations

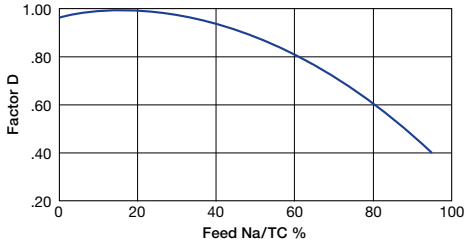


Table 7
Capacity Correction Factor E for Feed Total Hardness

Feed Total Hardness mg/l $CaCO^3$	Factor E
500	1.00
800	0.96
1000	0.93
1200	0.89

Figure 7
Feed Total Hardness

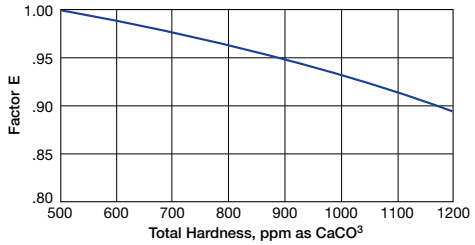
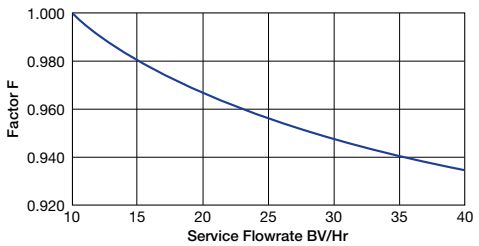


Table 8
Capacity Correction Factor F for Service Flowrate

Service Flowrate BV/h	Factor F
10	1.000
15	0.980
20	0.965
25	0.955
40	0.935

Figure 8
Service Flowrate



*Cap = Cap^0 x D x E x F

Indion® 225 NaF Resin Media

Salt Recycle

- **Operating conditions**

Table 9 shows the effect of regeneration level on the operating exchange capacity. Table 10 gives the correction factors to be applied for feed sodium. These capacities refer to a hardness breakthrough of 5 mg/l $CaCO_3$.

Table 11 gives the recommended operating conditions for using INDION 225 in sodium cycle with salt recycle. The technique of salt recycling is employed primarily to improve the regeneration efficiency. Efficiency of up to 80% is easily achieved. The data presented are based on extensive tests using feed water having a total hardness of 275 mg/l $CaCO_3$ and Na/TC of 40%. The runs were conducted at a flowrate of 12 BV/h.

- **Recommended regeneration procedure**

In order to obtain optimum results it is suggested that the following steps be followed:

1. On exhaustion, backwash the unit with filtered water as indicated.
2. Inject the spent brine (collected during the previous regeneration in the spent brine tank) at a flowrate sufficient to give a minimum contact time of 20 minutes. The entire volume is drained.
3. Inject fresh salt sodium (at 10 to 15% w/v NaCl) at a flowrate sufficient to give a minimum contact time of 20 minutes. The initial 0.5 BV containing a low concentration of NaCl and a high concentration of hardness is drained.
4. Collect the balance quantity of regenerant effluent in the spent brine tank.
5. Rinse the unit with filtered water and collect the initial 0.5 BV of the rinse water in the spent brine tank. Drain the balance portion of rinse.
6. The unit is now ready for the next service run.

Table 9
Regeneration Level vs. Operating Exchange Capacity

Initial Regeneration Level 130 kg $NaCl/m^3$

Fresh Regeneration Level kg $NaCl/m^3$	Operating Exchange Capacity kg $CaCO_3/m^3$
60	42.0
77	53.9
90	60.2

Table 10
Capacity Correction Factor for Feed Sodium

Na/TC (%)	Correction Factor
20	1.05
40	1.0
60	0.85
80	0.80

Table 11
Recommended Operating Conditions

Bed Depth	0.75 m minimum
Treatment Flowrate	60 $m^3/h\ m^2$ maximum
Pressure Loss	Refer to Figure 9
Bed Expansion	Refer to Figure 10
Backwash	9 $m^3/h\ m^2$ for 5 minutes or until effluent is clear
Regenerant	Sodium Chloride
Regenerant Flowrate	2 to 4 BV/H
Rinse	3BV at Service Flowrate

Figure 9
Pressure Loss

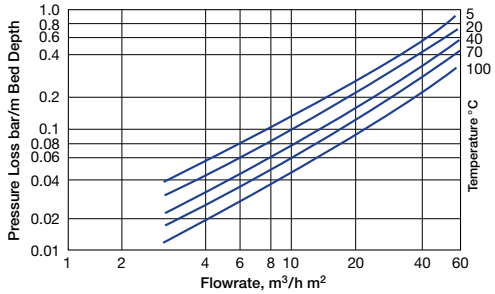
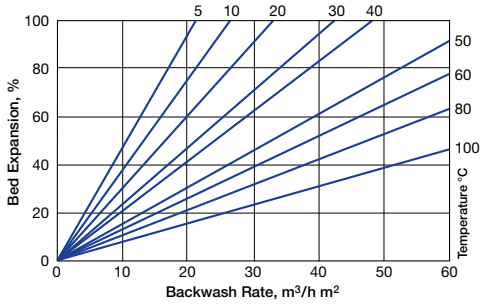


Figure 10
Bed Expansion



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