

## Sodium Metasilicate: Green and Efficient



Silmaco has been actively operating in the world of silicate for 25 years. As a small family-run business, nowadays our company supplies 50 countries worldwide. By constantly developing new products and services for our customers, we are known as a particularly innovative and flexible player in the silicate industry. We have turned our small size into our biggest asset. We have a close relationship with our customers and respond quickly and

appropriately to your questions, problems or requests. Our strengths make us the smart choice for you in the silicate industry. Silmaco produces the **complete range of liquid sodium silicates and granulated sodium metasilicates**. As we only use the purest raw materials, our finished products are of “premium” quality!

### Complete range

Sodium metasilicates are characterized by a  $\text{SiO}_2/\text{Na}_2\text{O}$  ratio of approximately one. Silmaco produces **sodium metasilicate anhydrous, -pentahydrate and -nonahydrate**. These grades differ in terms of concentration. As shown in Table 1, a variety of grain sizes are available.

The advantage with **Sodium Metasilicate Anhydrous** is the **high active content** which makes it possible to formulate high concentrated products. Whereas **Sodium Metasilicate Pentahydrate and Nonahydrate** offers the benefit of a **high dissolution speed**.



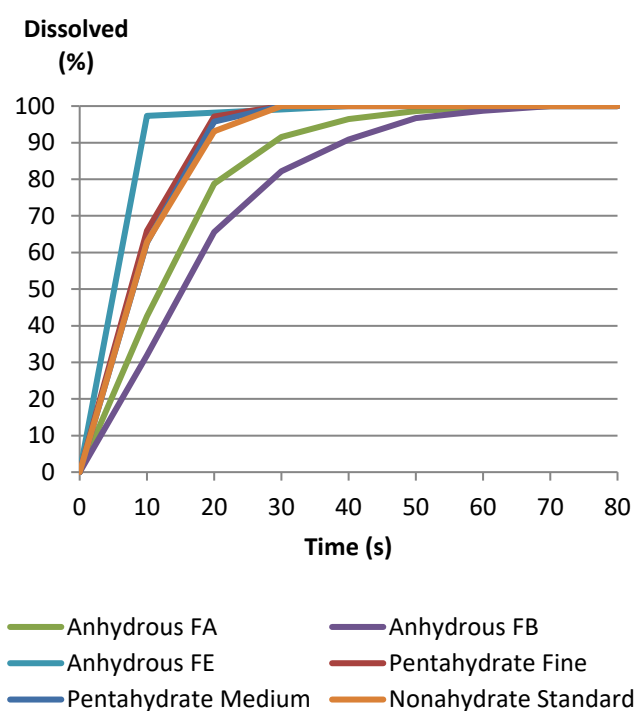
### Properties and advantages

- Sodium metasilicate **dissolves easily**, even in cold water.
- Our granules are characterized by a **high bulk density** and a **low dust content**.
- As a highly alkaline product, sodium metasilicate will easily react with  $\text{CO}_2$ . Our production methods are such that the risk of partial inactivity due to  $\text{CO}_2$  contamination is minimal as there is no contact between our products and the combustion gasses. This way, we can guarantee a **pure sodium metasilicate**.

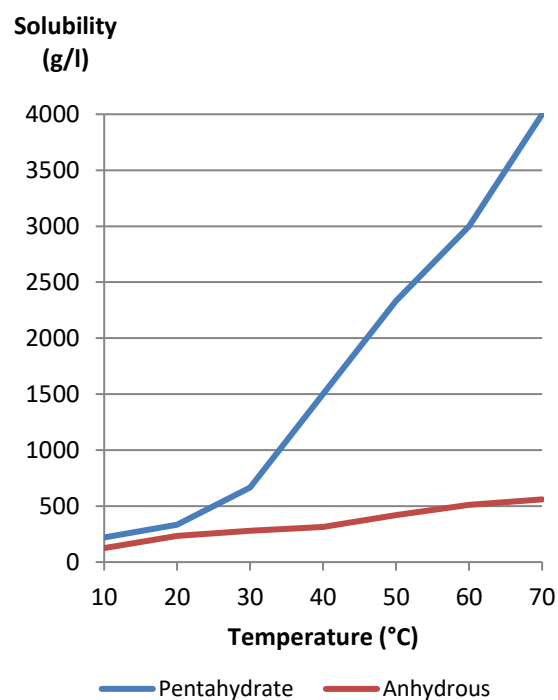
**Table 1.** An overview of SILMACO's SODIUM METASILICATES

Grade		Molar Ratio	Conc (%)	Form	Particle Size (micron)	Bulk density (g/L)
Anhydrous	FE	0,96	97	Powder	0 - 250	1.100
	FA	0,96	97	Granular	200 - 630	1.100
	FB	0,96	97		630 - 1250	1.100
	FC	0,96	97		200 - 1250	1.100
Pentahydrate	Fine	1,03	57	Granular	200 – 1250	950
	Medium	1,03	57		200 – 1600	950
Nonahydrate	Standard	1,04	46	Granular	200 – 1600	850

**Figure 1.** Speed of dissolution of Silmaco's Sodium Metasilicate Grades



**Figure 2.** Solubility of Sodium Metasilicate Anhydrous and Pentahydrate in function of temperature



## Applications

### Cement, Concrete and Refractories



Because of its absolutely inorganic composition, Silmaco's Sodium Metasilicate is especially suited for use in certain fire-resistant applications. The product is found in applications where components must be protected against high temperatures. Especially the **hydrated sodium metasilicates** have an **excellent cooling effect**. They are used in manufacturing **refractory** and **chemically-resistant bricks, mortars, and gunning mixes**. They are also added to the matrix to increase the alkalinity which promotes a faster dissolution of other silicate powders present in the formulation.

Sodium metasilicates can be added into dry cement admixtures to accelerate the set. Silmaco's Sodium Metasilicates are especially used in **oil well cements** to prevent segregation of the solids from the high water containing cement matrix.

### Ceramics

In the ceramic industry, a part of the water in clay slurries can be replaced by sodium metasilicate to **improve the liquid characteristics** which results in energy saving at the drying stage. Sodium metasilicate acts as a deflocculant, it adsorbs onto the clay surface and causes the clay particles to repel one another. Preferred grades are sodium metasilicate pentahydrate and nonahydrate.



### Cosmetics



Sodium Metasilicate is an inorganic salt. In cosmetics this ingredient is mainly used in **hair bleaching** as peroxide bleach stabilizer.

Sodium Metasilicate may be used in cosmetics and personal care products marketed in Europe according to regulation 1223/2009/EC and subsequent amendments.

### Detergents

Sodium metasilicates are very important ingredients in liquid and powder detergents for **professional and industrial applications**. They contain an optimum portion of **alkali** and **soluble silica**.

Their high active alkalinity provides an **efficient cleaning** and makes Silmaco's Sodium Metasilicate an **economical choice**. The soluble silica content protects metal, glass and ceramic surfaces against corrosion and disperses the soil in solution and prevents it from redepositing.



The large buffering capacity, their stabilizing effect of the bleach proces, the protective properties against corrosion, their hardness-binding capacity, their ability to keep removed dirt in suspension makes sodium metasilicates a **multifunctional** and indispensable ingredient in your detergent formulations.

Sodium Metasilicate is especially suitable for **hard surface cleaning** and in professional and industrial **dishwashing detergents**.

## Grouting



The construction of tunnels can be a hazardous operation. Direct injection of soluble silicates in combination with a hardener, gives consolidation of the ground and water-impermeability by in-situ formation of a siliceous gel, which strengthens and seals the soil.

Sodium metasilicates are used in **dry mixtures** composed of inorganic compounds which hardens in reaction with water.

## Mining

Flotation is a widely used process for **extracting** many **minerals** from their ores. Silmaco's sodium metasilicate is used as dispersant to keep undesired materials in suspension while the value minerals are carried to the surface by air bubbles.



## Newsprint deinking



Sodium metasilicate plays a multifunctional and vital role in the **deinking of paper**. Its alkaline buffering and saponification properties helps in the dispersion of the ink particles and improves flotation. In addition it stabilises the hydrogen peroxide used to bleach the pulp.

## Oil and drilling

Sodium metasilicates are used in **silicate-based drilling fluids**, which are an effective, versatile and low cost alternative to oil-based drilling fluids. Besides sodium metasilicates are wholly inorganic and therefore not flammable and once diluted they have no environmental impact. Granulated metasilicates offers an **advantage towards liquid silicates when conditions request**, such as limited storage capacity or danger towards freezing temperatures. Silmaco's sodium metasilicates are very performant in normal and heavyweight slurries for reducing the mobility of water. They are widely used as a cost effective extender, allowing a higher ratio of water to cement. They can also be used as a cement accelerator.



## Packaging and Storage

Sodium Metasilicate is available in bags of 25 kg, bigbags and bulk. The product should be kept in a dry storage because of its affinity for moisture.



## Environment



Because of its inorganic character, Sodium Metasilicates **do not significantly influence the natural cycles**. After being used, they mostly occur in a highly diluted liquid form and do not have a relevant influence on the environment. Only concentrated solutions may cause adverse effects on aquatic biosystems. Therefore neutralisation should be carried out before discharging to water / effluent systems. The silica ending up in the environment will be absorbed in the natural cycles of this material and **recycle itself**.

## Safety and Handling

Sodium Metasilicates are strongly alkaline products and therefore classified as dangerous goods. They should be handled with care in order to prevent injuries. Whenever disodium metasilicate as a substance on its own or in a preparation is handled outside closed systems, **suitable personal protective equipment** (gloves, goggles, dust masks or respirators) is the preferred and only measure of control. We strongly advise to carefully read our corresponding Material Safety Datasheet before using the product.