

# SEPARATION TECHNOLOGIES

## ION EXCHANGE RESINS

# DUOLITE C 20

## ENGINEERING DATA SHEET (SOFTENING)



Duolite C 20 is strong acid Cation Exchange Resin. These data provide information to calculate the hardness leakage and operating capacity of Duolite C -20 used for water softening with Co-flow regeneration. The properties of Duolite C-20 are described in the Product Data Sheet.

### HARDNESS LEAKAGE

The average hardness leakage is obtained by multiplying the basic leakage value from Table 1 by the correction factors A and B from Tables 2 & 3.

$$\text{Leak} = \text{Leak}_0 \times A \times B$$

**TABLE 2 : Leakage Correction Factor A versus Total Dissolved Solids Concentration.**

TDS meq/L	Factor A
< 10	1.0
15	1.9
20	3.0
30	5.8
40	9.1

**Table 1 : Basic Hardness Leakage versus NaCl Regenerant Level.**

NaCl g/L	Leakage meq/L (Leak <sub>0</sub> )
50	0.099
75	0.050
100	0.037
125	0.027
150	0.015
200	0.001
250	0.001

**TABLE 3 : Leakage Correction Factor B versus Sodium to Total Cations Ratio.**

Na %	Factor B
< 5	1.0
10	1.3
20	1.6
30	1.9
50	2.5
70	3.1
90	3.7

**TABLE 4 : Suggested Operating Conditions**

Maximum operating temperature _____	120°C
Minimum bed depth _____	700 mm
Service flow rate _____	5 to 40 BV */ hr
Maximum linear velocity _____	50 m / hr
Regenerant _____	NaCl
Level _____	50 to 250 g/L
Flow rate _____	2 to 8 BV/ hr ( minimum contact time 30 minutes)
Concentration _____	8% to 12%
Slow rinse _____	Minimum 2 BV at regeneration flow rate
Fast rinse _____	Same as service flow rate.

\* 1 BV ( Bed Volume ) = 1 m<sup>3</sup> solution per m<sup>3</sup> resin

## OPERATING CAPACITY

The operating capacity of Duolite C 20 in water softening is obtained by multiplying the basic capacity value from Table 5 by the correction factor C to F from Tables 6 to 9.

$$\text{Cap} = \text{Cap}_0 \times \text{C} \times \text{D} \times \text{E} \times \text{F}$$

**TABLE 5 : Basic capacity versus NaCl regenerant level ( co-current regeneraion)**

NaCl g / L	Capacity eq / L (Cap <sub>0</sub> )
50	0.70
60	0.80
80	1.01
100	1.12
120	1.22
150	1.38
200	1.52
250	1.60

**TABLE 6 : Capacity Correction Factor C versus Sodium Concentration**

Na meq/L	Factor C
< 5	1.00
10	0.98
20	0.95
30	0.92
40	0.88

**TABLE 7 : Capacity Correction Factor D versus Hardness Concentration**

TH meq/L	Factor D
< 5	1.00
10	0.97
20	0.92
30	0.87
40	0.82

**TABLE 8 : Capacity Correction Factor E versus Regenerant Concentration.**

Na Cl %	Factor E
8	0.95
10	0.97
> 12	1.00

**TABLE 9 : Capacity Correction Factor F versus Flow Rate in production.**

BV/hr	Factor F
5	1.04
10	1.02
15	1.00
20	0.99
30	0.97
40	0.96

## SAFE HANDLING INFORMATION

A material Safety Data Sheet, Material handling & storage sheet are available for Duolite products. To obtain a copy contact Auchtel representative Ion exchange resins and polymeric adsorbants, as produced, contain manufacturing by-products. the user must determine the extent to which these by-product must be removed for any particular use and to establish methods to ensure that the appropriate level of purity is achieved for that use. The user ensure compliance with all prudent safety standards and regulatory requirements governing the application. Except where otherwise stated, Auchtel does not recommend its ion exchange resins or polymeric adsorbants as suitable or appropriately pure for any particular use. Consult your Auchtel representative for further information.

### CAUTION

Acid and basic regenerant solutions are corrosive and should be handled in a manner that will prevent eye and skin contact. Nitric acid and other strong oxidizing agents can cause explosive type reactions when mixed with Ion Exchange Resins. Proper design of process equipment to prevent rapid buildup of pressure is necessary if use of an oxidizing agent such as nitric acid is contemplated. Before using strong oxidizing agents in contact with Ion Exchange Resins, consult sources knowledgeable in the handling of these materials.

*The suggestions and data in this bulletin are based on information we believe to be reliable. They are offered in good faith, but without guarantee, as conditions and methods of use of our products are beyond our control. We recommend that the prospective user determine the suitability of our materials and suggestions before adopting them on a commercial scale. The Company maintains a policy of continuous development and reserve the right to amend any specification without notice. DUOLITE is a trademark of Rohm and Hass Company, Philadelphia, U.S.A. and Auchtel Products Ltd. are users of the same in India.*

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