شرکت آتیه پردازان شریف

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SODIUM HYPOCHLORITE - STABILITY

PCH-1400-0007

Sodium hypochlorite solutions have limited storage stability. Decomposition will occur due to the following two reactions:

Transformation into chlorate:

$$3\ NaOCl \rightarrow 2\ NaCl + NaClO_3$$

Release of oxygen:

$$2\ NaOCl \rightarrow 2\ NaCl + O_2$$

In a good quality sodium hypochlorite solution, the chlorate decomposition pathway accounts for about 90 % of the total decomposition.

Increasing temperature, hypochlorite concentration and ionic strength (salt content) will increase the reaction rate of both reactions to about the same extent. UV-light (sunlight) also catalyzes both decomposition reactions.

The decomposition of sodium hypochlorite is minimized in the range of pH 12 to 13 (between 0.025 and 0.35 % excess sodium hydroxide). Below pH 11, the rate of formation of chlorate will increase dramatically. In the pH range of 13 to 13,5, there is only a minor increase in the decomposition rate.

The oxygen decomposition pathway is catalyzed by some transition metal ions (Ni^{2+}, Cu^{2+} and Co^{2+}). The maximum concentration that will not significantly increase the overall decomposition rate of sodium hypochlorite is ~0,1 mg/l Ni and ~1 mg/l Cu. Fe^{3+} is not considered to be an effective catalyst and Mn^{2+} is only effective in presence of other catalysts.

Table 1: Influence of temperature on the initial loss of active chlorine
(typical values for 160 g active chlorine/l).

Temperature, °C	Loss, g/(l·24 h)
10	0,2
20	0,8
25	1,6
30	3,0

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PCH-1400-0007-W-EN (WW)
Issue 1 - May 2005

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Figure 1: Sodium Hypochlorite
Loss of active chlorine as function of storage time and initial concentration

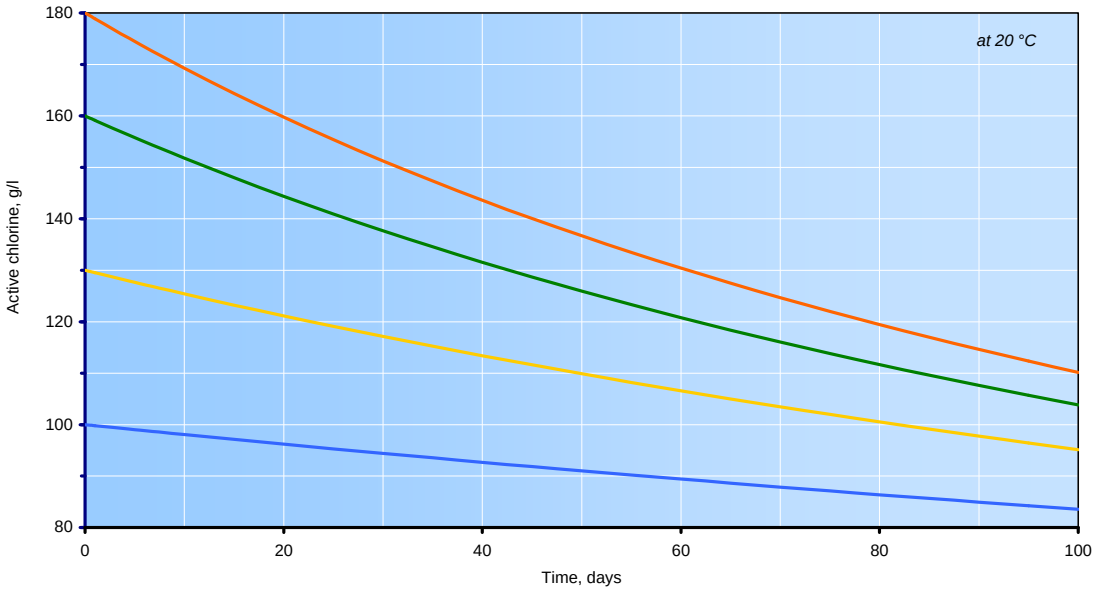
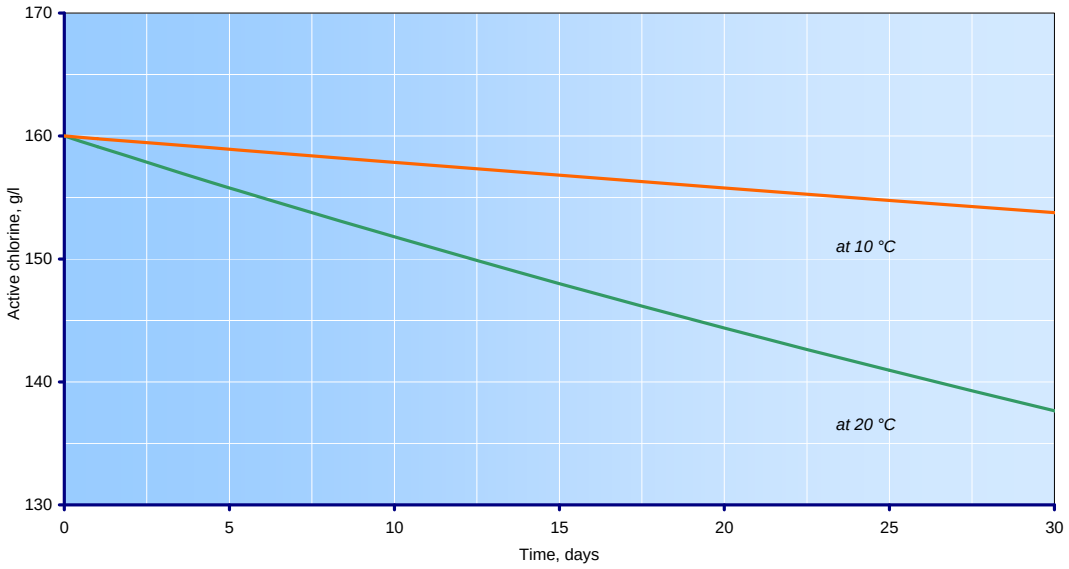


Figure 2: Sodium Hypochlorite
Loss of active chlorine as function of storage time and temperature



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