Technical Information

M 6066 e
May 2002 (Diet)

Supersedes M 6066 e of June 1996

Sodium Nitrite grades

Sodium Nitrite for Pickling Salt (E 250)
Sodium Nitrite Tech. RW
Sodium Nitrite Tech. U
Sodium Nitrite Solution N 25 – 39 %
Sodium Nitrite Solution N approx. 40 %
Sodium Nitrite Solution S 25 – 39 %
Sodium Nitrite Solution S approx. 40 %

Auxiliaries for the chemical and pharmaceutical industries, the textile industry, hardening technology and many other industries. Preservatives in certain applications.

Chemicals

BASF

Sodium Nitrite for Pickling Salt (E 250)
Sodium Nitrite Tech. RW
Sodium Nitrite Tech. U
Sodium Nitrite Solution N 25 – 39 %
Sodium Nitrite Solution N approx. 40 %
Sodium Nitrite Solution S approx. 40 %
Sodium Nitrite Solution S 25 – 39 %

Chemical name	Sodium nitrite
Chemical formula	$NaNO_2$
Molecular weight	68.995 g/mol
CAS no.	7632-00-0
EINECS no.	231-555-9
INDEX no.	007-010-00-4
Forms supplied and packaging	**Sodium Nitrite Tech. U** and **Sodium Nitrite for Pickling Salt (E 250)** are untreated products and therefore tend to cake. **Sodium Nitrite Tech. RW** is a free-flowing grade treated with an anti-caking agent. **Sodium Nitrite Tech. U and Tech. RW** are supplied in 25- and 50-kg PE bags. **Sodium Nitrite Tech. RW** can also be supplied in FIBCs (Big Bags) holding up to 1 t. **Sodium Nitrite for Pickling Salt (E 250)** is only supplied in 25-kg PE bags. **Sodium Nitrite Solutions** are transported only in road tankers, tank containers or rail tank wagons within Europe.

Properties

Sodium nitrite is a fine crystalline, faintly yellowish salt. Sodium nitrite absorbs moisture from the air when the relative humidity is as low as 60 % – and to an increasing extent as it rises. In unfavourable circumstances, as a result of this water absorption, the product can cake very rapidly and thus become hard without undergoing any change in chemical properties. Agglomerates are broken up by moving the containers, e. g. by standing them up.

The melting point of the dry product is about 280 °C. Sodium nitrite is freely soluble in water. Solubility and density of the solution are shown in the following two diagrams.

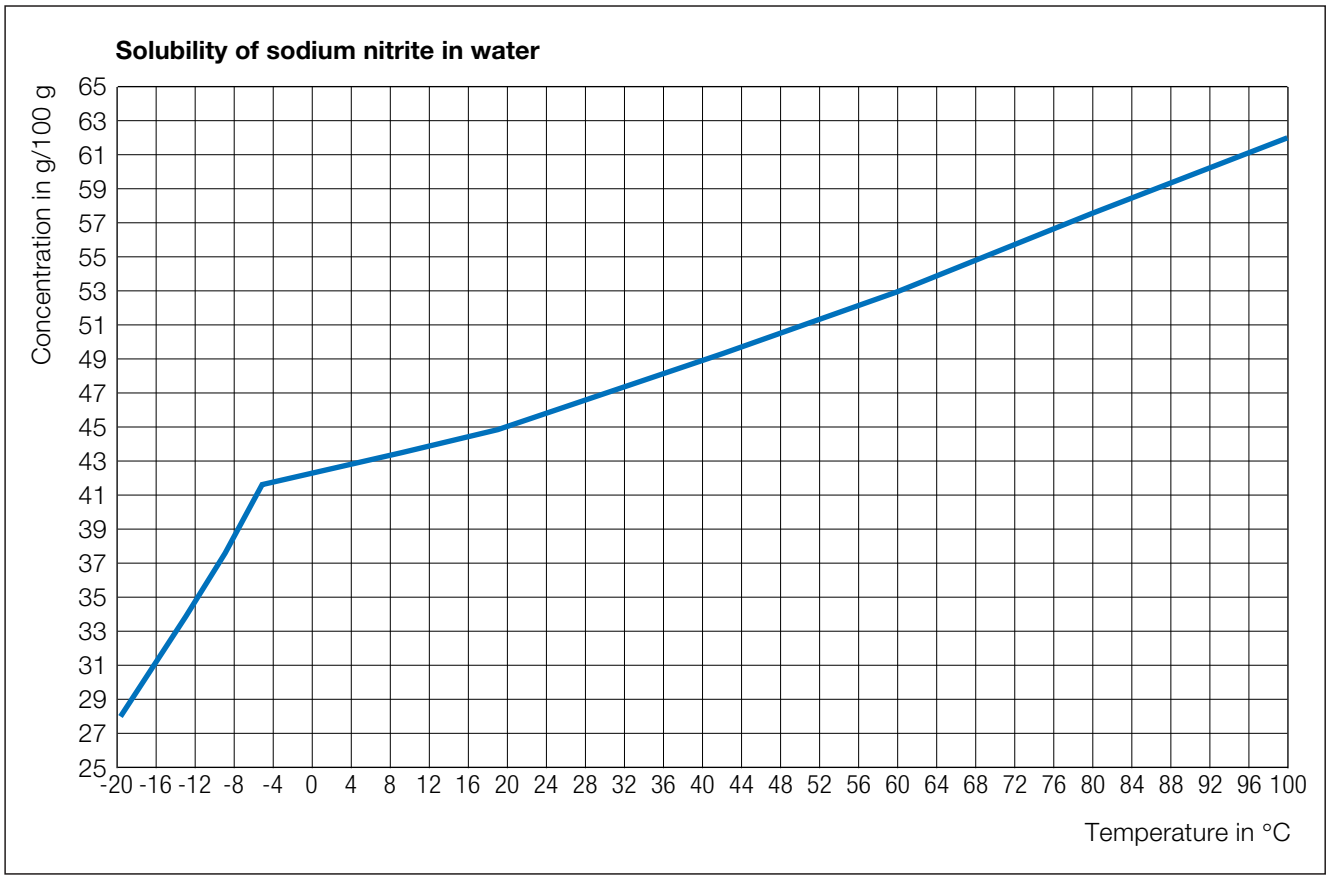

Fig. 1 Solubility of sodium nitrite in water

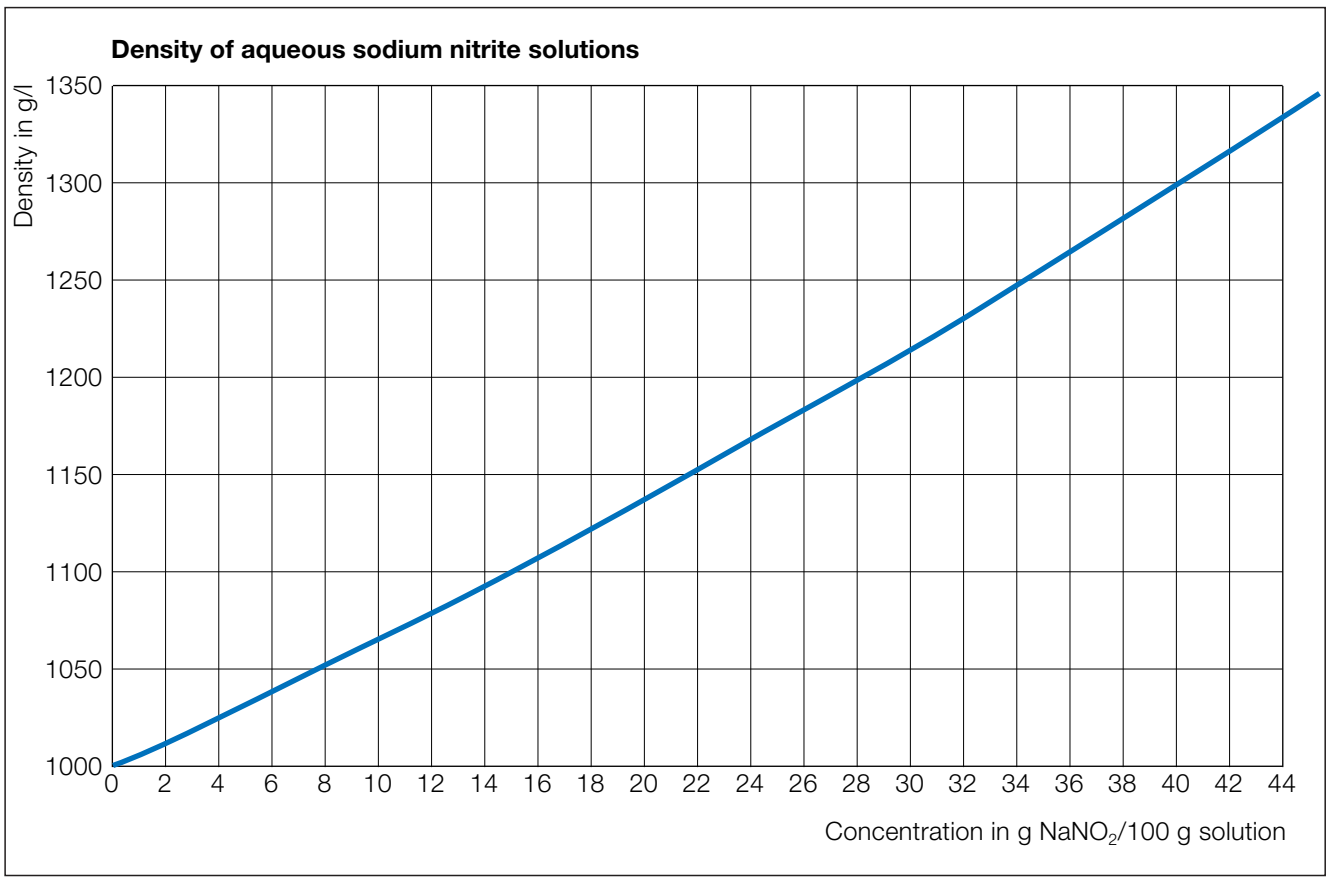

Fig 2: Density of sodium nitrite solutions

Typical values for particle size distribution are shown in the following diagram

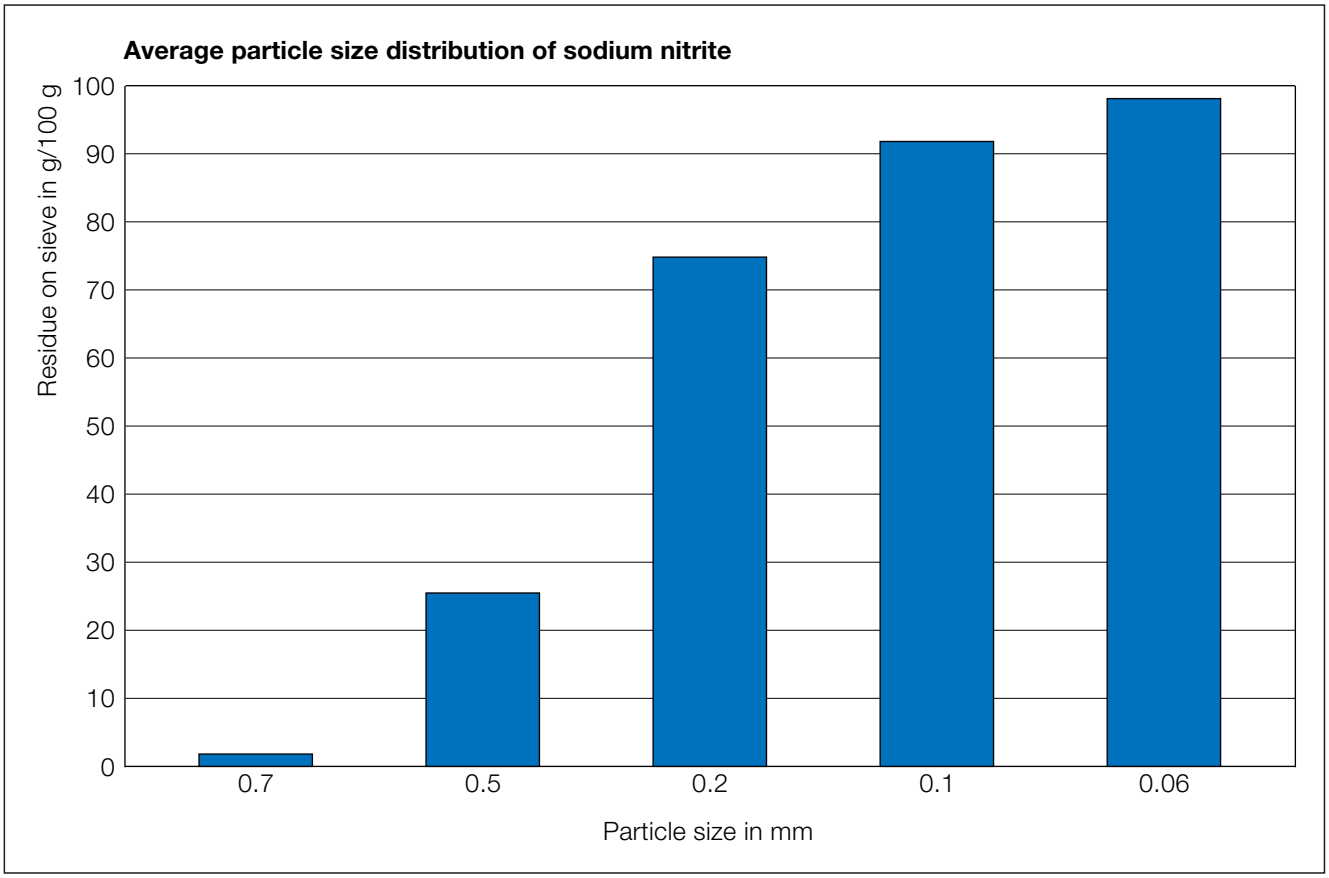

Fig. 3 Particle size distribution of sodium nitrite

Product specification

The values and test methods given in the following product specifications correspond to those that are valid at the time the technical data sheet is produced. If interested, please ask for the current product specifications because some changes may have occurred. Only the values in the relevant specification sheets supplied are then binding.

Sodium Nitrite for Pickling Salt (E 250)

Product without added anti-caking agent; hardens rapidly.

Characteristic	Unit	Average value	Specification	Test methods
Sodium nitrite	g/100 g	99.4	min. 98.7	Titrimetry
Sodium nitrate	g/100 g	0.5	0.1–1.2	Ion chromatography
Sodium carbonate	mg/kg	200	max. 600	Titrimetry
Sodium chloride	mg/kg	20	max. 50	Titrimetry
Sodium sulphate	mg/kg	40	max. 50	Ion chromatography
Water (loss on drying)	g/100 g	0.1	max. 0.2	Gravimetry
Water-insoluble residue	mg/kg	20	max. 50	Gravimetry
Total heavy metals (as Pb)	mg/kg	–	max. 10	FCC IV method*
Lead	mg/kg	< 0.5	max. 5	Atomic spectrometry
Arsenic	mg/kg	< 0.1	max. 0.2	Atomic spectrometry
Mercury	mg/kg	< 0.01	max. 0.05	Atomic spectrometry

** FCC = Food Chemicals Codex*

Sodium Nitrite Tech. RW Product with anti-caking agent based on naphthalene sulphonate.

Characteristic	Unit	Average value	Specification	Test methods
Sodium nitrite	g/100 g	99.4	min. 98.7	Titrimetry
Sodium nitrate	g/100 g	0.5	0.1–1.2	Ion chromatography
Sodium carbonate	mg/kg	200	max. 600	Titrimetry
Sodium chloride	mg/kg	20	max. 50	Titrimetry
Sodium sulphate	mg/kg	200	max. 300	Ion chromatography
Water (loss on drying)	g/100 g	0.1	max. 0.2	Gravimetry
Water-insoluble residue	mg/kg	20	max. 50	Gravimetry

Sodium Nitrite Tech. U Product without added anti-caking agent; hardens rapidly.

Characteristic	Unit	Average value	Specification	Test methods
Sodium nitrite	g/100 g	99.4	min. 98.7	Titrimetry
Sodium nitrate	g/100 g	0.5	0.1-1.2	Ion chromatography
Sodium carbonate	mg/kg	200	max. 600	Titrimetry
Sodium chloride	mg/kg	20	max. 50	Titrimetry
Sodium sulphate	mg/kg	40	max. 50	Ion chromatography
Water (loss on drying)	g/100 g	0.1	max. 0.2	Gravimetry
Water-insoluble residue	mg/kg	20	max. 50	Gravimetry

Sodium Nitrite Solution N 25 – 39 %
Sodium Nitrite Solution N approx. 40 %
Sodium Nitrite Solutions N are clear, faintly yellowish liquids with the following product specification:

Characteristic	Unit	Average value	Specification	Test methods
Sodium nitrite	g/100 g	25 – 40	24 – 41	Titrimetry
Sodium nitrate	g/100 g	2	0.1 – 4	Ion chromatography
pH (40 % solution)	–	8	7.5 – 9.0	pH measurement
Density (20 °C)	g/cm^3	–	1.17 – 1.345	Densimetry

Sodium Nitrite Solution S 25 – 39 %
Sodium Nitrite Solution S approx. 40 %

Sodium Nitrite Solutions S are clear, faintly yellowish liquids with the following product specification:

Characteristic	Unit	Average value	Specification	Test methods
Sodium nitrite	g/100 g	25 – 40	24 – 41	Titrimetry
Sodium nitrate	g/100 g	0.1	max. 0.3	Ion chromatography
Sodium carbonate	mg/kg	90	max. 450	Titrimetry
Sodium chloride	mg/kg	10	max. 20	Titrimetry
Sodium sulphate	mg/kg	15	max. 20	Ion chromatography
Magnesium	mg/kg	0.5	max. 3	Ion chromatography/ atomic spectrometry
Calcium	mg/kg	3	max. 8	Ion chromatography/ atomic spectrometry
pH (40 % solution)	–	8.5	7.5 – 9.0	pH measurement
Density (20 °C)	g/cm^3	–	1.17 – 1.315	Densimetry

Approvals

Of the sodium nitrite grades *only* **Sodium Nitrite for Pickling Salt (E 250)** is permitted for use as a food additive subject to special conditions. The product is produced, filled and despatched in accordance with HACCP guidelines. The purity of **Sodium Nitrite for Pickling Salt (E 250)** meets the limit values for a food additive and those of the European Pharmacopoeia 2002.

Chemical characteristics

Sodium nitrite is both an oxidising agent and a reducing agent. Violent and in some cases even explosive reactions can occur with ammonium salts, amides and products that contain these substances. Sodium nitrite can similarly react violently with reducing agents such as alkali sulphites and hydrosulphites.

The nitrous acid forming on acidification decomposes rapidly to form brown nitrous gases. The nitrous acid reacts with some substances to form diazo or nitroso compounds. These reactions are utilised for numerous syntheses.

Flammable substances that have been heavily impregnated with nitrite solution and then dried burn much more readily. Sodium nitrite and its solutions do not attack steel, iron and many other metals. Similarly, rubber, plastics, glass, porcelain and ceramics are resistant to sodium nitrite and its solutions. Comprehensive information on the resistance of various materials to sodium nitrite is given in the DECHEMA material tables.

Use

In the food industry

Sodium Nitrite for Pickling Salt (E 250) may be employed as a preservative for the production of nitrite pickling salt only in accordance with the provisions of the permitted additives regulations, EC Directive 95/2 or the Code of Federal Regulations (21 CFR) of the Food and Drug Administration or other local guidelines – *restricted to a few foods and in the maximum amounts specified there*.

In the chemical and and pharmaceutical industries

For the manufacture of azo dyes, diazo compounds and nitroso isonitroso compounds. For flushing butadiene tanks and as a component of heat transfer salts.

In textile dyeing and printing

For diazotisation in the manufacture of azo dyes. For oxidising dyeings and prints with leuco vat dyes. To protect against overreduction in dyeing and printing with certain vat dyes. For the accelerated oxidation of vat dyes that are difficult to reoxidise. For bleaching natural fibres.

In the metal industry

As an accelerator in cold phosphating. For the production of baths for the bluing of steels. For the bronzing and quenching of steel. In descaling steels and cast iron. As an additive to alkaline pickling baths for aluminium and aluminium alloys and for neutral cleaning and passivating baths. As an auxiliary in the treatment of tinplate.

In the construction industry

As an additive in the manufacture of concrete to increase its strength and as a corrosion inhibitor in reinforced steel.
As a corrosion inhibitor for iron, steel and water cooling circuit systems.

In the rubber industry

As an auxiliary for the production of rubber as hardener, accelerator, retarder and anti-ozonant.

In the chemical-technical industry

For the manufacture of corrosion inhibitors and corrosion-inhibiting papers. In the manufacture of aqueous emulsion paints. As an additive to enamel frits and for the manufacture of products for preventing corrosion of heating oil storage tanks. In cutting and drilling oils, in hydraulic fluids and in lubricants. In the oil industry.
For stabilising the colour of vinyl resins.

Safety

Physiological effects

Sodium nitrite promotes methaemoglobin formation. The symptoms are congestion in the head, nausea, hypotension, cyanosis and circulatory collapse. The lethal dose for adults is 4 – 6 g.

Sodium nitrite is classified as water-polluting (water hazard class 2)

Safety notes

Sodium nitrite must bear a hazard warning label in accordance with Appendix 1 of Directive 67/548/EEC:

Hazard symbols:	O, T, N
R phrases:	8, 25
S phrases:	45

Sodium nitrite solutions must be labelled as follows:

Sodium nitrite concentration > 1 to < 5 % by weight:	Xn, R 22
Sodium nitrite concentration > 5 to < 25 % by weight:	T, R 25, S 45, S 61
Sodium nitrite concentration ≥ 25 % by weight:	T, N, R 25, R 50, S 45, S 61

Further details can be found in the corresponding safety data sheets.

Transport and storage

If stored in a cool dry place sodium nitrite can be kept for years. However, the untreated product becomes hard after 1 – 2 weeks as a result of caking. The free-flowing properties of the treated (RW) grade depend to a large extent on external influences. If the product is stored at a low and as constant a temperature as possible and is subject to minimal pressure, e. g. by not stacking pallets on top of each other, it can retain its free-flowing properties for up to one year.

Sodium Nitrite for Pickling Salt (E 250) must be stored and transported in accordance with the guidelines for food additives.

Sodium nitrite is an oxidising substance. The storeroom must be suitable for this type of product. The local building regulations must be observed. Because of the danger of violent reactions sodium nitrite must **not** be stored and transported together with the following products: ammonium salts such as ammonium sulphate, ammonium chloride and ammonium hydrogen carbonate, ammonium-containing preparations such as nitrogenous fertilisers, amides such as urea and readily oxidisable products such as sodium bisulphite. Because of the danger of nitrogen oxide formation sodium nitrite must be transported and stored separately from acids. Because of its toxicity care must be taken to ensure that sodium nitrite is not confused with common salt or cattle salt. It must not be stored or transported together with food or animal feeds.

Note

The information submitted in this publication is based on our current knowledge and experience. In view of the many factors that may affect processing and application, these data do not relieve processors from the responsibility of carrying out their own tests and experiments; neither do they imply any legally binding assurance of certain properties or of suitability for a specific purpose. It is the responsibility of those to whom we supply our products to ensure that any proprietary rights and existing laws and legislation are observed.

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