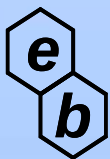


Product Data Sheet

SODIUM



Dr. Bilger Umweltconsulting GmbH

SODIUM

The chemical element sodium is very common on the earth's surface, especially in the form of chloride. It is the seventh most abundant element and represents 2.83% of the earth's crustal mass.

Davy succeeded in producing metallic sodium for the first time in 1807 by electrolysis of moistened and molten caustic soda using a Volta column. The first process on a technical scale was the Deville process in 1845. This involved heating soda with coal and lime in iron vats to over 1000°C and extracting the sodium by condensing the vapour. In 1891, Castner succeeded in developing an electrolytic production process for sodium from molten caustic soda. This process led the way in sodium production for almost four decades.

In 1921, Downs' molten salt electrolysis process was introduced. Today, practically all sodium manufacturers use this process. A mixture of NaCl/CaCl₂/BaCl₂ is used, which melts at approx. 600 °C.

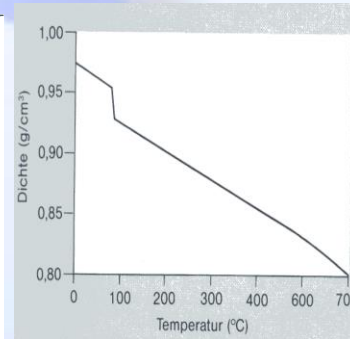
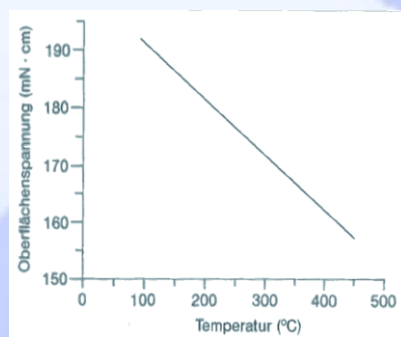
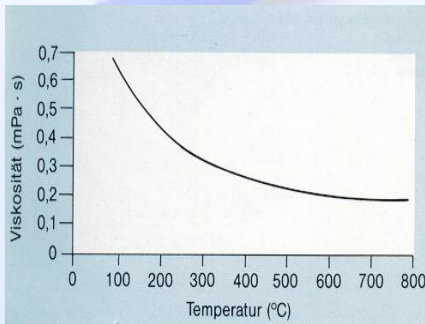
The pure sodium obtained after filtration is subjected to a post-treatment with Na₂O or Na₂O₂ at 300 - 400 °C for certain applications in order to reduce the calcium content to less than 10 ppm. During this treatment, the calcium is converted to calcium oxide, which is filtered off.

PHYSICAL- CHEMICAL PROPERTIES

Atomic number	11
Atom weight	22.99
Melting point	97.82 °C
Boiling point	881.4°C
Krit. Temperatur/ Pressure	ca.2460/413 bar
Volume extension at melting point	2,70%
Heat of Fusion	113 J/g

Physical Data of Sodium in different aggregate states

Character (Unit)	solid		liquid				
	20°C	97,82°C	97,82°C	100°C	400°C	550°C	881,4°C
Density (g/cm ³)	0,968	0,951	0,927	0,927	0,857	0,821	0,74
dyn. Viskosity (Pa.s)	o.A.	o.A.	o.A.	0,68	0,284	0,225	0,149
Surface tension (mN/cm)	o.A.	o.A.	1,92	o.A.	1,61	1,46	1,13
Spec. Electrical resistance (μΩ.cm)	4,88	6,6	9,64	9,67	22,14	29,91	52,87
Thermal conductivity (W/mK)	132,3	87	87	o.A.	72,2	64,8	48,6
spez. Wärme(J/gK)	1,22	1,34	1,38	1,28	1,26	1,285	2,721



Dr. Bilger Umweltconsulting GmbH offers Sodium in following standard specification:

Content	Unit	min.	max.
Sodium	%	99,9	
K	ppm		400
Ca	ppm		400

You can obtain our standard quality in form of ingots or individually packaged, gas-tightly welded in aluminium composite foil.

Storage

Sodium can be stored indefinitely in dry rooms. There must be no open water points or water-bearing pipes in the storage rooms. Sprinkler systems are not permitted. The floor of the storage facility should be above floor level to prevent water ingress. Glass roofs are not permitted, openable windows and skylights should be avoided. Condensation should be prevented by suitable measures. The storage rooms must be clearly labelled and lockable.

Labelling

CAS – No.	7440-23-5
EG	011-001-00-0
UN – No.	1428
Kemler number	X423

The signs must warn against the use of water and unsuitable extinguishing agents.

- Keep containers dry and tightly closed
- Only use calcined soda, common salt or dry cement for extinguishing.
- Do not use water or standard dry or wet fire extinguishers.

Suitable extinguishing agents must be provided.

Transport regulations

As a substance that emits flammable gases on contact with water, sodium is subject to the dangerous goods regulations of the respective mode of transport.

The following transport regulations apply to sodium:

GGVE, GGVS, RID, ADR: UN1428, NATRIUM, 4.3, I, (B/E)
GGV – See/IMDG – Code: UN1428 Sodium, 4.3, I
ICAO – TI/IATA – DGR: UN1428 Sodium, 4.3, I
By regular mail: prohibited

The technical designation must be stated in the transport documents:

- In land transport 'Natrium
- In sea or air transport 'Sodium

Packaging approved for transport in accordance with the above-mentioned dangerous goods regulations must always be used.

In the case of sea transport, the 'Group Emergency Schedule (EMS)' - number 4.3-01 and the 'Medical First Aid Guide (MFAG)' - number 705 must be cited in the shipping documents for hazard prevention and first aid measures.



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