

Oregon Department of Human Services

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TECHNICAL BULLETIN

HEALTH EFFECTS INFORMATION

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ENVIRONMENTAL TOXICOLOGY SECTION

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SODIUM HYDROXIDE
"Lye, limewater, lyewater"

For More Information Contact:

Environmental Toxicology Section
(971) 673-0440

Drinking Water Section
(971) 673-0405

SYNONYMS:

Caustic soda, sodium hydrate, soda lye, lye, natrium hydroxide

CHEMICAL AND PHYSICAL PROPERTIES:

- Molecular Formula: NaOH
- White solid, crystals or powder, will draw moisture from the air and become damp on exposure
- Odorless, flat, sweetish flavor
- Pure solid material or concentrated solutions are extremely caustic, immediately injurious to skin, eyes and respiratory system

WHERE DOES IT COME FROM?

Sodium hydroxide is extracted from seawater or other brines by industrial processes.

WHAT ARE THE PRINCIPLE USES OF SODIUM HYDROXIDE?

Sodium hydroxide is an ingredient of many household products used for cleaning and disinfecting, in many cosmetic products such as mouth washes, tooth paste and lotions, and in food and beverage production for adjustment of pH and as a stabilizer. In its concentrated form (lye) it is used as a household drain cleaner because of its ability to dissolve organic solids. It is also used in many industries including glassmaking, paper manufacturing and mining. It is used widely in medications, for regulation of acidity. Sodium hydroxide may be used to counteract acidity in swimming pool water, or in drinking water.

IS SODIUM HYDROXIDE NATURALLY PRESENT IN DRINKING WATER?

Yes, because sodium and hydroxide ions are common natural mineral substances, they are present in many natural soils, in groundwater, in plants and in animal tissues. Water supplies in limestone areas contain significant amounts of sodium and hydroxide ions. Water supplies from acidic formations contain sodium but very little hydroxide.

IS SODIUM HYDROXIDE HAZARDOUS TO HEALTH?

In concentrated solid form or in fairly concentrated solutions sodium hydroxide is potentially harmful. Direct skin contact with pure crystals or powder can produce immediate irritation, rashes or even burns. Inhalation of crystals or powder can be very injurious to the respiratory tract. Household cleaning and laundry solutions containing sodium hydroxide at levels between 4% and 50% are irritating to skin and can cause serious skin burns on prolonged contact. Very concentrated solutions (50% or greater) of sodium hydroxide may be alkaline (caustic) enough to cause immediate injury to skin and underlying tissues. Ingestion of the concentrated salt or of strong solutions can cause serious injury to the throat, nausea, vomiting stomach ache and diarrhea. Most solutions having less than 1000 ppm sodium hydroxide are safe for skin contact.

WHAT ARE TYPICAL LEVELS OF SODIUM AND HYDROXIDE IN FOOD PRODUCTS?

Sodium levels in foods vary enormously. High sodium foods such as pickles, salted meats, and potato chips contain sodium levels of 600 to several thousand parts per million. Bottled soft drinks contain from 80 to 250 ppm sodium.

Hydroxide levels in food and beverages are very low. The most alkaline foods (those having the highest pH) seldom have more than about 2 ppm hydroxide.

HOW MUCH SODIUM HYDROXIDE IS ADDED TO WATER FOR CORROSION CONTROL?

Generally sodium hydroxide for corrosion control is added to water at rates between 1 and 40 ppm. These amounts of sodium are very small compared to amounts already present in most waters, and compared to the amounts present in beverages and foods. The hydroxide which is added combines with and is neutralized by the acidity of the water, so that the resulting hydroxide level is well below a part per million.

ARE THERE LEGAL LIMITS FOR THE AMOUNT OF SODIUM OR HYDROXIDE IN DRINKING WATER?

No, because sodium and hydroxide are naturally present in water, and pose little or no hazard at the low levels normally found, there are no regulatory limits. The US Food and Drug Administration classes this salt as generally recognized as safe to be added to foods and beverages for alteration of acidity and for stabilization

purposes. The Department of Human Services requires that pH be as near 7 as possible, which corresponds to a hydroxide level of about 2 parts per billion. The recommended pH range for drinking water is 6.5 to 8.5 which corresponds to hydroxide levels of less than a part per billion to approximately 17ppb.

There is no standard for sodium in drinking water at the state or federal level, but USEPA recommends that drinking water sodium be held to 20 ppm or less because sodium is so common in other beverages and foods. You may wish to obtain the Department of Human Services's fact sheet on sodium for further discussion of sodium sources and effects.

WHERE CAN I GET ADDITIONAL INFORMATION?

Specific questions about the treatment and quality of your drinking water should be addressed to your water provider. You also can obtain further information from the Department of Human Services by calling the above telephone numbers.