AMBERJET® 1200 Na

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ENGINEERING DATA SHEET
(HCl, Reverse flow regeneration)

These data provide information to calculate the sodium leakage and operating capacity of AMBERJET 1200 Na used in water demineralisation with reverse flow (counterflow) regeneration with hydrochloric acid.
The properties of AMBERJET 1200 Na are described in the Product Data Sheet PDS 0354 A.
These data are valid for AMBERJET 1200 H but the results obtained refer to the Na form and must be corrected for the reversible swelling between the Na and H forms.

SODIUM LEAKAGE

With reverse flow regeneration, the average sodium leakage is always very low (less than 100 ppb as Na when regenerated with HCl) so that in industrial applications a treated water conductivity of about 1 µS/cm or lower can be obtained in most cases.

OPERATING CAPACITY

The operating capacity of AMBERJET 1200 Na with hydrochloric acid regeneration is obtained by multiplying the basic capacity value from Table 1 by the correction factors A to E from Tables 3 to 7 overleaf.

$$Cap = Cap_0 \times A \times B \times C \times D \times E$$

Table 1 : Basic capacity vs HCl Regenerant Level (reverse flow regeneration)

HCl g/L	Capacity eq/L (Cap_0)
40	1.03
50	1.15
60	1.24
70	1.32
80	1.39
90	1.44
100	1.49
120	1.57

Table 2 : Suggested Operating Conditions

Maximum operating temperature	120°C
Minimum bed depth	1000 mm (preferably > 1400 mm)
Service flow rate	5 to 50 BV*/h
Maximum linear velocity	60 m/h
Regenerant	HCl
Level	40 to 120 g /L
Minimum contact time	20 minutes
Concentration	4 to 10 %
Slow rinse	2 BV at regeneration flow rate
Fast rinse	1 to 3 BV at service flow rate

** 1 BV (Bed volume) = 1 m^3 solution per m^3 resin*

Table 3 : Capacity Correction Factor A versus Sodium to Total Cation Ratio

Na %	Factor A
0	0.95
10	0.96
20	0.97
30	0.97
40	0.98
50	0.99
60	0.99
70	1.00
80	1.01
90	1.01
100	1.02

Table 4 : Capacity Correction Factor B versus Alkalinity to Total Anions Ratio

% Alk	Factor B
0	0.94
30	0.98
50	1.00
70	1.02
99	1.03

Table 5 : Capacity Correction Factor C versus Resin Bed Depth

Bed depth mm	Factor C
900	0.94
1200	0.97
1500	1.00
1800	1.03
2000	1.06
2500	1.10

Table 6 : Capacity Correction Factor D versus Water Temperature

Temperature °C	0	50	99 % Na
5	0.97	0.95	0.92
10	0.99	0.98	0.97
15	1.00	1.00	1.00
20	1.01	1.01	1.02
25	1.01	1.03	1.04
> 30	1.02	1.04	1.06

Table 7 : Capacity Correction Factor E versus Run Length (Production Time)

Run Time (hours)	0	50	99 % Alk
5	0.96	0.98	1.00
8	0.98	1.00	1.01
10	0.99	1.00	1.01
20	1.01	1.01	1.01
> 25	1.01	1.01	1.02

IMPORTANT NOTE: at the end of the calculation, the engineer must check that the regenerant ratio is at least 110%. If it is less, the regenerant dosage must be increased accordingly, keeping the value of the operating capacity as found initially.
The regenerant ratio is defined as:

(eq/L of acid)/(eq/L of operating capacity), or [(g/L HCl)/cap]/36.5

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