Technical Leaflet

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August 1998 (JWF)

Supersedes issue of July 1995

Potassium Metabisulfite Grades

Potassium Metabisulfite PHOTO GRADE
Potassium Metabisulfite FOOD GRADE

Reducing agents and auxiliaries for various branches of industry; preservatives

Basic Chemicals

BASF

Potassium Metabisulfite PHOTO GRADE
Potassium Metabisulfite FOOD GRADE

Chemical nature	Potassium disulfite, potassium pyrosulfite and potassium metabisulfite
Chemical formula	$K_2S_2O_5$
Molecular weight	222.33
CAS No.	16731-55-8
EINECS No.	248-795-3
Physical form and packaging	Potassium metabisulfite PHOTO GRADE and FOOD GRADE can be supplied in 50-kg or 25-kg polyethylene valved sacks. The sacks are palletized on disposable pallets. The pallets may be wrapped on customer request.

Properties

Potassium metabisulfite PHOTO GRADE and FOOD GRADE are white to faintly yellowish, fine crystalline powders. They have a slight sulfur dioxide odour. The bulk density lies between 1.1 and 1.3 kg/l. At temperatures above 150 °C, potassium metabisulfite begins to decompose.

If it is stored in unclosed containers, potassium metabisulfite absorbs moisture rapidly and is oxidized. Even in closed containers, a certain water absorption can be anticipated. This corresponds to the water vapour diffusion through the polyethylene film. The rate of diffusion depends considerably on the storage temperature and relative humidity. Under unfavourable storage conditions, this can lead to hardening – caking –.

Potassium metabisulfite is readily soluble in water. In aqueous solution, it is in the form of potassium bisulfite ($KHSO_3$). Solutions of this nature are rapidly oxidized on standing in air.

Table 1 Density and composition of potassium metabisulfite solutions of various concentration

Concentration of $K_2S_2O_5$ (g/100 g)	$KHSO_3$ content (g/100 g)	Amount required for the preparation of $K_2S_2O_5$ (g/100 ml)	Density at 40 °C (g/100 ml)
5	5.41	5.27	102.8
10	10.81	11.1	106.5
15	16.22	17.7	110.4
20	21.62	25	114.6
25	27.03	33.35	119.0
30	32.43	43	123.6
35	37.84	54	128.4
40	43.24	66.7	133.4

The $KHSO_3$ content or the SO_2 content can be approximately determined by measuring the density. The exact values are obtained analytically. The test method that we recommend is ANSI PH 4.277-1980.

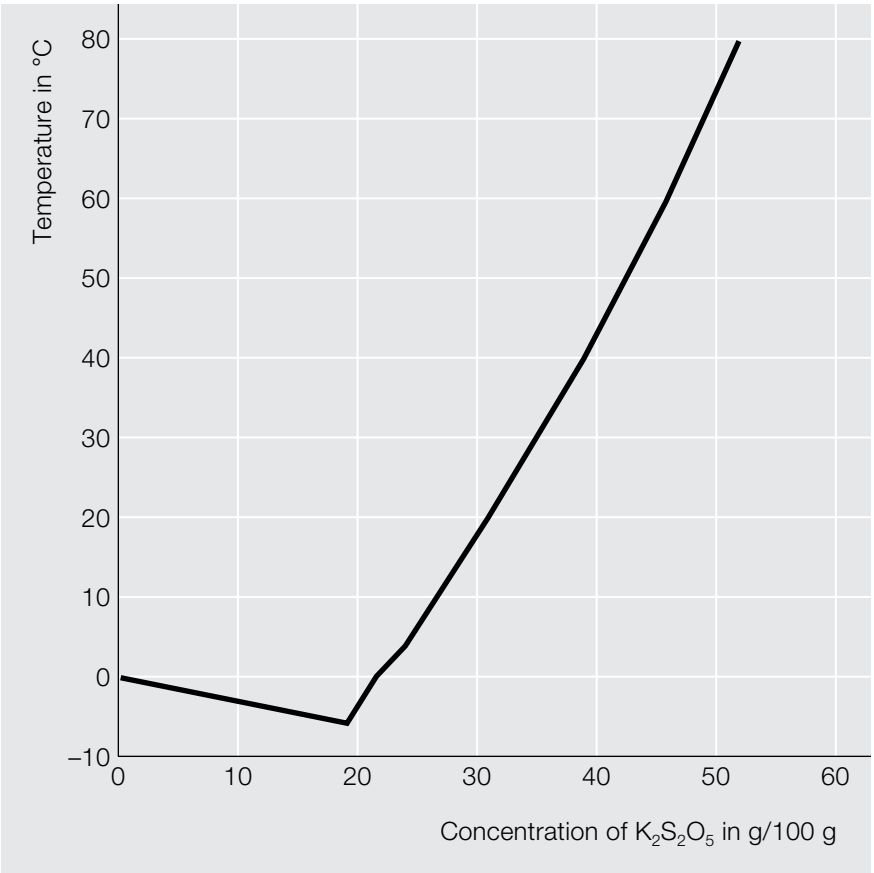

Fig. 1. Solubility of potassium metabisulfite in water

Product specifications

The values and test methods listed in the product specifications mentioned correspond to those that are valid at the time of compiling the Technical Leaflet. In view of possible changes since then, we would request that interested parties apply for the product specifications that are currently valid. Only those values that are sent to you in the respective specification sheets will be binding.

Potassium metabisulfite PHOTO GRADE

Property	Unit	Typical value	Boundary value	Test method
$K_2S_2O_5$ content	(g/100 g)	98.5	97.2 min.	ANSI PH 4.277-1980
SO_2 content	(g/100 g)	56.7	56.0 min.	calc.
Aspect of aqueous solution	–	–	conforms	ISO 3629-1976 (E)
pH	–	4.1	3.8 – 4.6	ISO 3629-1976 (E)
$K_2S_2O_3$ content	(g/100 g)	–	0.07 max.	RCA/Q-S-063
Heavy metals as lead	(mg/kg)	–	10 max.	AES-BASF M91/41
Iron content	(mg/kg)	< 3	5 max.	AAS-BASF M90/5
Reaction towards ammoniacal $AgNO_3$ solution	–	–	corresponds to	ISO 3629-1976 (E)
$K_2SO_3 + K_2SO_4$	–	–	Remainder	–

Product specification KDS_EP_02 dated 26 August 1993. Revision: 0

Potassium metabisulfite FOOD GRADE

Property	Unit	Typical value	Boundary value	Test method
$K_2S_2O_5$ content	(g/100 g)	98.5	97.2 min.	ANSI PH 4.277-1980
SO_2 content	(g/100 g)	56.7	56.0 min.	calc.
pH	–	< 4.6	3.8 – 4.8	ISO 3629-1976 (E)
Heavy metals as lead	(mg/kg)	–	10 max.	AES-BASF M 91/41
Content of				
Iron	(mg/kg)	< 3	5 max.	AAS-BASF M 90/5
Arsenic	(mg/kg)	< 0.1	< 1	AAS-BASF M 90/7
Lead	(mg/kg)	< 0.1	< 1	AAS-BASF M 90/5
Copper	(mg/kg)	–	< 1	AAS-BASF M 90/5
Manganese	(mg/kg)	–	< 1	AAS-BASF M 90/5
Mercury	(mg/kg)	< 0.03	< 0.1	AAS (cold steam)
Selenium	(mg/kg)	< 0.1	< 1	AAS-BASF M 90/8
Zinc	(mg/kg)	–	< 1	AAS-BASF M 90/5
K_2SO_3 + K_2SO	–	–	Remainder	–

Product specification KDS_DFG_02 dated 26 August 1993. Revision: 0

Potassium metabisulfite FOOD GRADE conforms to the EEC Guideline 95/2/EEC (dated 20.02.1995) Appendix III Part B (E-No. E 224) in the foodstuffs quoted therein and in the quoted maximum amounts. It is authorized under certain conditions as a preservative or antioxidant within the scope of the EEC. In Germany, the EEC Guideline quoted above conforms to the Ordinance on Permitted Additives*.

The values quoted in the product specification correspond to or exceed the purity requirements quoted in the Zusatzstoff-Verkehrsverordnung (dated 10.07.1984 as amended on 14.12.1993) and the minimum values laid down specially for potassium disulfite in Enclosure 2, List 2.

Our product also conforms to the requirements laid down for potassium metabisulfite on page 322 in the Food Chemical Codex 4th edition (FCC IV). These requirements represent a yardstick for an application on the foodstuff sector in North America, part of South America, and for many countries outside the European Union.

Finally, our product also satisfies the demands listed on page 1173 in the Compendium of Food Additive Specifications published by the Joint Expert Committee on Food Additives (JECFA) of the FAO/WHO, Rome 1992.

Chemical behaviour

In aqueous solution, potassium metabisulfite exerts a strong reducing effect. For this reason, it must not find its way untreated in lakes and rivers, because it would bind the oxygen dissolved in them and severely disturb animal and vegetable life.

On account of the acid pH of the aqueous solutions, materials to be considered for pipelines and tanks are Remanite (German Materials No. 1.4462), polypropylene, polyethylene, and PVC. Ebonite is resistant only if its qualities have a high graphite content. Details on materials questions can be derived from the DECHEMA Materials Tables.

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* *Zusatzstoff-Zulassungsverordnung* (dated 22.12.1981 as amended on 8 March 1996).

Owing to the violent reaction that may take place under certain circumstances, contact with nitrites, nitrates, and oxidizing agents should be avoided.

Toxic SO_2 is liberated by acids. In view of the risk of mixing, storage together with acids should be avoided.

Application

In the photographic industry as a reducing component in formulations and for acidizing fixation baths.

As a preservative in the foodstuffs industry (this application is restricted by Zusatzstoff-Zulassungsverordnung E 224).

For the treatment of wine after fermentation has ended.

For the removal of moulds from freshly selected grapes before pressing.

Safety

Physiological data

All potassium metabisulfite grades have a slight SO_2 odour and irritate the eyes and respiratory tract. Dangerous amounts of the poisonous gas SO_2 may be given off on contact with acids.

Potassium metabisulfite in inland waterways consumes oxygen to a considerable extent and thus exerts a damaging effect on water organisms. Further details are given in our Safety Data Sheet for the respective product.

Safety advice

The substance potassium metabisulfite is not listed in the EEC Guideline (90/492/EEC) or in the German Health and Safety Regulations*.

In the light of the data at our disposal, potassium metabisulfite grades must be labelled as irritating by the risk hazard symbol Xi. The following R and S phrases would then be necessary:

R 37 – Irritating to respiratory system
R 41 – Risk of serious damage to eyes
R 31 – Contact with acids liberates toxic gas
S 39 – Wear eye face/protection
S 26 – In case of contact with eyes, rinse immediately with plenty of water and seek medical advice

MAK value for SO_2: 2 ppm = 5 mg/m^3
TLV for SO_2: 2 ppm = 5 mg/m^3

All grades of potassium metabisulfite are classified according to German legislation as slightly hazardous water pollutants (WGK 1).

Transportation and storage

All potassium metabisulfite grades should be stored in a cool, dark place. When the storage temperature is maintained at a maximum of 25 °C and the maximum relative humidity is 45 %, the shelf life is six months.

If higher storage temperatures and/or higher humidities occur, the SO_2 content and the pH value of the aqueous solution may decrease. Similar effects are exerted by strong fluctuations in the storage temperature. Parallel to the chemical changes, caking or hardening of the product may occur. Hardening can also be caused by increased pressure – e. g. by stacking the pallets one on top of the other.

Safety Data Sheet

Further data on the potassium metabisulfite grades are contained in the respective Safety Data Sheet.

** Anhang I-IV der Gefahrstoffverordnung*

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 of 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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