SAFETY DATA SHEET (SDS)

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

Date: 19.11.2026 | Version: 23 | EN

bis(2-ethylhexyl) phthalate

bis(2-ethylhexyl) benzene-1,2-dicarboxylate

CAS 117-81-7

$C_{24}H_{38}O_4$ | EC 204-211-0

MOLAR MASS	LOGP
390.60	7.4

HAZARD CLASSIFICATION (GHS / CLP)



Danger

H360FD

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	bis(2-ethylhexyl) phthalate
1.1 IUPAC name	bis(2-ethylhexyl) benzene-1,2-dicarboxylate
1.1 CAS number	117-81-7
1.1 EC number	204-211-0
1.1 PubChem CID	8343
1.1 InChIKey	BJQHLKABXJIVAM-UHFFFAOYSA-N
1.1 SMILES	CCCCC(CC)COC(=O)C1=CC=CC=C1C(=O)OCC(CC)CCCC
1.1 Molecular formula	$C_{24}H_{38}O_4$ [7]
1.1 Molar mass	390.6 g/mol [7]
1.1 Exact mass	390.2770 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)

Contact the poison centre designated in the country of placing on the market (CLP Art. 45).

2. Hazards identification

GHS:



PPE:



Danger

Hazard statements (H) [3][4][9]

H360FD	May damage fertility. May damage the unborn child

Precautionary statements (P) [3][4][9]

P201	Obtain special instructions before use
P202	Do not handle until all safety precautions have been read and understood
P280	Wear protective gloves/protective clothing/eye protection/face protection
P308+P313	IF exposed or concerned: Get medical advice/attention
P405	Store locked up
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.

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3. Composition/information on ingredients

Substance type	pure substance
CAS Number	117-81-7
EC number	204-211-0
Molecular formula	$C_{24}H_{38}O_4$
Concentration	≥99% (typical reagent-grade purity — to be confirmed by the supplier's specification)
Clp index no	607-317-00-9

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][12]

Skin contact

Remove contaminated clothing. Rinse skin with soap and water (min. 15 minutes). [1][2][12]

Eye contact

Rinse eyes with running water (min. 15 minutes). Remove contact lenses if possible. If irritation persists — consult an ophthalmologist. [1][2][12]

Ingestion

Do NOT induce vomiting (unless directed by a physician). Rinse mouth with water. Never give anything by mouth to an unconscious person. Emergency number: 112 (EU-wide). Contact the poison centre designated in your country (CLP Art. 45). [1][2][12]

Symptoms and effects

No specific symptoms described in the literature. [3][9]

Notes for physician

Requires verification

Emergency numbers: Emergency: 112 (EU-wide). Poison centre: as designated in the country of placing on the market (CLP Art. 45).

5. Firefighting measures

Suitable extinguishing media	Adapt extinguishing media to surroundings. CO2, dry powder, foam.
Unsuitable extinguishing media	No specific restrictions.
Specific hazards	Thermal decomposition products: CO, CO2. [13]
Advice for firefighters	Use self-contained breathing apparatus (SCBA). Full protective suit.
Flash Point	207.2°C [7]
Auto-ignition temperature	390.6°C [7]

6. Accidental release measures

Personal precautions	Use personal protective equipment (see Section 8). Avoid breathing vapours. [1][2][12]
Environmental precautions	Prevent entry into sewers, groundwater and surface water. [1][2][12]
Methods for containment and cleaning up	Contain the spill with a barrier. Absorb with inert material (sand, vermiculite, diatomaceous earth). Collect into sealed, labelled containers. Do not release into drains. [1][2][12]
Related sections	8; 13

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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][12]
Storage temperature	Store at room temperature (15-25°C) or as indicated on the label. [1][2][12]
Humidity	Store in a dry place (<60% RH). [1][2][12]
Light	Protect from direct sunlight. [1][2][12]
Incompatible materials	Strong oxidizers. [13]

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][14]



Chemical-resistant protective gloves
EN ISO 374-1:2016+A1:2018
fluoroelastomer FKM (Viton), min. 0.4 mm — NOT nitrile (breakthrough within minutes)

Closed safety spectacles or goggles
EN ISO 16321-1:2022 / EN 166:2001

Closed safety footwear with toe protection
EN ISO 20345:2022 (S2/S3)

9. Physical and chemical properties

Property (item 9.1)	Value	Source
Physical state	Liquid	
Colour	Liquid [7]	
Odour	Slight odor [7]	
pH (1% aqueous solution)	Not applicable	
Melting point	-50°C (experimental data) [7]	
Boiling point	384.0673°C [8] [7][20]	
Flash point	207.2°C (experimental data) [7]	
Flammability	No data available.	
Lower and upper explosion limit	0.3–2.4 % vol. [20]	
Density (20°C)	0.9819 g/cm³ [7]	
Vapour pressure	0.176 kPa (1.32 mmHg, 200°C) (experimental data) [7]	

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Property (item 9.1)	Value	Source
Relative vapour density	13.48 [19]	
Dynamic viscosity	81 mPa·s [9]	
Kinematic viscosity	No data available.	
Refractive index nD²⁰	1.4853 (experimental data) [7]	
Auto-ignition temperature	390.6°C (experimental data) [7]	
Decomposition temperature	Not applicable	
Water solubility	0.0003 g/L, 25°C [7]	
Particle characteristics	Not applicable (REACH 9.1(r))	
Partition coefficient n-octanol/water (log value)	7.4	
Molar mass	390.6 g/mol [7]	
Molecular formula	$C_{24}H_{38}O_4$ [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, CO2.

11. Toxicological information

LD50 (oral)	LD50 >25 g/kg (rat, oral) [7]
LD50 (dermal)	No data available.
LC50 (inhalation)	No data available.
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	Not classified for this hazard (outside the scope of the harmonised classification in CLP Annex VI; verify supplier self-classification) [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	No harmonised CLP classification as carcinogenic; for carcinogenicity assessment see the IARC classification below. [17]
IARC classification (carcinogenicity)	IARC Group 2B — possibly carcinogenic to humans. [local snapshot — not verified against the current IARC list] [17]
Reproductive toxicity	Category 1A/1B (harmonised classification, Annex VI to CLP).
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]

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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	LC_{50} (fish): 38 mg/L (Cyprinus carpio, 96 h). EC_{50} (Daphnia): 0.133 mg/L (Daphnia pulex, 48 h) [18]
Persistence / biodegradability	No data available.
Bioaccumulative potential	log Kow = 7.4. Elevated bioaccumulation potential (log Kow ≥ 4.5 — PBT/vPvB screening threshold per ECHA R.11); a definitive assessment requires the bioconcentration factor BCF (REACH Annex XIII: B if BCF > 2000). [15][16]
Mobility in soil	No data available.
PBT/vPvB assessment	Insufficient data to assess PBT/ vPvB.
Endocrine disrupting properties	Identified as an endocrine disruptor — included in the REACH Candidate List of SVHC (Art. 59(1)), listed inter alia for endocrine-disrupting properties (Art. 57(f)). Reported effects on the endocrine system in animal studies (ecotoxicological data, US EPA ECOTOX; not a regulatory ED classification under 2018/605). Reported endocrine effects in aquatic organisms (ecotoxicological data, US EPA ECOTOX; not a regulatory ED classification under 2018/605). [18]

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 (e.g. chemical reagents) containing hazardous substances. Verification of the EWC code required. [11]
Packaging	Cleaned packaging may be recycled. Contaminated packaging must be treated as hazardous waste.

14. Transport information

UN number	VERIFICATION REQUIRED — no verified UN assignment.
Environmental hazard	The aquatic hazard classes are not covered by the harmonised entry in Annex VI. Data in Section 12 indicate a value below the classification threshold — supplier self-classification (Article 4(3) CLP) and verification per ADR 2.2.9 / IMDG are required. Do not assume that marking as a marine pollutant is not 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	Transport classification not verified. Do not assume the absence of restrictions — check ADR/IMDG/IATA before shipping.
Environmentally hazardous (mark: fish and tree)	Requires verification

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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	Subject to general entries 28–30 of REACH Annex XVII (CMR substance cat. 1A/1B): sale to the general public prohibited — supply to professional users only. [1]
IARC classification (carcinogenicity)	IARC Group 2B — possibly carcinogenic to humans.

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 19.11.2026 were omitted as future (not yet applicable).

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

Scientific citations (10)

Lesa L. Aylward, Sean M. Hays, Michelle Gagné et al.. *Derivation of Biomonitoring Equivalents for di(2-ethylhexyl)phthalate (CAS No. 117-81-7)*. Regulatory Toxicology and Pharmacology (2009). DOI: 10.1016/j.yrtph.2009.09.001

Carcinogenesis Bioassay of Di(2-ethylhexyl)phthalate (CAS No. 117-81-7) in F344 Rats and B6C3F1 Mice (Feed Studies).. National Toxicology Program technical report series (1982).

Sakaoduoen Bunsangiam, Chatsuda Sakdapetsiri, C. Charoenpong et al.. *A versatile potential Ancylobacter sp. PD-4 capable of biodegrading polyethylene microplastics and di(2-ethylhexyl) phthalate.*. Journal of Hazardous Materials (2025). DOI: 10.1016/j.jhazmat.2025.140731

O. Aerts, M. Mertens, Dina Oulkadi et al.. *Novel topical statin treatments of disseminated actinic porokeratosis risk provoking cutaneous sensitization*. Contact Dermatitis (2022). DOI: 10.1111/cod.14220

Robert W. Moore, Thomas A. Rudy, T. M. Lin et al.. *Abnormalities of sexual development in male rats with in utero and lactational exposure to the antiandrogenic plasticizer Di(2-ethylhexyl) phthalate.*. Environmental Health Perspectives (2001). DOI: 10.1289/ehp.01109229

Full text of H statements

H360FD	May damage fertility. May damage the unborn child

Full text of P statements

P201	Obtain special instructions before use
P202	Do not handle until all safety precautions have been read and understood
P280	Wear protective gloves/protective clothing/eye protection/face protection
P308+P313	IF exposed or concerned: Get medical advice/attention
P405	Store locked up
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

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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

v23 (19.11.2026)	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: 2026-11-19.

[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: 2026-11-19.

[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: 2026-11-19.

[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: 2026-11-19.

[5] ISO. ISO 7010:2019 — Graphical symbols. Safety signs. URL: https://www.iso.org/standard/72424.html Accessed: 2026-11-19.

[6] ISO. ISO 3864-1:2011 — Safety colours and safety signs. URL: https://www.iso.org/standard/51021.html Accessed: 2026-11-19.

[7] PubChem. National Center for Biotechnology Information (NIH/NLM), chemical compound database. URL: https://pubchem.ncbi.nlm.nih.gov/compound/8343

[8] NIST. Chemistry WebBook, SRD 69. National Institute of Standards and Technology. URL: https://webbook.nist.gov/cgi/cbook.cgi?ID=117-81-7

[9] ECHA. European Chemicals Agency — harmonised classification inventory (CLP Annex VI). URL: https://echa.europa.eu

[10] ECHA. REACH Registration Dossier (registered substance, acute toxicity study record). Helsinki: European Chemicals Agency. URL: https://echa.europa.eu/registration-dossier

[11] 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

[12] 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

[13] Urben, P.G., ed. Bretherick's Handbook of Reactive Chemical Hazards. 8th ed. Oxford: Academic Press.

[14] CEN. Personal protective equipment standards (EN ISO 374-1, EN 166, EN 149, EN 14387, EN ISO 20345). Brussels: European Committee for Standardization.

[15] 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

[16] 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

[17] IARC. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. Lyon: International Agency for Research on Cancer. URL: https://monographs.iarc.who.int

[18] U.S. EPA. ECOTOX Knowledgebase. Washington, DC: U.S. Environmental Protection Agency. URL: https://cfpub.epa.gov/ecotox/

[19] MOL-GOD. Value obtained by calculation from the molecular formula/molecular weight (the specific quantity and its formula are indicated at the respective field). Calculated value, not an experimental measurement. URL: https://www.nist.gov/pml/atomic-weights-and-isotopic-compositions-relative-atomic-masses

[20] DECHEMA, PTB, and BAM. CHEMSAFE - Database of Evaluated Safety Characteristics for the Avoidance of Explosions. Frankfurt am Main: DECHEMA e.V.; Braunschweig/Berlin: Physikalisch-Technische Bundesanstalt and Bundesanstalt fur Materialforschung und -prufung. URL: https://www.chemsafe.ptb.de

[21] 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: 2026-11-19.

External links

NIST: https://webbook.nist.gov/cgi/cbook.cgi?ID=117-81-7

ChEMBL: https://www.ebi.ac.uk/chembl/compound_report_card/CHEMBL1242017

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