

# SAFETY DATA SHEET Sodium cyanoborohydride

According to the REACH etc. (Amendment etc.) (EU Exit) Regulations 2020 No. 1577, as amended.

## SECTION 1: Identification of the substance/mixture and of the company/undertaking

#### 1.1. Product identifier

Product name Sodium cyanoborohydride

 Product number
 23955696

 CAS number
 25895-60-7

 EC number
 247-317-2

#### 1.2. Relevant identified uses of the substance or mixture and uses advised against

**Identified uses** For research purposes only.

Uses advised against No specific uses advised against are identified.

#### 1.3. Details of the supplier of the safety data sheet

Supplier Molekula Ltd.

Lingfield Way, Darlington, DL1 4XX, United Kingdom +44 (0) 3302000333 info@molekula.com

#### 1.4. Emergency telephone number

## SECTION 2: Hazards identification

## 2.1. Classification of the substance or mixture

Classification (SI 2019 No. 720)

Physical hazards Flam. Sol. 1 - H228

Health hazards Acute Tox. 2 - H300 Acute Tox. 2 - H310 Acute Tox. 2 - H330 Skin Corr. 1B - H314 Eye Dam.

1 - H318

**Environmental hazards** Aquatic Acute 1 - H400 Aquatic Chronic 1 - H410

2.2. Label elements

**EC number** 247-317-2

Hazard pictograms









Signal word

Danger

## Sodium cyanoborohydride

Hazard statements H228 Flammable solid.

H300+H310+H330 Fatal if swallowed, in contact with skin or if inhaled.

H314 Causes severe skin burns and eye damage. H410 Very toxic to aquatic life with long lasting effects.

Precautionary statements

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No

smoking.

P240 Ground and bond container and receiving equipment.

P241 Use explosion-proof electrical equipment.

P260 Do not breathe dust.

P262 Do not get in eyes, on skin, or on clothing.

P264 Wash contaminated skin thoroughly after handling. P271 Use only outdoors or in a well-ventilated area.

P273 Avoid release to the environment.

P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

P284 [In case of inadequate ventilation] wear respiratory protection.

P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor. P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P302+P352 IF ON SKIN: Wash with plenty of water.

P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing.

Rinse skin with water or shower.

P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove

contact lenses, if present and easy to do. Continue rinsing.

P320 Specific treatment is urgent (see medical advice on this label).

P361+P364 Take off immediately all contaminated clothing and wash it before reuse.

P363 Wash contaminated clothing before reuse.

P370+P378 In case of fire: Use foam, carbon dioxide, dry powder or water fog to extinguish.

P391 Collect spillage.

P403+P233 Store in a well-ventilated place. Keep container tightly closed.

P405 Store locked up.

P501 Dispose of contents/ container in accordance with national regulations.

## 2.3. Other hazards

This substance is not classified as PBT or vPvB according to current UK criteria.

#### SECTION 3: Composition/information on ingredients

#### 3.1. Substances

Product name Sodium cyanoborohydride

 CAS number
 25895-60-7

 EC number
 247-317-2

 Chemical formula
 NaBH3CN

## SECTION 4: First aid measures

#### 4.1. Description of first aid measures

General information Get medical attention if any discomfort continues. Show this Safety Data Sheet to the medical

personnel. Chemical burns must be treated by a physician.

Inhalation Move affected person to fresh air and keep warm and at rest in a position comfortable for

breathing. Maintain an open airway. Loosen tight clothing such as collar, tie or belt. When breathing is difficult, properly trained personnel may assist affected person by administering oxygen. Get medical attention. Place unconscious person on their side in the recovery

position and ensure breathing can take place.

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**Ingestion** Get medical attention immediately. Rinse mouth thoroughly with water. Give a few small

glasses of water or milk to drink. Stop if the affected person feels sick as vomiting may be dangerous. Never give anything by mouth to an unconscious person. Place unconscious person on their side in the recovery position and ensure breathing can take place. Keep

affected person under observation.

Skin contact It is important to remove the substance from the skin immediately. Rinse immediately with

plenty of water. Continue to rinse for at least 15 minutes and get medical attention. Chemical

burns must be treated by a physician.

Eye contact Rinse immediately with plenty of water. Do not rub eye. Remove any contact lenses and open

eyelids wide apart. Continue to rinse for at least 15 minutes and get medical attention.

**Protection of first aiders**It may be dangerous for first aid personnel to carry out mouth-to-mouth resuscitation.

## 4.2. Most important symptoms and effects, both acute and delayed

General information The severity of the symptoms described will vary dependent on the concentration and the

length of exposure.

**Inhalation** A single exposure may cause the following adverse effects: Difficulty in breathing.

Unconsciousness, possibly death.

**Ingestion** A single exposure may cause the following adverse effects: Unconsciousness, possibly death.

May cause stomach pain or vomiting. May cause severe internal injury. Small amounts may

cause serious damage.

Skin contact A single exposure may cause the following adverse effects: Pain. Unconsciousness, possibly

death.

**Eye contact** Causes serious eye damage. Symptoms following overexposure may include the following:

Pain. Profuse watering of the eyes. Redness.

#### 4.3. Indication of any immediate medical attention and special treatment needed

Notes for the doctor Treat symptomatically. Keep affected person under observation.

#### SECTION 5: Firefighting measures

## 5.1. Extinguishing media

Suitable extinguishing media The product is flammable. Extinguish with alcohol-resistant foam, carbon dioxide, dry powder

or water fog. Use fire-extinguishing media suitable for the surrounding fire.

Unsuitable extinguishing

media

Do not use water jet as an extinguisher, as this will spread the fire.

#### 5.2. Special hazards arising from the substance or mixture

Specific hazards Flammable solid. Dust may form explosive mixture with air. Fire-water run-off in sewers may

create fire or explosion hazard. This product is toxic. Severe corrosive hazard. Water used for

fire extinguishing, which has been in contact with the product, may be corrosive.

Hazardous combustion

products

Thermal decomposition or combustion products may include the following substances:

Very toxic or corrosive gases or vapours.

Carbon dioxide (CO2). Carbon monoxide (CO). Oxides of nitrogen.

Oxides of the following substances:

Hydrogen cyanide (HCN).

Boron. Sodium.

#### 5.3. Advice for firefighters

## Sodium cyanoborohydride

## Protective actions during firefighting

Avoid breathing fire gases or vapours. Evacuate area. Keep upwind to avoid inhalation of gases, vapours, fumes and smoke. Ventilate closed spaces before entering them. Cool containers exposed to heat with water spray and remove them from the fire area if it can be done without risk. Cool containers exposed to flames with water until well after the fire is out. Avoid discharge to the aquatic environment. Control run-off water by containing and keeping it out of sewers and watercourses. If risk of water pollution occurs, notify appropriate authorities.

## Special protective equipment for firefighters

Regular protection may not be safe. Wear chemical protective suit. Wear positive-pressure self-contained breathing apparatus (SCBA) and appropriate protective clothing. Firefighter's clothing will provide a basic level of protection for chemical incidents.

#### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

#### Personal precautions

Wear protective clothing as described in Section 8 of this safety data sheet. No action shall be taken without appropriate training or involving any personal risk. Do not touch or walk into spilled material. Evacuate area. Provide adequate ventilation. No smoking, sparks, flames or other sources of ignition near spillage. Promptly remove any clothing that becomes contaminated. Avoid inhalation of dust. Use suitable respiratory protection if ventilation is inadequate. Avoid contact with skin and eyes.

#### 6.2. Environmental precautions

**Environmental precautions** 

Avoid discharge into drains or watercourses or onto the ground. Avoid discharge to the aquatic environment.

#### 6.3. Methods and material for containment and cleaning up

#### Methods for cleaning up

Wear protective clothing as described in Section 8 of this safety data sheet. Clear up spills immediately and dispose of waste safely. Eliminate all ignition sources if safe to do so. No smoking, sparks, flames or other sources of ignition near spillage. Do not allow material to enter confined spaces, due to the risk of explosion. This product is corrosive. Provide adequate ventilation. Collect spillage with a shovel and broom, or similar and reuse, if possible. Collect and place in suitable waste disposal containers and seal securely. Flush contaminated area with plenty of water. Wash thoroughly after dealing with a spillage. Dangerous for the environment. Do not empty into drains. For waste disposal, see Section 13.

#### 6.4. Reference to other sections

#### Reference to other sections

For personal protection, see Section 8. See Section 11 for additional information on health hazards. See Section 12 for additional information on ecological hazards. For waste disposal, see Section 13.

#### SECTION 7: Handling and storage

## 7.1. Precautions for safe handling

#### Usage precautions

Read and follow manufacturer's recommendations. Wear protective clothing as described in Section 8 of this safety data sheet. Keep away from food, drink and animal feeding stuffs. Keep container tightly sealed when not in use. The product is flammable. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. This product is toxic. This product is corrosive. Immediate first aid is imperative. Avoid discharge to the aquatic environment. Do not handle until all safety precautions have been read and understood. Do not handle broken packages without protective equipment. Do not reuse empty containers.

## Advice on general occupational hygiene

Wash promptly if skin becomes contaminated. Take off contaminated clothing. Wash contaminated clothing before reuse.

## 7.2. Conditions for safe storage, including any incompatibilities

## Sodium cyanoborohydride

Storage precautions

Store away from incompatible materials (see Section 10). Store locked up. Keep away from oxidising materials, heat and flames. Keep only in the original container. Keep container tightly closed, in a cool, well ventilated place. Keep containers upright. Protect containers from damage.

Contents may develop pressure upon prolonged storage.

Hygroscopic.

Handle and store under inert gas

Storage class Toxic storage.

7.3. Specific end use(s)

Specific end use(s) The identified uses for this product are detailed in Section 1.2.

#### **SECTION 8: Exposure controls/Personal protection**

#### 8.1. Control parameters

#### 8.2. Exposure controls

## Protective equipment















Appropriate engineering controls

Use process enclosures, local exhaust ventilation or other engineering controls as the primary means to minimise worker exposure. Ensure the ventilation system is regularly maintained and tested. In case of insufficient ventilation, wear suitable respiratory equipment. Observe any occupational exposure limits for the product or ingredients.

Eye/face protection

Wear tight-fitting, chemical splash goggles or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

Hand protection

Wear protective gloves. The most suitable glove should be chosen in consultation with the glove supplier/manufacturer, who can provide information about the breakthrough time of the glove material. To protect hands from chemicals, wear gloves that are proven to be impervious to the chemical and resist degradation. Considering the data specified by the glove manufacturer, check during use that the gloves are retaining their protective properties and change them as soon as any deterioration is detected. Frequent changes are recommended.

Other skin and body protection

Wear appropriate clothing to prevent any possibility of skin contact.

Hygiene measures

Wash after use and before eating, smoking and using the toilet. Do not eat, drink or smoke when using this product.

Respiratory protection

Ensure all respiratory protective equipment is suitable for its intended use and is 'UKCA'-marked. Check that the respirator fits tightly and the filter is changed regularly. Gas and combination filter cartridges suitable for intended use should be used. Full face mask respirators with replaceable filter cartridges suitable for intended use should be used. Half mask and quarter mask respirators with replaceable filter cartridges suitable for intended use should be used.

Environmental exposure controls

Keep container tightly sealed when not in use. Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

#### SECTION 9: Physical and chemical properties

## Sodium cyanoborohydride

#### 9.1. Information on basic physical and chemical properties

**Appearance** Powder. Colour White.

Odour Not known.

Odour threshold No information available.

pΗ pH (diluted solution): 8-9 10% ag. solution

Melting point 242°C/467.6°F

Initial boiling point and range No information available. Flash point 70°C/158°F Closed cup. **Evaporation rate** No information available. Flammability (solid, gas) No information available. Upper/lower flammability or No information available.

explosive limits

Vapour pressure No information available. Vapour density No information available. Relative density 1.12 g/cm3 @ 28°C/82.4°F

Solubility(ies) Decomposes in water.

No information available. Partition coefficient No information available. **Auto-ignition temperature Decomposition Temperature** No information available.

9.2. Other information

Molecular weight 62.84

## SECTION 10: Stability and reactivity

#### 10.1. Reactivity

See the other subsections of this section for further details. Reactivity

10.2. Chemical stability

Stability Stable at normal ambient temperatures and when used as recommended. Stable under the

prescribed storage conditions.

#### 10.3. Possibility of hazardous reactions

Possibility of hazardous The following materials may react strongly with the product:

reactions Oxidising agents.

Risk of ignition or formation of inflammable gases or vapours with:

Water

Violent reactions possible with:

Oxidising agents.

Generates dangerous gases or fumes in contact with:

Acids.

#### 10.4. Conditions to avoid

## Sodium cyanoborohydride

Conditions to avoid Avoid heat, flames and other sources of ignition.

Static electricity and formation of sparks must be prevented.

Protect from moisture.

10.5. Incompatible materials

Materials to avoid Oxidising materials. Acids - oxidising.

10.6. Hazardous decomposition products

Hazardous decomposition

Does not decompose when used and stored as recommended. products

Thermal decomposition or combustion products may include the following substances:

Corrosive gases or vapours. Carbon dioxide (CO2). Carbon monoxide (CO). Oxides of nitrogen.

Oxides of the following substances:

Hydrogen cyanide (HCN).

Boron. Sodium.

## SECTION 11: Toxicological information

## 11.1. Information on toxicological effects

Acute toxicity - oral

Fatal if swallowed. Summary

Acute toxicity oral (LD50

mg/kg)

5.1

**Species** Rat 5.1 ATE oral (mg/kg)

Acute toxicity - dermal

Summary Fatal in contact with skin.

Acute toxicity dermal (LD₅o

mg/kg)

50.1

**Species** Rat ATE dermal (mg/kg) 50.1

Acute toxicity - inhalation

Summary Fatal if inhaled.

Acute toxicity inhalation (LC50

dust/mist mg/l)

0.051

**Species** Rat

ATE inhalation (dusts/mists

0.051

mg/l)

Skin corrosion/irritation

Summary Causes severe skin burns and eye damage.

Serious eye damage/irritation

Summary Causes serious eye damage.

Respiratory sensitisation

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**Summary** Based on available data the classification criteria are not met.

Skin sensitisation

**Summary**Based on available data the classification criteria are not met.

Germ cell mutagenicity

**Summary** Based on available data the classification criteria are not met.

Carcinogenicity

**Summary** Based on available data the classification criteria are not met.

**IARC carcinogenicity**None of the ingredients are listed or exempt.

Reproductive toxicity

**Summary** Based on available data the classification criteria are not met.

Specific target organ toxicity - single exposure

**Summary** Based on available data the classification criteria are not met.

Specific target organ toxicity - repeated exposure

**Summary** Based on available data the classification criteria are not met.

Aspiration hazard

Summary Not relevant. Solid.

General information The severity of the symptoms described will vary dependent on the concentration and the

length of exposure.

**Inhalation** A single exposure may cause the following adverse effects: Difficulty in breathing.

Unconsciousness, possibly death.

**Ingestion** A single exposure may cause the following adverse effects: Unconsciousness, possibly death.

May cause stomach pain or vomiting. May cause severe internal injury. Small amounts may

cause serious damage.

Skin contact A single exposure may cause the following adverse effects: Pain. Unconsciousness, possibly

death.

**Eye contact** Causes serious eye damage. Symptoms following overexposure may include the following:

Pain. Profuse watering of the eyes. Redness.

Route of exposure Ingestion Inhalation Skin and/or eye contact

**Target organs** No specific target organs known.

## **SECTION 12: Ecological information**

#### 12.1. Toxicity

Acute aquatic toxicity

**Summary** Very toxic to aquatic life.

**LE(C)**<sub>50</sub>  $0.1 < L(E)C50 \le 1$ 

M factor (Acute) 1

Chronic aquatic toxicity

**Summary** Very toxic to aquatic life with long lasting effects.

M factor (Chronic) 1

## 12.2. Persistence and degradability

## Sodium cyanoborohydride

Persistence and degradability The degradability of the product is not known.

#### 12.3. Bioaccumulative potential

Bioaccumulative potential No data available on bioaccumulation.

**Partition coefficient** No information available.

12.4. Mobility in soil

**Mobility** No data available.

#### 12.5. Results of PBT and vPvB assessment

12.6. Other adverse effects

Other adverse effects None known.

#### **SECTION 13: Disposal considerations**

#### 13.1. Waste treatment methods

**General information** The generation of waste should be minimised or avoided wherever possible. Reuse or recycle

products wherever possible. This material and its container must be disposed of in a safe way. When handling waste, the safety precautions applying to handling of the product should be considered. Care should be taken when handling emptied containers that have not been thoroughly cleaned or rinsed out. Empty containers or liners may retain some product

residues and hence be potentially hazardous.

**Disposal methods**Do not empty into drains. Dispose of surplus products and those that cannot be recycled via a

licensed waste disposal contractor. Waste, residues, empty containers, discarded work clothes and contaminated cleaning materials should be collected in designated containers, labelled with their contents. Incineration or landfill should only be considered when recycling is

not feasible.

## **SECTION 14: Transport information**

14.1. UN number

UN No. (ADR/RID) 3179

**UN No. (IMDG)** 3179

**UN No. (ICAO)** 3179

**UN No. (ADN)** 3179

## 14.2. UN proper shipping name

Proper shipping name

FLAMMABLE SOLID, TOXIC, INORGANIC, N.O.S. (Sodium cyanoborohydride)

(ADR/RID)

Proper shipping name (IMDG) FLAMMABLE SOLID, TOXIC, INORGANIC, N.O.S. (Sodium cyanoborohydride)

Proper shipping name (ICAO) FLAMMABLE SOLID, TOXIC, INORGANIC, N.O.S. (Sodium cyanoborohydride)

Proper shipping name (ADN) FLAMMABLE SOLID, TOXIC, INORGANIC, N.O.S. (Sodium cyanoborohydride)

#### 14.3. Transport hazard class(es)

ADR/RID class 4.1

ADR/RID subsidiary risk 6.1

ADR/RID classification code FT2

ADR/RID label 4.1

## Sodium cyanoborohydride

IMDG class 4.1

IMDG subsidiary risk 6.1

ICAO class/division 4.1

ICAO subsidiary risk 6.1

ADN class 4.1

ADN subsidiary risk 6.1

#### Transport labels





## 14.4. Packing group

ADR/RID packing group II
IMDG packing group II
ICAO packing group II
ADN packing group II

#### 14.5. Environmental hazards

Environmentally hazardous substance/marine pollutant

No.

#### 14.6. Special precautions for user

EmS F-A, S-G

ADR transport category 2

Emergency Action Code 1X

Hazard Identification Number 46

(ADR/RID)

Tunnel restriction code (E)

#### 14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code

#### SECTION 15: Regulatory information

## 15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

National regulations Health and Safety at Work etc. Act 1974 (as amended).

The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment

Regulations 2009 (SI 2009 No. 1348) (as amended) ["CDG 2009"].

EH40/2005 Workplace exposure limits.

## 15.2. Chemical safety assessment

No chemical safety assessment has been carried out.

## Inventories

#### **EU - EINECS/ELINCS**

None of the ingredients are listed or exempt.

## SECTION 16: Other information

## Sodium cyanoborohydride

Abbreviations and acronyms used in the safety data sheet

ADR: European Agreement concerning the International Carriage of Dangerous Goods by

Road.

ADN: European Agreement concerning the International Carriage of Dangerous Goods by

Inland Waterways.

RID: European Agreement concerning the International Carriage of Dangerous Goods by Rail.

IATA: International Air Transport Association.

ICAO: Technical Instructions for the Safe Transport of Dangerous Goods by Air.

IMDG: International Maritime Dangerous Goods.

CAS: Chemical Abstracts Service. ATE: Acute Toxicity Estimate.

LC50: Lethal Concentration to 50 % of a test population.

LD50: Lethal Dose to 50% of a test population (Median Lethal Dose).

EC50: 50% of maximal Effective Concentration.

PBT: Persistent, Bioaccumulative and Toxic substance. vPvB: Very Persistent and Very Bioaccumulative.

Classification abbreviations

and acronyms

Flam. Sol. = Flammable solid Acute Tox. = Acute toxicity

Eye Dam. = Serious eye damage Skin Corr. = Skin corrosion

Aquatic Acute = Hazardous to the aquatic environment (acute)
Aquatic Chronic = Hazardous to the aquatic environment (chronic)

Classification procedures

according to SI 2019 No. 720

Acute Tox. 2 - H310: Acute Tox. 2 - H330: Acute Tox. 2 - H300: Eye Dam. 1 - H318: Skin Corr. 1B - H314: : Expert judgement. Aquatic Acute 1 - H400: Aquatic Chronic 1 - H410: :

Expert judgement. Flam. Sol. 1 - H228: : Expert judgement.

**Training advice** Only trained personnel should use this material.

Revision date 15/03/2022

Revision 1

SDS number 743

Hazard statements in full H228 Flammable solid.

H300 Fatal if swallowed.

H310 Fatal in contact with skin.

H314 Causes severe skin burns and eye damage.

H318 Causes serious eye damage.

H330 Fatal if inhaled.

H400 Very toxic to aquatic life.

H410 Very toxic to aquatic life with long lasting effects.

This information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is, to the best of the company's knowledge and belief, accurate and reliable as of the date indicated. However, no warranty, guarantee or representation is made to its accuracy, reliability or completeness. It is the user's responsibility to satisfy himself as to the suitability of such information for his own particular use.