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Technical Data Sheet (TDS)

1. Product Overview

- Product Name: Amino Trimethylene Phosphonic Acid (ATMP) Aqueous Solution - English Name: Amino Trimethylene Phosphonic Acid - CAS Number: 6419-19-8 - Formula: $C_3H_{12}NO_9P_3$ - Molecular Weight: 299.05 g/mol - Product Characteristics: High-efficiency organophosphonic acid scale and corrosion inhibitor, with strong chelating ability for metal ions (Ca^{2+}, Mg^{2+}, Fe^{3+}, Cu^{2+}, etc.). Features excellent scale inhibition performance for calcium carbonate, calcium sulfate, calcium phosphate, and iron oxide scales; good corrosion inhibition effect on carbon steel, copper, and stainless steel equipment; high temperature resistance (up to 150℃) and wide pH adaptation range (1.0-10.0); stable chemical properties, not easy to decompose; low dosage, high efficiency, and cost-saving.

2. Technical Specifications (Complies with GB/T 26324-2010)

Item	Specification
Appearance	Colorless to pale yellow transparent liquid, no
Active Component Content	≥ 50.0%
pH Value (25℃, 1% Solution)	1.5-2.5
Density (25℃)	1.35-1.45 g/cm³
Total Phosphorus (as PO_4^{3-})	≥ 40.0%
Calcium Carbonate Scale	≥ 95% (80℃, 24h)
Heavy Metals (Pb)	≤ 0.0005%
Iron (Fe)	≤ 0.001%
Chloride Content (as Cl^-)	≤ 0.1%
Stability (25℃, 12 months)	No delamination, no precipitation, scale
Operating Temperature Range	0-150℃
Operating pH Range	1.0-10.0

3. Product Advantages

1. Superior Scale Inhibition Performance: Strong chelating ability for metal ions (Ca^{2+}, Mg^{2+}, Fe^{3+}, etc.), efficiently inhibits formation of calcium carbonate, calcium sulfate, calcium phosphate, and iron oxide scales; scale inhibition rate ≥ 95% under high temperature and high hardness conditions. 2. Excellent Corrosion Inhibition Effect: Forms a protective film on the surface of carbon steel, copper, and stainless steel equipment, reducing corrosion rate significantly; suitable for corrosion protection of various industrial water treatment equipment. 3. High Temperature & Wide pH Adaptability: Stable at temperatures up to 150℃, no decomposition or loss of performance; applicable in pH range 1.0-10.0, suitable for various water quality conditions (acidic, neutral, slightly alkaline). 4. Low Dosage & Cost-Saving: Effective dosage is 2-10 mg/L, significantly lower than traditional scale inhibitors; reduces dosage cost and equipment cleaning frequency, extending equipment service life. 5. Good Compatibility: Compatible with other water treatment agents (e.g., polycarboxylates, organic phosphonates, biocides), can be used in combination to enhance overall treatment effect; no adverse reactions with common water treatment chemicals. 6. Stable Chemical Properties: Resistant to hydrolysis and oxidation (except strong oxidizers), long service life in water treatment systems; does not produce toxic by-products.

4. Application Fields

- Industrial Cooling Water Systems: Scale and corrosion inhibition for open and closed cooling water systems in power plants, chemical plants, oil refineries, steel mills, and textile mills; prevents scale formation on heat exchangers, condensers, and pipelines. - Boiler Feed Water Systems: Scale inhibition for low, medium, and high-pressure boiler feed water; inhibits scale

formation in boiler tubes, improves heat transfer efficiency, and prevents boiler explosion risks. - Oilfield Water Injection Systems: Scale and corrosion inhibition for oilfield water injection pipelines and wellbores; prevents scale formation and corrosion caused by high salinity and high hardness of oilfield water. - Reverse Osmosis (RO) Pretreatment: Scale inhibition for RO system feed water; prevents scale formation on RO membranes, maintains membrane flux and desalination rate, and extends membrane service life. - Metal Processing Industry: Chelating agent for metal surface treatment (pickling, electroplating); removes metal oxides and impurities, improves surface finish of metal products. - Detergent & Cleaning Industry: Additive for industrial detergents; enhances chelating ability for metal ions, improves cleaning effect, and prevents scale deposition on cleaned surfaces.

5. Usage Methods

- Dosage (as undiluted product): - Industrial Cooling Water Systems: 2-5 mg/L (based on water hardness and temperature); add continuously. - Boiler Feed Water Systems: 3-8 mg/L; add to boiler feed water pipeline. - Oilfield Water Injection Systems: 5-10 mg/L; add continuously before water injection. - RO Pretreatment Systems: 2-4 mg/L; add before RO membrane (compatible with RO membranes). - Usage: Dilute the product with deionized water or system water (dilution ratio 1:5 to 1:20) before use; stir evenly; use a metering pump to add continuously to the water inlet pipeline (1-2 meters before equipment or membrane). - Optimal Conditions: Use at temperature 0-150℃ and pH 1.0-10.0; for high hardness water (Ca^{2+} + Mg^{2+} > 500 mg/L), can be used in combination with polycarboxylate scale inhibitors; avoid mixing with strong bases and strong oxidizers directly (dilute first if necessary). - Precautions: Do not overdose; regular monitoring of water quality (hardness, pH, scale inhibition rate) and adjustment of dosage accordingly.

6. Packaging & Storage

- Packaging Specifications: 25 kg HDPE plastic drums (with sealed caps); 200 kg HDPE plastic drums; 1000 kg IBC totes (lined with HDPE); custom packaging available upon request. - Storage Conditions: Store in cool, dry, well-ventilated warehouse (5-30℃); keep container tightly closed to prevent leakage, moisture absorption, and contamination; avoid direct sunlight, high temperature (>40℃), and freezing (below 0℃); store separately from strong bases, strong oxidizers, food-grade materials, and heavy metal salts; stack drums stably (no more than 2 layers) to prevent tipping and damage. - Shelf Life: 12 months (unopened, specified conditions); if frozen, thaw at room temperature and stir evenly before use (does not affect product performance); use promptly after opening, seal tightly after each use; do not use if the product is discolored, turbid, or has precipitation. - Transportation: UN 3264 (Class 8 Corrosive); transport in corrosion-resistant vehicles; avoid collision, vibration, and impact; keep away from strong bases and strong oxidizers during transport; prevent exposure to sunlight, rain, and moisture;

7. Safety & Protection

- The product is strongly acidic, corrosive to skin and eyes, and very toxic to aquatic organisms; non-flammable and non-explosive. - Operators must wear full personal protective equipment: chemical-resistant gloves (neoprene or butyl rubber), face shield, safety goggles, acid-proof apron, and protective clothing; avoid skin and eye contact, and inhalation of mist. - Operate in well-ventilated area; install emergency eyewash stations and safety showers nearby; in case of leakage, follow accidental release measures to avoid environmental contamination. - In case of skin contact: Rinse with plenty of running water for at least 15 minutes immediately, remove contaminated clothing, and seek emergency medical attention.

8. Quality Assurance

- Manufactured in accordance with ISO 9001 quality management system standards; strictly controls raw materials (formaldehyde, ammonia, phosphorous acid), production processes (condensation, hydrolysis, purification), and finished product testing. - Each batch of product is strictly tested with a Certificate of Analysis (COA) to meet GB/T 26324-2010 and international quality standards, ensuring product performance, stability, and safety. - Provide professional technical support: customize dosage and application schemes based on user water quality (hardness, pH, temperature) and system parameters; provide on-site guidance for product use, dosage adjustment, and system maintenance; solve scale and corrosion problems in water treatment systems in a timely manner.