Environment, flue gas and water-treatments

Product Range

Technical Sodium Bicarbonate
Technical Sodium Carbonate
Special Novabis® Sodium Bicarbonate
Liquid Sodium Silicate
Flue gas treatment

We produce sodium bicarbonate and sodium carbonate for the flue gas treatment market:

- Technical Sodium Bicarbonate
- Special Novabis® Sodium Bicarbonate
- Technical Sodium Carbonate

**HOW DOES IT WORK?**

Sodium bicarbonate and sodium carbonate facilitate the fast and efficient neutralization of acidic gases contained in waste fumes produced by energy plants, sewage sludge incinerators or industrial plants (glass and steel industries). They are designed to be used with the dry process treatment.

The main acidic gases in the fumes are:

- Sulfur oxides: SO$_2$ and SO$_3$ (SOx)
- Halogenated acids: HCl, HF (HX)

Neutralizing these acidic gases brings emissions in lines with the European Directive 2010/75/EU requirements for combustion plants.

"Over the past few years, waste treatment has garnered a prominent place in environmental policies for urban communities and factories as they work to align themselves with applicable standards.

Communities and manufacturers employ incineration to treat and recycle waste, but this method is also a potential source of pollution. The rigorous pollutant emission standards introduced in the European Union guidelines for waste incineration require the optimization of flue gas cleaning systems. This helps limit the environmental impact as measured by emission caps.”

Neutralizing acid gases with activated sodium carbonate:

\[
\text{Na}_2\text{CO}_3(\text{s}) + 2\text{HCl}(\text{g}) \rightarrow 2\text{NaCl}(\text{s}) + \text{H}_2\text{O}(\text{g}) + \text{CO}_2(\text{g})
\]

The kinetics of neutralization can be increased by grinding sodium bicarbonate to a specific particle size, using a determined contact time and controlling the temperature of flue gases (between 150°C and 400°C).

When sodium bicarbonate is injected into hot flue gas, it turns into activated sodium carbonate with a higher specific surface area. This improves the kinetics of the gas-solid reaction.

Activating sodium bicarbonate: \(2\text{NaHCO}_3 \rightarrow \text{Na}_2\text{CO}_3 + \text{H}_2\text{O} + \text{CO}_2\)

Sodium bicarbonate particle surfaces before/after thermal decomposition at 300°C:

**DRY PROCESS ACID GAS TREATMENT WITH SODIUM BICARBONATE**

- Flue gas from incineration (after boiler) → Electrostatic precipitator → Bag filter
- Electrostatic precipitator (ASHES)
- Sodium Bicarbonate → Active carbon → Grinder
- Sodic Residues (NaCl, Na₂SO₄, ...)
-OPTIONAL: Catalytic DeNOx
- Stack
- TREATED SMOKED
**PRODUCT RANGE**

**Particulate Size**

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Particle Size</th>
<th>Average Density (kg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical Sodium Bicarbonate</td>
<td>&lt; 500µm : &gt; 95%</td>
<td>900-1200</td>
</tr>
<tr>
<td>Novabis® Special Sodium Bicarbonate</td>
<td>&lt; 180µm : &gt; 95%</td>
<td>800-900</td>
</tr>
<tr>
<td>Light Technical Sodium Carbonate</td>
<td>&lt; 1000µm : &gt; 97%</td>
<td>510-610</td>
</tr>
</tbody>
</table>

Upon request, Technical Sodium Bicarbonate can be enhanced with additives to improve its flow properties.

**Novabis® - an Innovative, 2-in-1 Reactant for Flue Gas Treatment:**

Just as efficient as standard sodium bicarbonate at neutralizing SOx and HX

Supports denitrification in catalytic processes. With Novabis®, the quantity of ammonia or urea used for denitrification decreases by 10% to 15%.

No modification of the flue gas treatment process is needed to use Novabis®.

Sodium Bicarbonate is not classified as a corrosive, unlike other reactants such as lime.

"Thanks to their extensive experience with customer ans in-house equipment, our R&D team can provide the following:

- Technical advice on choosing reactants or equipment, and the expected consumption of the reactant
- Technical support during the early stages: adjusting injection flow, grinding, and measuring pollutants
- Technical assistance with optimizing treatment (reducing reagent consumption, etc.)"

Water treatment

We produce sodium bicarbonate, sodium carbonate and liquid sodium silicate for water treatment market:

- Technical sodium bicarbonate
- Technical sodium carbonate
- Liquid sodium silicate

**HOW DOES IT WORK?**

Sodium bicarbonate regulates water pH.
Sodium carbonate decreases permanent water hardness by reacting with calcium sulfate and calcium chloride. Sodium carbonate then precipitates insoluble calcium carbonate (CaCO₃).

\[
\begin{align*}
\text{CaSO}_4(\text{l}) + \text{Na}_2\text{CO}_3(\text{l}) & \rightarrow \text{Na}_2\text{SO}_4(\text{l}) + \text{CaCO}_3(\text{s}) \\
\text{CaCl}_2(\text{l}) + \text{Na}_2\text{CO}_3(\text{l}) & \rightarrow 2\text{NaCl}(\text{l}) + \text{CaCO}_3(\text{s})
\end{align*}
\]

Sodium silicate helps to precipitate some metals in waste water as Al and Fe.

**PRODUCT RANGE**

<table>
<thead>
<tr>
<th></th>
<th>PARTICLE SIZE</th>
<th>AVERAGE DENSITY (KG/M³)</th>
<th>DISSOLUTION TIME (20°C, 175 RPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical Sodium Bicarbonate</td>
<td>&lt; 500µm : &gt; 95%</td>
<td>900-1200</td>
<td>From 5 min to 10 min</td>
</tr>
<tr>
<td>Light Technical Sodium Carbonate</td>
<td>510-610</td>
<td>≥ 99.0</td>
<td>4min30</td>
</tr>
<tr>
<td>Liquid Sodium Silicate (weight ratio 1.4 to 3.5)</td>
<td>1325-1570</td>
<td>&gt;82.0</td>
<td>-</td>
</tr>
</tbody>
</table>
SEQENS Mineral Specialties: Responsiveness, reliability and quality

RESPONSIVENESS
SEQENS Mineral Specialties is producer of sodium-based mineral compounds. Novacarb is headquartered in Lorraine in northeastern France, Novabion is located near Paris and Novabay is based in Singapore. These locations enable us to maintain a strong presence on the international markets for the food, animal feed, pharmaceutical, environmental protection, glass, laundry and detergent industries.

RELIABILITY
SEQENS Mineral Specialties is state-of-the-art companies with more than 300 motivated and well-trained employees. We have been passionate about quality and satisfying our customers’ needs since the launch of our industrial activities in 1855. SEQENS Mineral Specialties is subsidiary of the international SEQENS Group.

QUALITY
SEQENS Mineral Specialties ISO 9001, ISO 14001, ISO 50001, and OHSA 18001 certified and a member of the worldwide Responsible Care® charter. We have implemented the HACCP methodology in all of our processes. Some of our products are also Kosher and Halal certified. Overall we strive to promote sustainable development in daily life.