# DOWEX Ion Exchange Resins

## The Removal of Oxygen and Chlorine from Water

### The Removal of Oxygen

Dissolved oxygen can be reduced by using sodium sulfite according to following reaction:

$2\ Na_2SO_3 + O_2 \rightarrow 2Na_2SO_4$

Based on this equation, a minimum of 7.87 mg $Na_2SO_3$ is necessary per mg dissolved $O_2$. The table shows levels required to remove different amounts of dissolved oxygen:

| Dissolved Oxygen | | Sodium Sulfite (theoretical amount) | |
|---|---|---|---|
| cc/liter** | mg/l | mg/l | lbs/ 1000 gal. |
| 0.1 | 0.14 | 1.1 | 0.0094 |
| 0.2 | 0.29 | 2.3 | 0.019 |
| 0.3 | 0.43 | 3.4 | 0.028 |
| 0.4 | 0.57 | 4.5 | 0.038 |
| 0.5 | 0.72 | 5.6 | 0.047 |
| 1.0 | 1.4 | 11.3 | 0.094 |
| 2.0 | 2.9 | 22.5 | 0.19 |
| 5.0 | 7.2 | 56.3 | 0.47 |
| 10.0 | 14.3 | 112.5 | 0.94 |

**1 cc dissolved oxygen per liter = 1.43 mg/l
1 mg/l dissolved oxygen = 0.698 cc/liter

### The Removal of Chlorine

Chlorine is a strong oxidant and may readily degrade ion exchange resins. Chlorine levels in water can be reduced using sulphur dioxide or sodium sulphite according to following reactions:

$Na_2SO_3 + Cl_2 + H_2O \rightarrow 2HCl + Na_2SO_4$

$SO_2 + Cl_2 + H_2O \rightarrow 2HCl + H_2SO_4$

Per gram of chlorine to remove, one needs to add a minimum of 0.91 gram of $SO_2$ or 1.78 gram of $Na_2SO_3$. This leads to following amounts of reducing agents to add per 1000 liter of water for the given chlorine levels:

| $Cl_2$ | $Na_2SO_3$ (theoretical amount) | | $SO_2$ (theoretical amount) | |
|---|---|---|---|---|
| mg/l | g/1000 l | lbs/1000 gal. | g/1000 l | lbs/ 1000 gal. |
| 0.1 | 0.18 | 0.0015 | 0.09 | 0.00075 |
| 0.5 | 0.89 | 0.0075 | 0.45 | 0.0038 |
| 1 | 1.78 | 0.015 | 0.91 | 0.0075 |
| 2 | 3.56 | 0.030 | 1.82 | 0.015 |
| 3 | 5.34 | 0.045 | 2.73 | 0.0225 |
| 4 | 7.12 | 0.06 | 3.64 | 0.03 |
| 5 | 8.90 | 0.075 | 4.55 | 0.038 |
| 10 | 17.80 | 0.15 | 9.10 | 0.075 |

# DOWEX
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For more information about DOWEX resins,
call Dow Liquid Separations business:
North America . . . . . .1-800-447-4369
Latin America . . . . . .(+55) 11-5188-9277
Europe . . . . . .(+32) 3-450-2240
Japan . . . . . .(+81) 3-5460-2100
Australia . . . . . .(+61) 2-9776-3226
http://www.dowex.com

**WARNING:** Oxidizing agents such as nitric acid attack organic ion exchange resins under certain conditions. This could lead to anything from slight resin degradation to a violent exothermic reaction (explosion). Before using strong oxidizing agents, consult sources knowledgeable in handling such materials.

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