

INDION[®] BSR

Brine Softening Resin

Description

INDION BSR is a chelating Ion exchange resin having a macroporous structure. It has a crosslinked polystyrene matrix containing amino phosphonic acid functional groups. INDION BSR forms chelating complexes with metallic ions such as lead, copper, zinc, calcium, magnesium etc.

Application

INDION BSR is very efficient for the removal of calcium, magnesium and other metals present, in trace

quantities (a few ppm) in concentrated brine to produce brine of a very high purity containing hardness less than 20 ppb and suitable for electrolysis of brine in membrane cells. INDION BSR can also be used for separation of zinc from media in which this metal is present, for example corrosion preventive products in cooling towers. INDION BSR can be used to separate lead from industrial effluents, such as oil refinery, battery wastes, solvents and wastes from paints and printing ink industries.

Characteristics

Appearance	:	Opaque off white to brown beads
Matrix	:	Macroporous crosslinked polystyrene
Functional Group	:	Amino phosphonic acid
Ionic form as supplied	:	Sodium
Total exchange capacity in H form	:	2.0 meq/ml, minimum
Moisture holding capacity	:	60 - 70 %
Shipping weight *	:	720 kg/m ³ , approximately
Particle size range	:	0.42 to 1.2 mm
> 1.20 mm	:	5.0%, maximum
< 0.355 mm	:	1.0%, maximum
Uniformity co-efficient	:	1.7, maximum
Effective size	:	0.45 to 0.55 mm
Maximum operating temperature	:	80° C
Operating pH range	:	8 to 11
Reversible volume change	:	H to Na, < 45 % H to Ca, < 20 %

* Weight of resin, as supplied, occupying 1 m³ in a unit after backwashing and draining.

Note:

Indion BSR is susceptible to oxidation. Hence treating solutions having free chlorine should be avoided. Brine solution generally contains significant amount of

chlorates. So, rinsing is done efficiently before acid regeneration. This will prevent the formation of free chlorine when brine having chlorates, comes in contact with acid during regeneration.

Typical operating data

Bed depth : 1.0 meter, minimum

Regeneration : HCl

Conditioning : NaOH

Operation	Flowrate	Time(min)	Solution	Vol. change	Qty	Temp(0°C)
Treatment	8 - 30 BV/h	Ref. Fig.1 - 4	Brine	1.25	---	60 - 90
Brine displacement	4 BV/h	60 - 90	Soft water	1.3	4 - 6 BV	RT*
Backwash	8 - 12 m/h	30	Soft water	---	----	RT*
Regeneration	2 - 6 BV/h	30 - 60	HCl (7%)	1	140 -150 kg/m ³	RT*
Rinse	2 - 4 BV/h	30 - 60	Soft water	1	2 BV	RT*
Na Conversion	2 - 4 BV/h	15 - 60	NaOH (5 %) Upflow	1.45	80 - 90 kg/m ³	RT*
Rinse	2 - 4 BV/h	30 - 60	Soft water	1.45	2 BV	RT*

* Room Temperature

Principles of operation

During electrolysis of brine solutions, chlorine and alkali hydroxides are produced. Three types of cells are used namely mercury, diaphragm and membrane cells in chlor alkali industries. Membrane cell technology is considered most economical out of the above mentioned three cells. Periodical maintenance is required for all these cells because of impurities like Ca and Mg present in brine. The purified brine should have Ca and Mg less than 20 ppb and Sr less than 100 ppb as per the process requirements. Indion BSR will purify the brine which will meet the chlor alkali industry specifications.

Operating capacity :

Refer figure 1 for operating capacity expressed in g Ca/l. The capacity increases with increasing concentration of Ca.

Correction factor for pH :

Refer figure 2 for correction factor to applied on operating capacity values obtained from figure 1 for varying pH values of brine.

Correction factor for temperature:

Refer figure 3.

Correction factor for flow rate :

Refer figure 4.

Ca leakage values vs output :

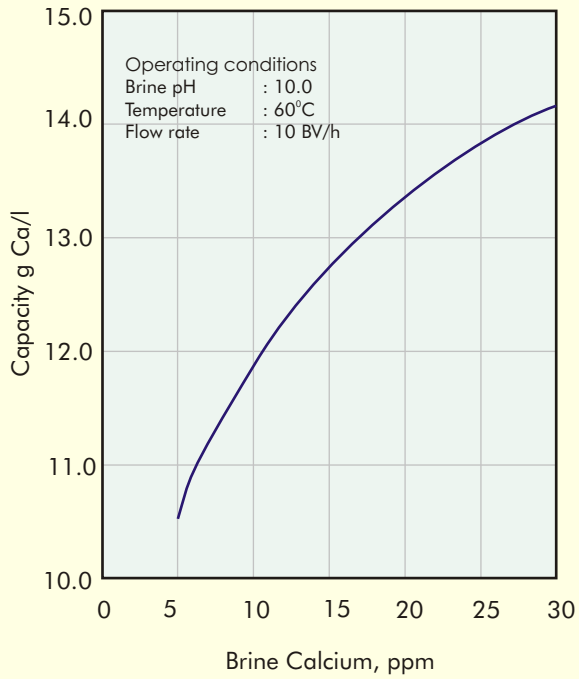
Refer figure 5 for Ca leakage values for different output values and different flow rates.

Bed expansion and pressure loss :

For bed expansion and pressure loss refer figure 6 and figure 7 respectively.

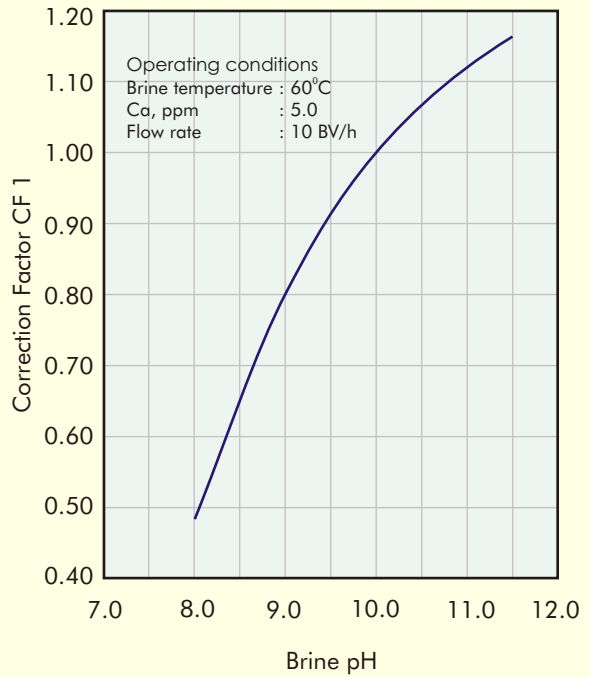
BRINE Ca Vs. CAPACITY

Figure 1



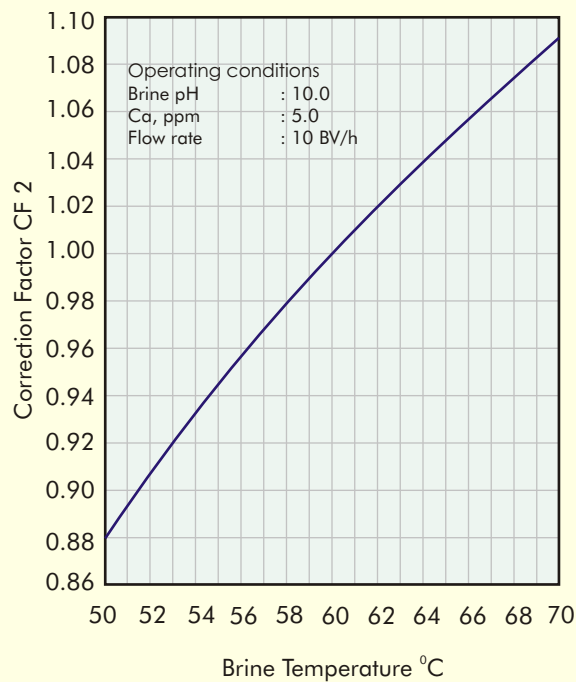
CORRECTION FACTOR FOR BRINE pH

Figure 2



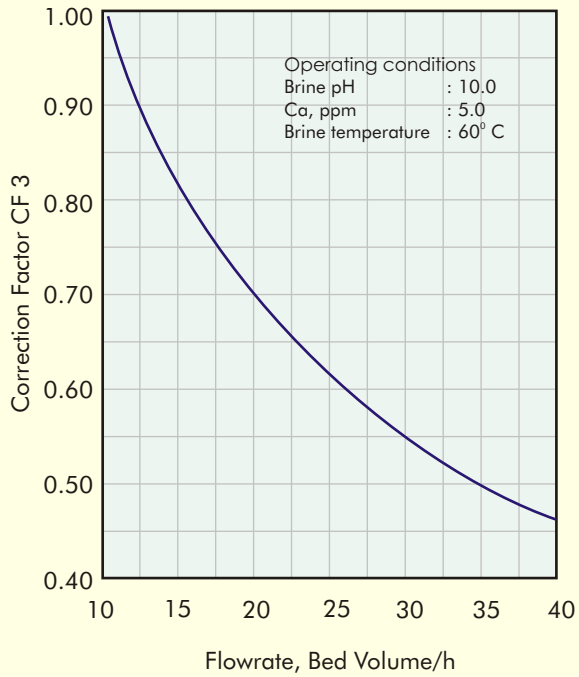
CORRECTION FACTOR FOR BRINE TEMP.

Figure 3



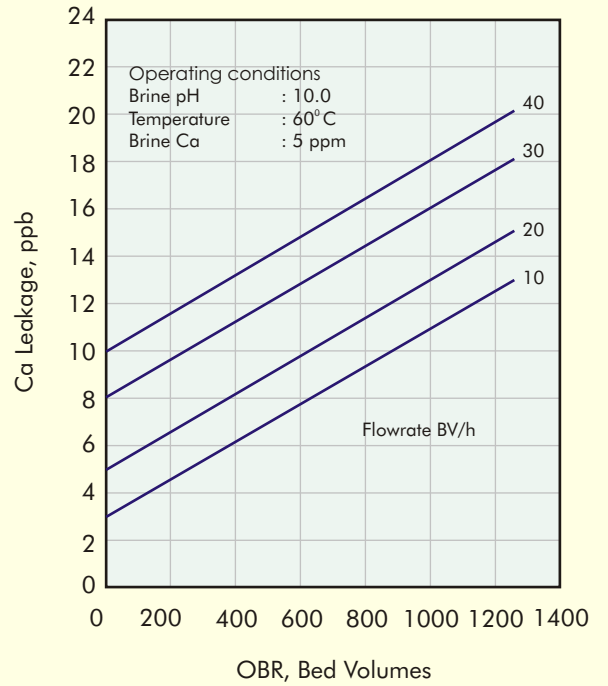
CORRECTION FACTOR FOR FLOWRATE

Figure 4



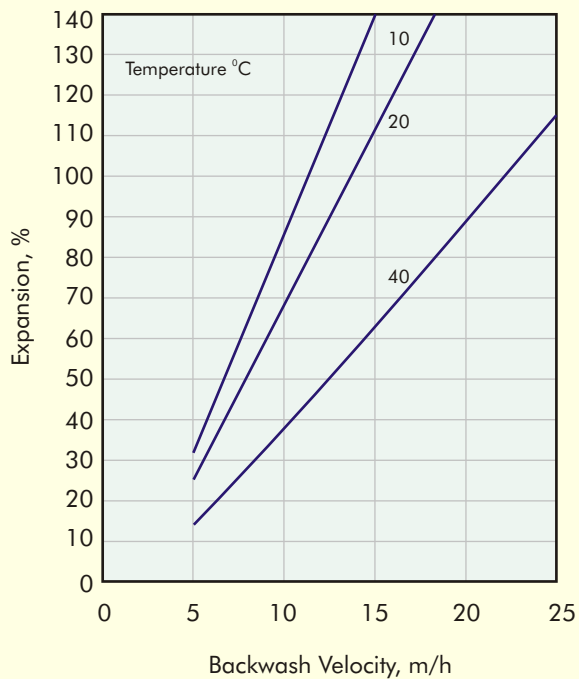
TREATED BRINE Ca LEAKAGE

Figure 5



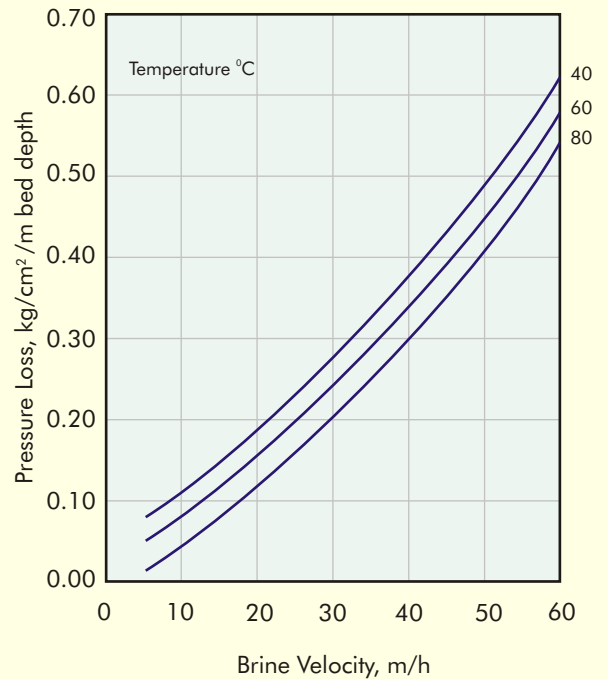
BED EXPANSION

Figure 6



PRESSURE LOSS

Figure 7



Packing

HDPE Lined bags	25/ 50 lts	LDPE bags	1 cft / 25 lts
Super sack	1000 lts	Super sack	35 cft
MS drums		Fiber drums	
with liner bags	180 lts	with liner bags	7 cft

Storage

Ion Exchange resins require proper care at all times. The resins must never be allowed to become dry. Regularly open the plastic bags and check the condition

of the resin when in storage. If not moist, add enough clean demineralised water and keep it in completely moist condition. Always keep the resin drum in the shade. Recommended storage temperature is between 20° C - 40° C.

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.

INDION range of Ion Exchange resins are produced in a state-of-the-art ISO 9001 and ISO 14001 certified manufacturing facilities at Ankleshwar, in the state of Gujarat in India.

To the best of our knowledge the information contained in this publication is accurate. Ion Exchange (India) Ltd. maintains a policy of continuous development and reserves the right to amend the information given herein without notice.

INDION is the registered trademark of Ion Exchange (India) Ltd.

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