Technical data sheet

Product Name: HEDP·4Na (Tetrasodium Salt of Hydroxyethylidene Diphosphonic Acid)
CAS No.: 3794-83-0
EINECS No.: 223-267-7
Molecular Formula: $C_2H_4O_7P_2Na_4$
Molecular Weight: 294.10

Product Description

HEDP·4Na is the tetrasodium salt of hydroxyethylidene diphosphonic acid. It is a stable, water-soluble organophosphonate with excellent chelating, scale inhibition, and corrosion resistance properties. Compared with HEDP acid, the sodium salt form has better solubility and easier handling, making it suitable for liquid formulations.

Specification

Application		Water treatment
Appearance		White crystalline solid
Active content (as HEDP)	%	58.0-62.0
Active content (as HEDP-4Na)	%	82.8-88.5
Iron	≤ppm	35
Loss on drying	≤%	15.0
pH (1% water solution)	≤	11.0-12.0
Package		25kg bags (solid)
Loading qty FCL (20'GP)		24MTs (solid)

Applications

Water Treatment Chemicals: Used as a scale inhibitor and corrosion inhibitor in circulating cooling water systems, boilers, and reverse osmosis.

Detergent Industry: Acts as a chelating agent to improve cleaning performance.

Textile & Dyeing: Used for metal ion sequestration and process water conditioning.

Paper & Pulp Industry: Prevents scale formation and improves processing efficiency.

Working Principle

1. Scale Inhibition Mechanism

Crystal Lattice Distortion: HEDP·4Na adsorbs on the active growth sites of calcium carbonate and other salts, causing lattice distortion and preventing crystal growth.

Chelation Effect: It forms stable complexes with Ca^{2+}, Mg^{2+}, Fe^{2+}, etc., keeping them in solution and reducing the precipitation of insoluble salts.

2. Corrosion Inhibition Mechanism

Protective Film Formation: On metal surfaces, HEDP·4Na reacts with metal ions to form a stable, insoluble phosphonate film, isolating the metal from corrosive agents.

Cathodic Inhibition: By chelating calcium ions, it reduces $CaCO_3$ deposition in cathodic areas, slowing down cathodic reactions.

Anodic Inhibition: It adsorbs at anodic sites, lowering the dissolution rate of metals and reducing anodic corrosion.

3. Synergistic Effects

Works synergistically with zinc salts to enhance protective film density.

When blended with polycarboxylates (e.g., PAA, PESA), it significantly improves dispersion performance and scale inhibition efficiency.

Handling & Storage

Avoid contact with eyes and skin.

Wear protective gloves and goggles during handling.

In case of accidental contact, rinse with plenty of water and seek medical advice.

Store in a cool, dry, and well-ventilated place.

Avoid contact with strong oxidizing agents.

Shelf life: **12 months** in original sealed container.

Packaging

25kg bags or jumbo bags