

SAFETY DATA SHEET (SDS)

in accordance with Regulation (EC) No 1907/2006 (REACH), Annex II — Regulation (EU) 2020/878

Date: 04.09.2026 | Version: 1 | EN

C,C'-azodi(formamide)

(E)-carbamoyliminourea

CAS 123-77-3

 $C_2H_4N_4O_2$

EC 204-650-8

MOLAR MASS
116.08LOGP
-1

HAZARD CLASSIFICATION (GHS / CLP)



Danger

H334

Hazard class scope limited to the harmonised classification (CLP Annex VI); classes outside the harmonised entry may require supplier self-classification (CLP Art. 4(3)) — verify with the supplier safety data sheet.

1. Identification of the substance/mixture and of the company/undertaking

1.1 Substance name	C,C'-azodi(formamide)
1.1 IUPAC name	(E)-carbamoyliminourea
1.1 CAS number	123-77-3
1.1 EC number	204-650-8
1.1 PubChem CID	5462814
1.1 InChIKey	XOZUGNYVDXMRKW-AATRIKPKSA-N
1.1 SMILES	<chem>C(=O)(N)/N=N/C(=O)N</chem>
1.1 Molecular formula	$C_2H_4N_4O_2$ ^[7]
1.1 Molar mass	116.08 g/mol ^[7]
1.1 Exact mass	116.0334 Da ^[7]

1.2 Uses

For laboratory and research purposes. Not for use in the production of food, medicines or cosmetics without appropriate authorisation.

1.3 Details of the supplier

REFERENCE COPY — NO
SUPPLIER DETAILS — NOT FOR
DISTRIBUTION

Supplier details are not included in this reference copy. The supplier placing the substance on the market must complete this section and remains responsible for the sheet under REACH. MolGod.org prepares documentation and is not the supplier of this substance.

1.4 Emergency telephone number

Emergency telephone 112 (EU-wide emergency number)

2. Hazards identification

GHS:



PPE:



Danger

Hazard statements (H) ^{[3][4][9]}

H334

May cause allergy or asthma symptoms or breathing difficulties if inhaled

Precautionary statements (P) ^{[3][4][9]}

P233

Keep container tightly closed

P261

Avoid breathing dust/fume/gas/mist/vapours/spray

P273

Avoid release to the environment

P284

Wear respiratory protection

P304+P340

IF INHALED: Remove person to fresh air and keep comfortable for breathing

P342+P311

If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician

P501

Dispose of contents/container to an approved waste collection point

Hazard class scope limited to the harmonised classification (CLP Annex VI); classes outside the harmonised entry may require supplier self-classification (CLP Art. 4(3)) — verify with the supplier safety data sheet.

3. Composition/information on ingredients

Substance type	pure substance
CAS Number	123-77-3
EC number	204-650-8
Molecular formula	$C_2H_4N_4O_2$
Concentration	≥99% (typical reagent-grade purity — to be confirmed by the supplier's specification)
Clp index no	611-028-00-3

4. First aid measures



Inhalation

Move the affected person to fresh air. Keep at rest. If not breathing: artificial respiration (qualified personnel only). [\[1\]\[2\]\[11\]](#)

Skin contact

Remove contaminated clothing. Rinse skin with soap and water (min. 15 minutes). [\[1\]\[2\]\[11\]](#)

Eye contact

Rinse eyes with running water (min. 15 minutes). Remove contact lenses if possible. If irritation persists — consult an ophthalmologist. [\[1\]\[2\]\[11\]](#)

Ingestion

Do NOT induce vomiting (unless directed by a physician). Rinse mouth with water. Never give anything by mouth to an unconscious person. Poison Centre Łódź: +48 42 631 47 24 (24/7). Emergency number: 112. [\[1\]\[2\]\[11\]](#)

Symptoms and effects

cough, shortness of breath, headache, dizziness. [\[3\]\[9\]](#)

Notes for physician

Requires verification

Emergency numbers: CIT Łódź: +48 42 631 47 24 (24/7) | Emergency: 112

5. Firefighting measures

Suitable extinguishing media	Adapt extinguishing media to surroundings. CO ₂ , dry powder, foam.
Unsuitable extinguishing media	No specific restrictions.
Specific hazards	Thermal decomposition products: CO, CO ₂ , NO _x . [12]
Advice for firefighters	Use self-contained breathing apparatus (SCBA). Full protective suit.
Flash Point	96.1°C [7]

6. Accidental release measures

Personal precautions	Use personal protective equipment (see Section 8). Avoid breathing dust. [1][2][11]
Environmental precautions	Prevent entry into sewers, groundwater and surface water. [1][2][11]
Methods for containment and cleaning up	Collect mechanically into suitable containers. Absorption: sand, vermiculite, diatomaceous earth. Do not sweep dry (dust formation). [1][2][11]
Related sections	8; 13

7. Handling and storage

Precautions	Work in a fume hood or with adequate ventilation. No eating, drinking or smoking in the work area. [1][2][11]
Storage temperature	Store at room temperature (15-25°C) or as indicated on the label. [1][2][11]
Humidity	Store in a dry place (<60% RH). [1][2][11]

Light	Protect from direct sunlight. ^{[1][2][11]}
Incompatible materials	Strong oxidizers. ^[12]

8. Exposure controls/personal protection

8.1 Control parameters

OEL — NDS (Poland)	No NDS (OEL) value in the available working list — verify in the current MRPiPS regulation before use; do not assume the absence of a limit value.
OEL (EU)	The EU OEL value has not been verified against the available dataset — check the IOELV/BOELV directives; do not assume the absence of a value.
DNEL	No data available.
PNEC	No data available.

8.2 Personal protective equipment (PPE) ^{[5][6][13]}

 Chemical-resistant protective gloves EN ISO 374-1:2016+A1:2018 nitrile (min. 0.11 mm)	 Closed safety spectacles or goggles EN ISO 16321-1:2022 / EN 166:2001	 Respiratory protection EN 14387:2004+A1:2008 type A2 filter (organic vapours)	 Closed safety footwear with toe protection EN ISO 20345:2022 (S2/S3)
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9. Physical and chemical properties

Property (item 9.1)	Value	Source
Physical state	Solid	
Colour	No data available.	
Odour	No data available.	
pH (1% aqueous solution)	No data available.	
Melting point	225°C (experimental data) ^[7]	
Boiling point	No data available.	
Flash point	96.1°C (experimental data) ^[7]	
Flammability	No data available.	
Lower and upper explosion limit	Not applicable (REACH 9.1(g))	
Density (20°C)	1.65 g/cm ³ ^[7]	
Vapour pressure	0.947 kPa (7.1 mmHg, 19°C) (experimental data) ^[7]	
Relative vapour density	Not applicable (REACH 9.1(q))	
Kinematic viscosity	Not applicable (REACH 9.1(l))	
Auto-ignition temperature	No data available.	
Decomposition temperature	Not applicable	
Rozpuszcz. w wodzie	0.035 g/L, 20°C ^[7]	

Property (item 9.1)	Value	Source
Particle characteristics	The particle size distribution has not been determined for this commercial form – required under Annex II 9.1(r); to be completed from the supplier's specification.	
Partition coefficient n-octanol/water (log value)	-1 ^[8]	
Molar mass	116.08 g/mol ^[7]	
Molecular formula	C ₂ H ₄ N ₄ O ₂ ^[7]	
Lipinski rule (RO5)	PASS	

Where a property above reads "No data available", no measured value was found in the public sources consulted for this substance. The property has not been determined by MolGod.org and no value is inferred. "Not applicable" means the property has no meaning for this substance in the form supplied.

10. Stability and reactivity

Reactivity	Stable under normal storage and handling conditions.
Chemical stability	Thermally stable under recommended conditions.
Hazardous reactions	No hazardous reactions known under normal conditions.
Conditions to avoid	High temperatures, direct sunlight, moisture.
Incompatible materials	Strong oxidizers.
Decomposition products	Thermal decomposition products: CO, CO ₂ , NO _x .

11. Toxicological information

LD50 (oral)	No data available.
LD50 (dermal)	LD50 >2000 mg/kg (rabbit) ^[7]
LC50 (inhalation)	LC50 >6100 mg/m ³ (4 h) (rat) ^[7]
Skin irritation	Not classified for this hazard (outside the scope of the harmonised classification in CLP Annex VI; verify supplier self-classification) ^{[3][9]}
Eye irritation	Not classified for this hazard (outside the scope of the harmonised classification in CLP Annex VI; verify supplier self-classification) ^{[3][9]}
Sensitisation	Respiratory tract, Category 1 (H334): May cause allergy or asthma symptoms or breathing difficulties if inhaled. ^{[3][9]}
Mutagenicity	Not classified for this hazard (outside the scope of the harmonised classification in CLP Annex VI; verify supplier self-classification) ^{[3][9]}
Carcinogenicity	Not classified for this hazard (outside the scope of the harmonised classification in CLP Annex VI; verify supplier self-classification) ^{[3][9]}
IARC classification (carcinogenicity)	No individual IARC monograph for this CAS — this is not confirmation of the absence of carcinogenicity (cf. CLP/GHS classification in section 2).
Reproductive toxicity	Not classified for this hazard (outside the scope of the harmonised classification in CLP Annex VI; verify supplier self-classification) ^{[3][9]}
STOT — single exposure	Not classified for this hazard (outside the scope of the harmonised classification in CLP Annex VI; verify supplier self-classification) ^{[3][9]}
STOT — repeated exposure	Not classified for this hazard (outside the scope of the harmonised classification in CLP Annex VI; verify supplier self-classification) ^{[3][9]}
Aspiration hazard	Not classified for this hazard (outside the scope of the harmonised classification in CLP Annex VI; verify supplier self-classification) ^{[3][9]}

12. Ecological information

Aquatic toxicity	No data available.
Persistence / biodegradability	No data available.
Bioaccumulative potential	log Kow = -1 ^[8] . Low bioaccumulation potential (log Kow < 4.5 — PBT/vPvB screening criterion per ECHA Guidance R.11). ^{[14][15]}
Mobility in soil	No data available.
PBT/vPvB assessment	Insufficient data to assess PBT/vPvB.
Endocrine disrupting properties	No information.

13. Disposal considerations

Disposal method	Hand over for disposal to licensed contractors in accordance with national and local regulations. Do not discharge into sewers.
Waste code (EWC)	16 05 06* — Laboratory and analytical chemicals (np. chemical reagents) zawierające substancje niebezpieczne. EWC code verification required. ^[10]
Packaging	Cleaned packaging may be recycled. Contaminated packaging must be treated as hazardous waste.

14. Transport information

UN number	UN 3242 ^[7]
Environmental hazard	Not classified as environmentally hazardous for transport (no H400/H410/H411 in CLP Annex VI; no marine pollutant mark required) ^[3]
Special precautions	Handle as dangerous goods according to the assigned class (ADR/IMDG/IATA); apply the precautions appropriate to that class.
CN/HS code	CN/HS code: verification required in the Eurostat Combined Nomenclature.
Notes	UN number per the indicated source. Verify the transport class and packing group in ADR Table A / UN Model Regulations before shipment. ^[7]

15. Regulatory information

SVHC status	SVHC status not verified against the available dataset — check the current ECHA Candidate List; do not assume absence. ^[1]
REACH Annex XIV	Not verified against the ECHA Authorisation List — check REACH Annex XIV. ^[1]
REACH Annex XVII	Not confirmed in the available Annex XVII dataset — verify against the current ECHA list before placing on the market; do not assume absence of restriction. ^[1]

16. Other information

Legal status of classification: harmonised under CLP Annex VI — Reg. (EC) No 1272/2008 (as at the date of issue). Entries with an entry-into-force date after 04.09.2026 were omitted as future (not yet applicable).

Data aggregated automatically from public reference databases (PubChem, ECHA, NIST and others).

Scientific citations (10)

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- Tian WR, Sang YX, Wang XH. Semicarbazide - from state-of-the-art analytical methods and exposure to toxicity: a review.. Food additives & contaminants. Part A, Chemistry, analysis, control, exposure & risk assessment (2014). DOI: 10.1080/19440049.2014.953012
- Can Özkan. Letter: Is Distal Transradial Approach Superior?. Angiology (2024). DOI: 10.1177/00033197241256686
- Chen X, Qin H, Zhou X et al.. Long-lasting chemiluminescence-based portable biosensor for POCT of food contaminant azodicarbonamide.. Talanta (2025). DOI: 10.1016/j.talanta.2024.127319
- Hang L, Yang H, Ji W. Determination of azodicarbonamide in flour samples using high-performance liquid chromatography-tandem mass spectrometry with xanthidrol pre-column derivatisation.. Food additives & contaminants. Part A, Chemistry, analysis, control, exposure & risk assessment (2024). DOI: 10.1080/19440049.2024.2400238

Full text of H statements

H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled

Full text of P statements

P233 Keep container tightly closed

P261 Avoid breathing dust/fume/gas/mist/vapours/spray

P273 Avoid release to the environment

P284 Wear respiratory protection

P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing

P342+P311 If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician

P501 Dispose of contents/container to an approved waste collection point

Abbreviations

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

ATE Acute Toxicity Estimate

CAS Chemical Abstracts Service

CLP Classification, Labelling and Packaging (Reg. (EC) 1272/2008)

CMR Carcinogenic, Mutagenic, toxic to Reproduction

DNEL Derived No-Effect Level

EC European Community number

EPI Personal protective equipment

GHS Globally Harmonized System

IATA International Air Transport Association

IMDG International Maritime Dangerous Goods Code

SDS Safety Data Sheet

LC50 Lethal Concentration, 50%

LD50 Lethal Dose, 50%

NDS Maximum admissible concentration (workplace, PL)

NDSCh Short-term exposure limit (PL)

OEL Occupational Exposure Limit

PBT Persistent, Bioaccumulative and Toxic

PNEC Predicted No-Effect Concentration

REACH Registration, Evaluation, Authorisation and Restriction of Chemicals (Reg. (EC) 1907/2006)

STOT Specific Target Organ Toxicity

SVHC Substance of Very High Concern

TPSA Topological Polar Surface Area

vPvB very Persistent and very Bioaccumulative

Version history

v1 (04.09.2026) Based on ECHA harmonised classification (Annex VI to CLP, ATP 23).

References

- [1] EP and Council. Reg.(EC) No 1907/2006 (REACH). Art.31, Annex II. OJ EU L 396/2006. URL: <https://eur-lex.europa.eu/eli/reg/2006/1907/oj> Accessed: 2026-09-04.
- [2] European Commission. Reg.(EU) 2020/878 — amending Annex II REACH. OJ EU L 203/2020. From 01.01.2023. URL: <https://eur-lex.europa.eu/eli/reg/2020/878/oj> Accessed: 2026-09-04.
- [3] EP and Council. Reg.(EC) 1272/2008 (CLP) + ATP 23. OJ EU L 353/2008. (2026-07-07) URL: <https://eur-lex.europa.eu/eli/reg/2008/1272/oj> Accessed: 2026-09-04.

- [4] United Nations. GHS Rev.9. ST/SG/AC.10/30/Rev.9. New York and Geneva: United Nations, 2021. URL: <https://unece.org/transport/dangerous-goods/ghs-rev9-2021> Accessed: 2026-09-04.
- [5] ISO. ISO 7010:2019 — Graphical symbols. Safety signs. URL: <https://www.iso.org/standard/72424.html> Accessed: 2026-09-04.
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- [7] PubChem. National Center for Biotechnology Information (NIH/NLM), chemical compound database. URL: <https://pubchem.ncbi.nlm.nih.gov/compound/5462814>
- [8] Rumble, J.R., ed. CRC Handbook of Chemistry and Physics. 105th ed. Boca Raton: CRC Press, 2024. URL: <https://hbcpc.chemnetbase.com>
- [9] ECHA. European Chemicals Agency — harmonised classification inventory (CLP Annex VI). URL: <https://echa.europa.eu>
- [10] European Commission. Decision 2000/532/EC establishing a list of wastes (European Waste Catalogue). OJ EU L 226/3. URL: <https://eur-lex.europa.eu/eli/dec/2000/532/oj>
- [11] European Chemicals Agency (ECHA). Guidance on the Compilation of Safety Data Sheets. Version 4.0. Helsinki: European Chemicals Agency, 2020. URL: https://echa.europa.eu/documents/10162/2324906/sds_en.pdf
- [12] Urben, P.G., ed. Bretherick's Handbook of Reactive Chemical Hazards. 8th ed. Oxford: Academic Press.
- [13] CEN. Personal protective equipment standards (EN ISO 374-1, EN 166, EN 149, EN 14387, EN ISO 20345). Brussels: European Committee for Standardization.
- [14] ECHA. Guidance on Information Requirements and Chemical Safety Assessment, Chapter R.11: PBT/vPvB Assessment. Helsinki: European Chemicals Agency. URL: <https://echa.europa.eu/guidance-documents/guidance-on-information-requirements-and-chemical-safety-assessment>
- [15] European Parliament and Council. Regulation (EC) No 1907/2006 (REACH), Annex XIII — Criteria for the identification of PBT and vPvB substances. OJ EU L 396/2006 (consolidated). URL: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02006R1907-20140410>
- [16] MRIPS Regulation of 12.06.2018 — NDS/NDN. Journal of Laws 2024 item 1017. URL: <https://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU20240001017> Accessed: 2026-09-04.

External links

NIST: <https://webbook.nist.gov/cgi/cbook.cgi?ID=123-77-3>

NFPA 704 (supplementary information — NFPA/USA system; not a required element of an EU safety data sheet under REACH Annex II)



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