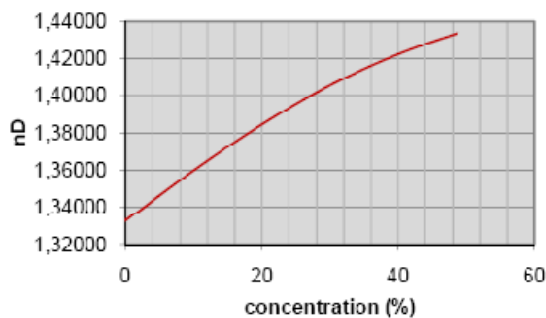


SODIUM HYDROXIDE (NaOH), BRINE (NaCl), HYDROCHLORIC ACID (HCl), SODIUM HYPOCHLORITE (NaClO)

Typical end products

Polymers, resins, elastomers, PVC plastic, in manufacturing of other chemicals, medicines, metallurgy, detergents and textiles

Chemical curve: Sodium hydroxide R.I. per Conc% b.w. at Ref. Temp. of 20°C



Introduction

Sodium hydroxide, caustic soda, NaOH, is a white, translucent and hygroscopic solid, which forms a strong alkaline solution with water.

Application

Sodium hydroxide is manufactured by the electrolysis of sodium chloride solutions. Brine (NaCl in water) electrolysis produces chloride at the anode

and hydrogen, along with the alkali hydroxide at the cathode.

Typically sodium hydroxide is delivered in 30-40% NaOH concentrations to customers, who will further dilute its usage concentrations of 14-15% NaOH.

These specific concentration percentages are obtained by mixing a full strength solution with water.

Installation

The K-Patents Process Refractometers are used to measure the concentrations at different phases of the process. The first and the second measurements before the electrolytic cell, and in brine recirculation line, are NaCl measurements. Prior to the cell, the concentration varies between 250-320 g/l and the temperature between 50-70°C (122-158°F). In the recirculation line the numbers are 190-210 g/l and 70-90°C (158-194°F) respectively.

The third measurement is an HCl measurement. The concentration is 30-35% and the temperature is ambient. A sulfuric acid concentration of 88-98% is measured before feeding the product to the dryer at ambient temperature.

Sodium hydroxide measurements are taken prior to and after the evaporators. The pre-evaporator concentration is 25-35% and after 45-55%. The

temperature decrease is from 70-90°C (158-194°F) to 30-50°C (86-122°F).

The last measurement is of NaClO, where concentration is 0-12% and temperature is ambient.

The K-Patents refractometer wetted parts are either total plastic or metal alloys, depending on corrosion resistance requirements.

In sodium chloride measurements, the sensor wetted parts should be titanium or palladium doped titanium. In HCl measurement the parts should be either tantalum, zirconium (PR-23-GP) or chemically resistant Teflon material (PR-23-M or PR-23-W) to ensure a viable service life. Automatic prism cleaning with an integral steam or high pressure water nozzle is recommended.

Instrumentation	Description
	<p>Teflon Body Refractometer PR-23-M. A compact refractometer for chemically aggressive solutions and ultra-pure fine chemical processes. Connected to the process by a G1/2" female or a 1/2" NPT process connection. It has a built-in flow cell designed to keep all metal and other easily corroding parts from coming into contact with the process liquid.</p>
	<p>Saunders Body Refractometer PR-23-W. A heavy-duty refractometer for chemically aggressive liquids in large-scale production and in large pipe sizes (diameter 50, 80 or 100mm/2", 3" or 4"). The Saunders body material is graphite cast iron, which provides a solid mechanical base. A PFA-lining ensures the chemical resistance.</p>
	<p>K-Patents Process Refractometer PR-23-GP is an industrial refractometer for large pipe sizes and tanks, cookers, crystallizers and kettles. Installation through a flange or clamp connection.</p>
<p>Measurement range:</p>	<p>Refractive Index (nD) 1.3200 – 1.5300, corresponding to 0-100 % by weight.</p>