



SAFETY DATA SHEET

Formamidinesulfinic acid (Thiourea dioxide)

According to Regulation (EC) No 1907/2006, Annex II, as amended. Commission Regulation (EU) No 2015/830 of 28 May 2015.

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

1.1. Product identifier

Product name	Formamidinesulfinic acid (Thiourea dioxide)
Product number	46113998
CAS number	1758-73-2
EC number	217-157-8

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

Uses advised against	For research and development purposes. Not suitable for human consumption or veterinary purposes.
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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
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1.4. Emergency telephone number

+44 (0) 1380 725952

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (EC 1272/2008)

Physical hazards	Self-heat. 1 - H251
Health hazards	Acute Tox. 4 - H302 Acute Tox. 2 - H330 Skin Irrit. 2 - H315 Eye Dam. 1 - H318 Repr. 2 - H361 STOT SE 3 - H335 STOT RE 2 - H373
Environmental hazards	Not Classified

2.2. Label elements

EC number	217-157-8
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Hazard pictograms



Signal word

Danger

Formamidinesulfinic acid (Thiourea dioxide)

Hazard statements	H251 Self-heating: may catch fire.
	H302 Harmful if swallowed.
	H330 Fatal if inhaled.
	H315 Causes skin irritation.
	H318 Causes serious eye damage.
	H361 Suspected of damaging fertility or the unborn child.
	H335 May cause respiratory irritation.
	H373 May cause damage to organs through prolonged or repeated exposure.
Precautionary statements	P201 Obtain special instructions before use.
	P202 Do not handle until all safety precautions have been read and understood.
	P235 Keep cool.
	P260 Do not breathe dust.
	P264 Wash contaminated skin thoroughly after handling.
	P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
	P284 [In case of inadequate ventilation] wear respiratory protection.
	P301+P312 IF SWALLOWED: Call a POISON CENTRE/doctor if you feel unwell.
	P302+P352 IF ON SKIN: Wash with plenty of water.
	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.
	P308+P313 IF exposed or concerned: Get medical advice/ attention.
	P310 Immediately call a POISON CENTER/ doctor.
	P314 Get medical advice/ attention if you feel unwell.
	P330 Rinse mouth.
	P332+P313 If skin irritation occurs: Get medical advice/ attention.
	P362+P364 Take off contaminated clothing and wash it before reuse.
	P403+P233 Store in a well-ventilated place. Keep container tightly closed.
	P405 Store locked up.
	P407 Maintain air gap between stacks or pallets.
	P413 Store bulk masses greater than kg/ lbs at temperatures not exceeding °C/°F.
	P420 Store separately.
	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 EU criteria.

SECTION 3: Composition/information on ingredients

3.1. Substances

Product name	Formamidinesulfinic acid (Thiourea dioxide)
CAS number	1758-73-2
EC number	217-157-8
Chemical formula	CH4N2O2S

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.
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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.
Ingestion	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. Get medical attention if symptoms are severe or persist.
Skin contact	Rinse with water.
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	May cause discomfort if swallowed. Stomach pain. Nausea, vomiting.
Skin contact	Redness. Irritating to skin.
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.
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SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	Extinguish with alcohol-resistant foam, carbon dioxide, dry powder or water fog. Use fire-extinguishing media suitable for the surrounding fire. Explosion risk in case of 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	This product is toxic.
Hazardous combustion products	Thermal decomposition or combustion products may include the following substances: Very toxic or corrosive gases or vapours. Carbon monoxide (CO). Carbon dioxide (CO ₂). Nitrous gases (NO _x). Sulphurous gases (SO _x).

5.3. Advice for firefighters

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. Control run-off water by containing and keeping it out of sewers and watercourses. If risk of water pollution occurs, notify appropriate authorities.
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Formamidinesulfinic acid (Thiourea dioxide)

Special protective equipment for firefighters Wear positive-pressure self-contained breathing apparatus (SCBA) and appropriate protective clothing. Firefighter's clothing conforming to European standard EN469 (including helmets, protective boots and gloves) 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. Avoid inhalation of dust. Use suitable respiratory protection if ventilation is inadequate.

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. 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. 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. This product is toxic. Immediate first aid is imperative. Suspected of damaging fertility. Suspected of damaging the unborn child. Pregnant or breastfeeding women should not work with this product if there is any risk of exposure. 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

Storage precautions Store away from incompatible materials (see Section 10). Store locked up. Store away from other materials. Keep only in the original container. Keep container tightly closed, in a cool, well ventilated place. Keep containers upright. Protect containers from damage. Maintain air gap between stacks/pallets.

Moisture sensitive. Store under inert gas. Store at temperatures between 2°C/35.6°F and 8°C/46.4°F.

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.

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SECTION 8: Exposure controls/Personal protection

8.1. Control parameters

STEL

TWA

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, gloves should comply with European Standard EN374. 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 'CE'-marked. Check that the respirator fits tightly and the filter is changed regularly. Gas and combination filter cartridges should comply with European Standard EN14387. Full face mask respirators with replaceable filter cartridges should comply with European Standard EN136. Half mask and quarter mask respirators with replaceable filter cartridges should comply with European Standard EN140.

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

9.1. Information on basic physical and chemical properties

Appearance	Crystalline solid.
Colour	White/off-white.
Odour	Not known.
Odour threshold	No information available.
pH	pH (diluted solution): 4.0 (10g/l @ 20°C (68°F))
Melting point	ca. 126°C/258.8°F

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Initial boiling point and range	No information available.
Flash point	No information available.
Evaporation rate	No information available.
Flammability (solid, gas)	No information available.
Upper/lower flammability or explosive limits	No information available.
Vapour pressure	No information available.
Vapour density	No information available.
Relative density	1.68
Solubility(ies)	No information available.
Partition coefficient	No information available.
Auto-ignition temperature	123°C/253.4°F
Decomposition Temperature	No information available.

9.2. Other information

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	Self-reactive May ignite itself if exposed to air.
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10.2. Chemical stability

Stability	Stable under the prescribed storage conditions.
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10.3. Possibility of hazardous reactions

Possibility of hazardous reactions	May explosively decompose on heating, shock, friction, etc
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10.4. Conditions to avoid

Conditions to avoid	Avoid heat. Do not subject to grinding/shock/friction.
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10.5. Incompatible materials

Materials to avoid	Avoid contact with acids. Oxidising agents. Strong alkalis.
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10.6. Hazardous decomposition products

Hazardous decomposition products	Does not decompose when used and stored as recommended. Thermal decomposition or combustion products may include the following substances: Toxic gases or vapours. Carbon monoxide (CO). Carbon dioxide (CO ₂). Nitrous gases (NO _x). Sulphurous gases (SO _x).
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SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity - oral

Summary	Harmful if swallowed.
Acute toxicity oral (LD ₅₀ mg/kg)	1,120.0
Species	Rat
ATE oral (mg/kg)	1,120.0

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Acute toxicity - dermal

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

Acute toxicity - inhalation

Summary Fatal if inhaled.

Acute toxicity inhalation (LC₅₀ dust/mist mg/l) 0.164

Species Rat

ATE inhalation (dusts/mists mg/l) 0.164

Skin corrosion/irritation

Summary Causes skin irritation.

Serious eye damage/irritation

Summary Causes serious eye damage.

Respiratory sensitisation

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 Suspected of damaging the unborn child. Suspected of damaging fertility.

Specific target organ toxicity - single exposure

Summary May cause respiratory irritation.

Target organs Respiratory system, lungs

Specific target organ toxicity - repeated exposure

Summary May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard

Summary Not relevant. Solid.

General information

Avoid contact during pregnancy/while nursing. May damage fertility. 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

May cause discomfort if swallowed. Stomach pain. Nausea, vomiting.

Skin contact

Redness. Irritating to skin.

Eye contact

Causes serious eye damage. Symptoms following overexposure may include the following: Pain. Profuse watering of the eyes. Redness.

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Route of exposure Ingestion Inhalation Skin and/or eye contact

Target organs Respiratory system, lungs

SECTION 12: Ecological information

Ecotoxicity Not regarded as dangerous for the environment. However, large or frequent spills may have hazardous effects on the environment.

12.1. Toxicity

Acute aquatic toxicity

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

Chronic aquatic toxicity

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

12.2. Persistence and degradability

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

General For limited quantity packaging/limited load information, consult the relevant modal documentation using the data shown in this section.

14.1. UN number

UN No. (ADR/RID) 3341

UN No. (IMDG) 3341

UN No. (ICAO) 3341

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UN No. (ADN) 3341

14.2. UN proper shipping name

Proper shipping name (ADR/RID) THIOUREA DIOXIDE

Proper shipping name (IMDG) THIOUREA DIOXIDE

Proper shipping name (ICAO) THIOUREA DIOXIDE

Proper shipping name (ADN) THIOUREA DIOXIDE

14.3. Transport hazard class(es)

ADR/RID class 4.2

ADR/RID classification code S2

ADR/RID label 4.2

IMDG class 4.2

ICAO class/division 4.2

ADN class 4.2

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

Always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

EmS F-A, S-J

ADR transport category 2

Emergency Action Code 1Y

Hazard Identification Number (ADR/RID) 40

Tunnel restriction code (D/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

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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.
EU legislation	Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (as amended). Commission Regulation (EU) No 2015/830 of 28 May 2015. Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (as amended).

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

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. LC ₅₀ : Lethal Concentration to 50 % of a test population. LD ₅₀ : Lethal Dose to 50% of a test population (Median Lethal Dose). EC ₅₀ : 50% of maximal Effective Concentration. PBT: Persistent, Bioaccumulative and Toxic substance. vPvB: Very Persistent and Very Bioaccumulative.
Classification abbreviations and acronyms	Self-heat. = Self-heating Acute Tox. = Acute toxicity Eye Dam. = Serious eye damage Repr. = Reproductive toxicity Skin Irrit. = Skin irritation STOT RE = Specific target organ toxicity-repeated exposure STOT SE = Specific target organ toxicity-single exposure
Classification procedures according to Regulation (EC) 1272/2008	Acute Tox. 2 - H330: Acute Tox. 4 - H302: Eye Dam. 1 - H318: STOT RE 2 - H373: STOT SE 3 - H335: Skin Irrit. 2 - H315: Repr. 2 - H361: : Expert judgement. Self-heat. 1 - H251: : Expert judgement.
Training advice	Only trained personnel should use this material.
Revision date	18/08/2021
Revision	1
SDS number	295

Formamidinesulfinic acid (Thiourea dioxide)

Hazard statements in full

H251 Self-heating: may catch fire.
H302 Harmful if swallowed.
H315 Causes skin irritation.
H318 Causes serious eye damage.
H330 Fatal if inhaled.
H335 May cause respiratory irritation.
H361 Suspected of damaging fertility or the unborn child.
H373 May cause damage to organs through prolonged or repeated exposure.

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.