



## Environment, flue gas and water treatments

Technical Sodium Bicarbonate  
Technical Sodium Carbonate  
Special Novabis™ Sodium Bicarbonate  
Liquid Sodium Silicate



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# 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:  $\text{SO}_2$  and  $\text{SO}_3$  (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 yhis 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."*

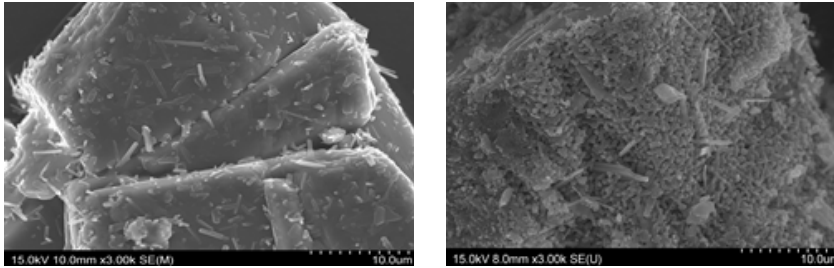
Source: <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32010L0075>

- Process details

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:

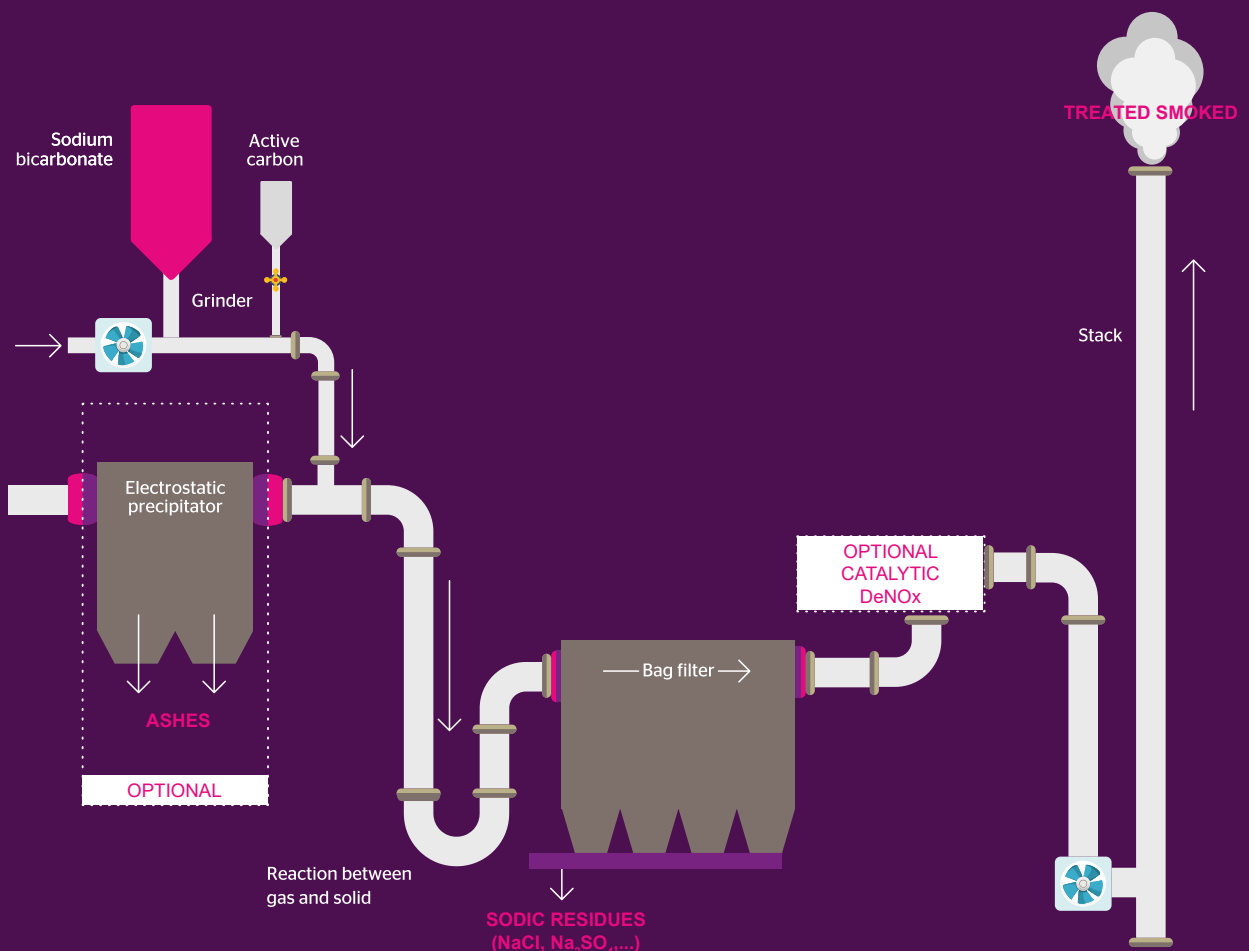


Neutralizing acid gases with activated sodium carbonate:



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).

- Dry process acid gas treatment with sodium bicarbonate



## • Product range

	PARTICLE SIZE	AVERAGE DENSITY (KG/M <sup>3</sup> )
Technical Sodium Bicarbonate	< 500µm : > 95%	900-1200
Novabis™ Special Sodium Bicarbonate*	< 180µm : > 95%	800-900
Light Technical Sodium Carbonate*	< 1000µm : > 97%	510-610

\* Only available in Europe

**Sodium bicarbonate is not classified as a corrosive, unlike other reactants such as lime.**  
*Upon request, Technical Sodium Bicarbonate can be enhanced with additives to improve its flow properties (only for European markets).*

## • Novabis™ focus

Novabis™ is an innovative, 2-in-1 reactant for flue gas treatment

- Just as efficient as standard sodium bicarbonate at neutralizing SO<sub>x</sub> 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™.



*Thanks to their extensive experience with customer and 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:

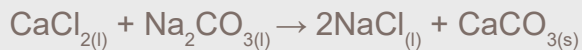
- Technical sodium bicarbonate
- Technical sodium carbonate
- Liquid sodium silicate



## • 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 ( $\text{CaCO}_3$ ).

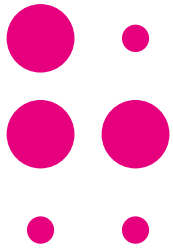


Sodium silicate helps to precipitate some metals in waste water as Al and Fe.

## • Product range

	PARTICLE SIZE	AVERAGE DENSITY (KG/M <sup>3</sup> )	DISSOLUTION TIME (20°C, 175 RPM)
Technical Sodium Bicarbonate	< 500µm : > 95%	900-1200	From 5 min to 10 min
Light Technical Sodium Carbonate*	510-610	≥ 990	4min30
Liquid Sodium Silicate* (weight ratio 1.4 to 3.5)	1325-1570	>82.0	-

\* Only available in Europe



**Humens**  
the purity makers



## Our company

### Historical know-how

Humens produces sodium-based mineral compounds. Our company has a production history that goes back more than 160 years at our La Madeleine plant in Laneuveville-devant-Nancy, France. Our products are made from two high purity natural mineral raw materials extracted in the Lorraine region: limestone from our Pagny-sur-Meuse quarry and salt from our Lenoncourt salt field. From local to global player, Humens set up a greenfield sodium bicarbonate unit in Singapore in 2016.

### Shared goal for product quality

Humens is a state-of-the-art company with 400 skilled and committed employees. We have been passionate about products purity and satisfying our customers' needs since our industrial activities were launched in 1855.

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