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SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Product	Hydroxyethylidene Diphosphonic Acid 60% (HEDP)	**Revision date**	2026-11-16
Version	1.0	**Brand**	Richest

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

Product name	Hydroxyethylidene Diphosphonic Acid 60% (HEDP)
Synonyms	Etidronic acid; 2809-21-4; HEDP; 1-Hydroxyethylidene-1,1-diphosphonic acid; EHDP; Etidronsaeure
CAS No.	2809-21-4
EC No.	220-552-8
Molecular formula	C2H8O7P2
Molecular weight	206.03 g/mol
Relevant identified uses	Scale and corrosion inhibitor for industrial water treatment; Chelating agent
Uses advised against	No specific uses advised against were identified in the reviewed sources.
Company	Richest Group
Address	No. 999, Jiangyue Rd, Minhang, Shanghai 201114, China
Telephone	0086 21 5017 5386
E-mail	inquiry@richest-group.com
Website	www.richest-group.com
Emergency telephone number	0086 21 5017 5386

SECTION 2: Hazards identification

GHS Classification	Corrosive to Metals 1; Acute Toxicity oral 5; Skin Corrosion 1C; Eye Damage 1; STOT SE 2 (systemic toxicity)
Pictogram(s)	GHS05□GHS07□GHS08
Signal word	Danger
Hazard statement(s)	H290 May be corrosive to metals; H303; H314 Causes severe skin burns and eye damage; H371 May cause damage to organs
Precautionary statement(s)	P234; P260; P264; P270; P280; P301+P330+P331; P303+P361+P353; P304+P340+P310; P305+P351+P338+P310; P308+P311; P363; P390; P405; P406; P501
Other hazards	No human data, but not expected to increase risk of congenital abnormalities based on animal studies; [REPROTOX] Safe to use as a sequestrant in food preparation; [JECFA] Causes gastrointestinal bleeding in lethal-dose feeding studies of mice; [RTECS] A corrosive substance that can cause injury to the skin, eyes, and respiratory tract; Inhalation may cause chemical pneumonitis; [MSDSonline]

SECTION 3: Composition/information on ingredients

Component	Hydroxyethylidene Diphosphonic Acid 60% (HEDP)
CAS No.	2809-21-4

SECTION 3: Composition/information on ingredients	
EC No.	220-552-8
Classification	Corrosive to Metals 1; Acute Toxicity oral 5; Skin Corrosion 1C; Eye Damage 1; STOT SE 2 (systemic toxicity)
Concentration	Active acid ≥60.0%

SECTION 4: First-aid measures	
If inhaled	Move the person to fresh air and keep comfortable for breathing. Get medical advice if symptoms occur.
In case of skin contact	Wash with plenty of water. Remove contaminated clothing. Get medical advice if irritation occurs.
In case of eye contact	Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing. Get medical advice if irritation persists.
If swallowed	Rinse mouth. Do not induce vomiting unless directed by medical personnel. Get medical advice if symptoms occur.
Most important symptoms and effects	No data available
Indication of immediate medical attention	Treat symptomatically. Show this safety data sheet to medical personnel.

SECTION 5: Fire-fighting measures	
Suitable extinguishing media	Water spray, foam, dry chemical or carbon dioxide
Unsuitable extinguishing media	No data available
Special hazards arising from the chemical	Decomposes in a fire giving off irritant fumes; reported combustion products include carbon monoxide, carbon dioxide and phosphines
Advice for firefighters	Wear self-contained breathing apparatus and protective clothing appropriate for the surrounding fire.

SECTION 6: Accidental release measures	
Personal precautions and emergency procedures	Avoid contact with the material. Ensure adequate ventilation. Wear appropriate personal protective equipment.
Environmental precautions	Prevent uncontrolled release to drains, soil and watercourses.
Methods for containment and cleaning up	Collect mechanically or with a suitable absorbent and place in a suitable closed container for disposal.

SECTION 7: Handling and storage	
Precautions for safe handling	Avoid contact with skin and eyes. Avoid formation or inhalation of dust, mist or vapour as applicable. Wash thoroughly after handling.
Conditions for safe storage, including incompatibilities	Cool, shaded, ventilated place away from oxidizing agents and strong bases; shelf life 12 months; store locked up in corrosion-resistant container

SECTION 8: Exposure controls/personal protection	
Occupational exposure limit values	No data available
Biological limit values	No biological limit values were identified in the reviewed sources.

SECTION 8: Exposure controls/personal protection	
Appropriate engineering controls	Provide adequate ventilation. Eyewash facilities should be available where contact is possible.
Eye/face protection	Use safety eyewear appropriate to the risk of exposure.
Skin and body protection	Wear suitable protective gloves and clothing appropriate to the risk of exposure.
Respiratory protection	Use suitable respiratory protection if exposure limits may be exceeded or dust, mist or vapour is generated.
Thermal hazards	No specific thermal hazards were identified in the reviewed sources; see Sections 5 and 10.

SECTION 9: Physical and chemical properties	
Physical state	Clear colorless to pale tan liquid, free from foreign matter
Colour	Clear, colourless to pale yellow; TNJ SDS describes the product as clear yellow
Odour	Slight to none
Melting point / freezing point	-40 °C
Boiling point / boiling range	105 °C
Flammability	Non-flammable aqueous solution
Explosion / flammability limits	No data available
Flash point	Non-flammable aqueous solution
Auto-ignition temperature	No data available
Decomposition temperature	No data available
pH	≤2.0 (1% solution)
Viscosity	Dynamic viscosity: 46.0 mPa·s at 20 °C; 20.2 mPa·s at 40 °C; 10.3 mPa·s at 60 °C; 5.0 mPa·s at 90 °C
Solubility	1.15e+01 g/L
Partition coefficient n-octanol/water	-2.54
Vapour pressure	<3.2 kPa at 25 °C
Density and/or relative density	1.45
Relative vapour density	No data available
Particle characteristics	Not applicable (liquid).
Active concentration	HEDP 58–62% (aqueous solution, manufacturer MSDS).
Melting freezing point	<1 °C.
Specific gravity	1.40–1.45 (temperature not stated in the manufacturer MSDS).
Freezing point	-25 °C

SECTION 10: Stability and reactivity	
Reactivity	Attacks many metals and is corrosive to aluminium and mild steel; avoid contact with strong oxidizing agents and strong bases

SECTION 10: Stability and reactivity

Chemical stability	Manufacturer MSDS for 58–62% HEDP: stable at normal temperature and pressure; avoid bases, amines, metals, reducing agents, and oxidising agents. It may corrode metals under moist conditions. Thermal decomposition may produce phosphine, inorganic acids, and phosphorus oxides; hazardous polymerisation will not occur.
Possibility of hazardous reactions	Hazardous polymerization does not occur
Conditions to avoid	Do not expose to extreme temperatures; keep in a cool, dry, well-ventilated place
Incompatible materials	Strong oxidizing agents, strong bases, aluminium, mild steel and other reactive metals
Hazardous decomposition products	Decomposition produces carbon monoxide, carbon dioxide and phosphorus oxides (PxOy); fire can also produce phosphines and other irritant fumes

SECTION 11: Toxicological information

Skin corrosion irritation	GHS classification: Skin Corrosion 1C
Serious eye damage irritation	GHS classification: Eye Damage 1
Toxicological summary	Safe in the present practices of use and concentration. Ingredient, concentration, and use information are available in documents discoverable at https://cir-reports.cir-safety.org
Health effects	No human data, but not expected to increase risk of congenital abnormalities based on animal studies; [REPROTOX] Safe to use as a sequestrant in food preparation; [JECFA] Causes gastrointestinal bleeding in lethal-dose feeding studies of mice; [RTECS] A corrosive substance that can cause injury to the skin, eyes, and respiratory tract; Inhalation may cause chemical pneumonitis; [MSDSonline]
Acute toxicity	The manufacturer MSDS for 58–62% HEDP reports a mouse oral LD50 of 1,800 mg/kg; ingestion has moderate acute toxicity.
Sensitization	HERA's consolidated toxicological information states that HEDP and other phosphonates are not contact sensitisers.
Carcinogenicity	HERA's compilation of in vitro and in vivo information concludes that there is no evidence that HEDP is genotoxic, mutagenic, or carcinogenic.

SECTION 12: Ecological information

Ecotoxicity	All HERA values are expressed as mg/L active acid: Oncorhynchus mykiss 96 h LC50 368 and NOEC 151; Lepomis macrochirus 96 h LC50 868 and NOEC 529; Channel Catfish 96 h LC50 695 and NOEC 529. Daphnia magna 48 h EC50 527 and NOEC 400; in a 28 d chronic test, EC50 <25 and NOEC >12, while another study reported NOEC 0.1, and HERA notes a marked discrepancy and unclear dose-response. Selenastrum 96 h EC50 3.0 and NOEC 1.3; the algal results may be affected by complexation of essential metal nutrients. Pseudomonas putida EC0 >500 mg/L.
Persistence degradability	Not readily biodegradable: 14CO2 evolution in the OECD screening test was 1–3% after 28 d; DOC removal in SCAS reached 100% after 26 d, but 14CO2 evolution after 210 d was only 1.9–6.75%, demonstrating that DOC removal largely cannot be interpreted as mineralization. Mineralization in natural river water after 60 d was 2.0% in the dark and 17.2% in sunlight; HERA's exposure assessment uses an aquatic biodegradation half-life of 395 d. In neutral river water under simulated daylight, 3 mg/L HEDP degraded by 70% in 8 d, with an estimated half-life of approximately 100 h; at 10 mg/L, only 12.5% degraded, demonstrating concentration dependence.
Bioaccumulative potential	HERA reports an HEDP BCF of <2–18 and a LogKow of -3.49 for the active acid; combined with its high water solubility, HERA concludes that there is no significant risk of accumulation in organisms or the food chain.

SECTION 12: Ecological information

Mobility in soil	Despite its high water solubility, adsorption is substantial: approximately 1–10 mg/L HEDP incubated with municipal sewage sludge (2–3 g dry solids/L) for 24–48 h showed >90% adsorption, with estimated removal of 25–60% in the activated-sludge stage. Freundlich k values were 293–2378 for clay, 407–2107 for sediment, and 907–2718 for sludge, and adsorption was only partially reversible; high soil mobility therefore cannot be inferred from water solubility alone.
Other adverse effects	Algal growth inhibition may arise primarily from HEDP complexation of trace nutrient metals rather than direct systemic toxicity, and HERA cautions that uncertainty exists when using these results for classification and PNEC extrapolation. The discrepancy between chronic daphnid NOEC values of 0.1 and >12 mg/L led HERA to evaluate separate risk scenarios; the aquatic environment and sediment may be of concern if the lowest PNEC is confirmed.

SECTION 13: Disposal considerations

Product disposal methods	Dispose of contents in accordance with applicable local, regional and national regulations. Do not discharge untreated product to the environment.
Contaminated packaging	Empty containers should be taken to an approved waste handling site for recycling or disposal in accordance with local regulations.

SECTION 14: Transport information

UN Number (ADR/RID, IMDG, IATA)	3265
UN Proper Shipping Name	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (HEDP solution)
Transport hazard class(es)	8
Packing group	III
Environmental hazards / Marine pollutant	No; EmS F-A, S-B
Special precautions for user	Keep containers closed and secured during transport. Follow applicable dangerous goods regulations.

SECTION 15: Regulatory information

Safety, health and environmental regulations specific for the product	No data available

SECTION 16: Other information

Full text of H-Statements	H290 May be corrosive to metals; H303; H314 Causes severe skin burns and eye damage; H371 May cause damage to organs
Revision date	2026-11-16
Version	1.0

SECTION 16: Other information

References	Supplier technical documents, public SDS/COA/TDS and regulatory sources reviewed. Public data citations are listed below. Public data sources: PubChem Etidronic Acid (CID 3305): https://pubchem.ncbi.nlm.nih.gov/compound/3305 | HEDP / Hydroxyethylidene Diphosphonic Acid — Material Safety Data Sheet (58–62% in water): https://aadhunikindustries.com/hydroxyethylidenediphosphonicacidhedpmsdssheet.htm | Human & Environmental Risk Assessment — Phosphonates (CAS 6419-19-8; 2809-21-4; 15827-60-8): https://www.heraproject.com/wp-content/uploads/2025/08/30-F-04-HERA-Phosphonates-Full-web-wd.pdf | HEDP 60% Liquid CAS 2809-21-4 - Material Safety Data Sheet: https://www.tnjchem.com/uploadfile/attachment/a4f470fed356ef63106a63530682785c.pdf | 1-Hydroxyethane-1,1-diphosphonic Acid, approximately 60% in Water, TCI H0587: https://www.fishersci.com/shop/products/1-hydroxyethane-1-1-diphosphonic-acid-ca-60-water-ca-4-2mol-l-tci-america-2/H0587500G | HEDP 60% - Technical specifications and product data: https://chennaichemicals.com/product/hedp-60/
Abbreviations	CAS: Chemical Abstracts Service; ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road; IMDG: International Maritime Dangerous Goods; IATA: International Air Transport Association; SDS: Safety Data Sheet.
Disclaimer	The information in this SDS applies to the specified product and is provided in good faith based on information available to Richest Group at the date of issue. It describes health, safety and environmental requirements and does not constitute a guarantee of product properties. Users must assess suitability and comply with applicable regulations.