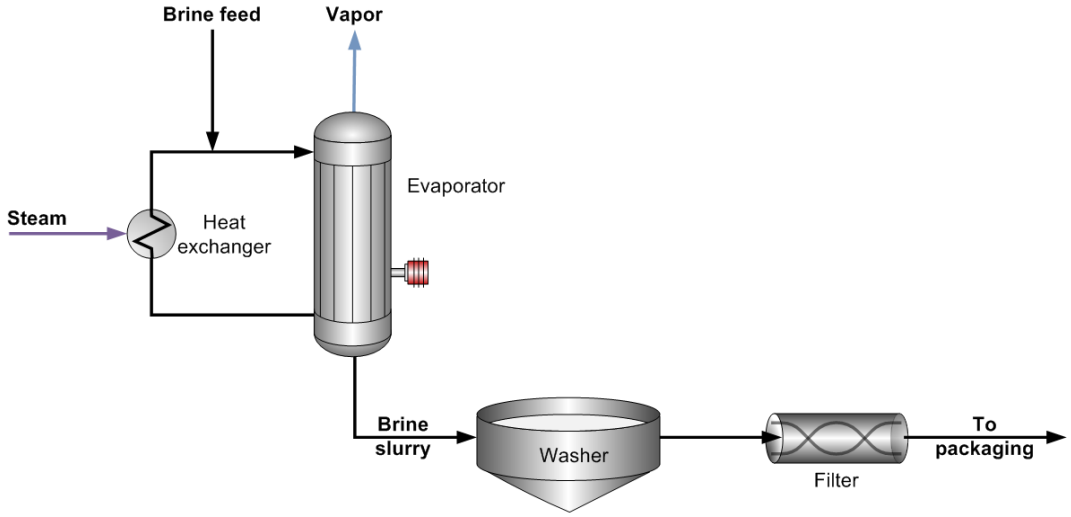
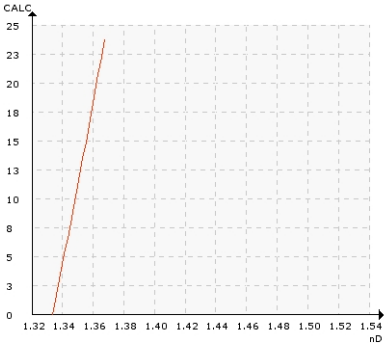



# SODIUM SULFATE, $NA_2SO_4$

**Typical end products**

Detergents, kraft process for wood pulp, textiles

**Chemical curve: Sodium sulfate R.I. per Conc% b.w. at Ref. Temp. of 20˚C**




## Introduction

Sodium chloride (NaCl), or common table salt, is a water soluble and colorless crystalline solid. The solution of dissolved salt in water is called brine.

Sodium chloride occurs as rock salt in nature, in natural brines, such as sea water. Rock salt deposits are mainly located in the USA.

The largest use of salt (in the form of brine) is in the electrolytic production of chlorine. In food industry, salt is used as a food flavouring agent, preservative and color developer.

## Application

Salt is obtained in three different ways; solar evaporation of seawater, mining of rock salt and from brine wells (solution mining).

For special grades of brine to be used in foods or chemicals, pre-treatment of the brine solution may be required to remove calciums. The main impurity left in the saturated brine feed is dissolved sodium sulfate ($Na_2SO_4$).

The saturated brine solution is recycled through a heat exchanger in a crystallizing evaporator. By adding heat, the saturated brine solution starts to crystallize and evaporate.

If the brine solution is over heated, a large quantity of sodium sulfate will also crystallize. This makes the salt impure. It is essential to know the amount of sulfate present in the brine to achieve both rapid production and high salt quality.

The salt-brine slurry is then washed, dried and filtered, before packaging.

## Installation

The K-Patents Process Refractometer measures the sulfate levels of the brine in the crystallizing evaporator. By measuring the amount of impurities, the crystallization process can be better controlled, thus giving purer salt with reduced production times.

Typical measurement ranges are 0-30g/l (0-0,25 lb/gl) sulfate in brine. Common temperatures are 40-60°C (104-140°F).

| Instrumentation | Description |
|---|---|
|  | 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. |
|  | 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. |
|  | 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. |
| Measurement range: | Refractive Index (nD) 1.3200 – 1.5300, corresponding to 0-100 % by weight. |