



# The Latest Water Treatment Chemicals

IRO, 2018

## Introduction

**Shandong IRO Water Treatment Co., Ltd** is specialized in the R&D and production of water treatment chemicals in China, including phosphonates, polymers, biocides and other relevant chemicals.

Since established in 2002, IRO Water Treatment has developed to the annual production capacity of 45,000MT, including 10,000MT HEDP, 8,000MT PBTCA and 15,000MT acrylic polymers (PAA, PAAS). With the philosophy –The large-scale industrial production of fine chemicals||, IRO Water Treatment can achieve both the low unit cost of the scale effect and the high quality of refine production.

After one decade effort, IRO Water Treatment has established the long-term business with global customers in different industries such as cooling towers, geothermal power plants, boilers, reverse osmosis systems, oil fields etc. Our pilot and bench test apparatuses enable us to offer the customer-tailored product portfolio after conducting the performance evaluation tests, which can be designed according to the customer specification.

We can also manufacture the water treatment chemicals as required. Based on the wide product range, the product blending can also be finished according to the customer formulation.

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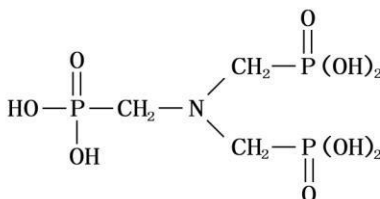
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**Amino Trimethylene Phosphonic Acid (ATMP)****CAS No.** 6419-19-8**Molecular formula:**  $N(CH_2PO_3H_2)_3$ **Molecular weight:** 299.05**Structural formula****Properties**

ATMP has excellent chelation, low threshold inhibition and lattice distortion ability. It can prevent scale formation, calcium carbonate in particular, in water system. ATMP has good chemical stability and is hard to be hydrolyzed in water system. At high concentration, it has good corrosion inhibition. ATMP is used in industrial circulating cool water system of thermal power plant and oil refinery plant. ATMP can decrease scale formation and inhibit corrosion of metal equipment and pipeline. ATMP can be used as chelating agent in woven and dyeing industries and as metal surface treatment agent. The solid state of ATMP is crystal powder, soluble in water, easily deliquescence, suitable for usage in winter and freezing districts. Because of its high purity, it can be used in woven & dyeing industries and as metal surface treatment agent.

**Specification**

Items	Index	
	Appearance	Colorless or pale yellow transparent liquid
Active Acid %	50.0-51.0	95min
Chloride (as Cl <sup>-</sup> )%	1.0max	1.0max
pH(1% Solution)	2.0max	2.0max
Fe,mg/L	10.0max	20.0max
Density(20°C) g/cm <sup>3</sup>	1.31-1.35	—
Colour APHA (Hazen)	30max	—

**Usage**

ATMP is usually used together with organophosphoric acid, polycarboxylic acid and salt to built all organic alkaline water treatment agent. ATMP can be used in many different circulating cool water systems. The dosage of 1-20mg/l is recommended. As corrosion inhibitor, the dosage of 20-60mg/l is preferred.

**Package and storage**

ATMP liquid: 200L plastic drum,IBC(1000L),customers' requirement.

ATMP solid: 25kg/bag,customers' requirement.

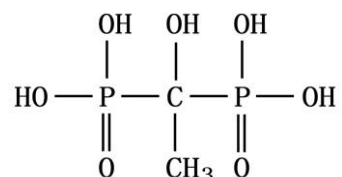
Storage for ten months in shady room and dry place.

**Safety protection**

Acidity, avoid contact with eye and skin, once contacted, flush with water.

**Keywords**

ATMP;ATMPA;ATMP(A);Amino Trimethylene Phosphonic Acid;AMINO TRI(METHYLENE PHOSPHONIC ACID); Tris(Methylene Phosphonic Acid) Amine

**1-Hydroxy Ethylidene-1,1-Diphosphonic Acid (HEDP)****CAS No.** 2809-21-4**Molecular formula:** C<sub>2</sub>H<sub>8</sub>O<sub>7</sub>P<sub>2</sub>**Molecular weight:** 206.02**Structural formula****Properties**

HEDP is an organophosphoric acid corrosion inhibitor. It can chelate with Fe, Cu, and Zn ions to form stable chelating compounds. It can dissolve the oxidized materials on these metals' surfaces. HEDP shows excellent scale and corrosion inhibition effects under temperature 250°C. HEDP has good chemical stability under high pH value, hard to be hydrolyzed, and hard to be decomposed under ordinary light and heat conditions. Its acid/alkali and chlorine oxidation tolerance are better than that of other organophosphoric acids (salt). HEDP can react with metal ions in water system to form hexa-element chelating complex, with calcium ion in particular. Therefore, HEDP has good antiscale and visible threshold effects. When built together with other water treatment chemicals, it shows good synergistic effects.

The solid state of HEDP is crystal powder, suitable for usage in winter and freezing districts. Because of its high purity, it can be used as cleaning agent in electronic fields and as additives in daily chemicals.

**Specification**

Items	Index	
	Appearance	Colorless or light yellow transparent liquid
Active content(HEDP)%	58.0-62.0	90.0min
Phosphorous acid(as PO <sub>3</sub> <sup>3-</sup> )%	1.0max	0.8max
Phosphoric acid (as PO <sub>4</sub> <sup>3-</sup> )%	0.6max	0.5max
Chloride (as Cl <sup>-</sup> )% ppm	100.0max	50.0max
pH(1%solution)	2.0max	2max
Density(20°C)g/cm <sup>3</sup>	1.43-1.47	—
Fe,mg/l	10max	5.0max
Colour APHA (Hazen)	30max	—

**Usage**

HEDP is used as scale and corrosion inhibition in circulating cool water system, oil field and low-pressure boilers in fields such as electric power, chemical industry, metallurgy, fertilizer, etc. In light woven industry, HEDP is used as detergent for metal and nonmetal. In dyeing industry, HEDP is used as peroxide stabilizer and dye-fixing agent; in non-cyanide electroplating, HEDP is used as chelating agent. The dosage of 1-10mg/l is preferred as scale inhibitor, 10-50mg/l as corrosion inhibitor, and 1000-2000mg/l as detergent. Usually, HEDP is used together with polycarboxylic acid.

**Package and storage**

HEDP liquid: 200L plastic drum,IBC(1000L),customers' requirement.

HEDP solid: 25kg/bag,customers' requirement.

Storage for ten months in shady room and dry place.

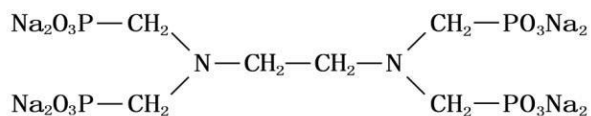
**Safety protection**

Acidity, avoid contact with eye and skin, once contacted, flush with water.

**Keywords**

HEDP;HEDP(A);HEDPA;ETIDRONIC ACID;1-Hydroxy Ethylidene-1,1-Diphosphonic Acid;  
Hydroxyethylidene-1,1-diphosphonicacid(HEDP); 1-HYDROXYETHYLIDENEDIPHOSPHONIC  
ACID;Hydroxyethylidene Diphosphonic acid(HEDP);1-hydroxy-1,1-Ethanediy ester



**Ethylene Diamine Tetra (Methylene Phosphonic Acid) Sodium(EDTMPS)****CAS No.** 1429-50-1**Molecular formula:** C<sub>6</sub>H<sub>12</sub>O<sub>12</sub>N<sub>2</sub>P<sub>4</sub>Na<sub>8</sub>**Molecular weight:** 612.13**Structural formula****Properties**

EDTMPS is nitrogenous organic polyphosphonic acid, a part of cathodic corrosion inhibitor. Its corrosion inhibition is 3~5 times better than that of inorganic polyphosphate. It can be fully dissolved in water, innocuous and non-polluting to the environment, has good chemical stability and thermal tolerance. It shows excellent scale inhibition ability under temperature 200 °C. It can dissociate into 8 positive-negative ions, thus can chelate with many metal ions to form polymer reticulation complex, to destroy the normal crystallization of calcium scale. EDTMPS shows better antiscalant effects to calcium sulfate and barium sulfate.

**Specification**

Items	Index
Appearance	Clear yellow to amber transparent liquid
Active component (EDTMPS)%	30.0min
Organic phosphonic acid (as PO <sub>4</sub> <sup>3-</sup> )%	10.0min
Phosphorous acid (as PO <sub>3</sub> <sup>3-</sup> )%	5.0max
Phosphoric acid (as PO <sub>4</sub> <sup>3-</sup> )%	1.0max
Chloride (Cl <sup>-</sup> ) %	3.0max
pH (1% water solution)	9.5-10.5
Density (20°C)g/cm <sup>3</sup>	1.25min

**Usage**

EDTMPS can be used as corrosion inhibitor in circulating cool water system and boiler water. It is a chelating agent in non-cyanogen electroplating industry and a water-softening agent in printing & dyeing industry. When used alone, 2~10mg/l is preferred. When built with HPMA by ratio EDTMP:HPMA=1:3, it can be used for low pressure boiler. It can also be built with BTA, PAAS and zinc salt.

**Package and storage**

200L plastic drum, IBC(1000L), customers' requirement. Storage for ten months in shady room and dry place.

**Keywords**

EDTMPS; EDTMP; EDTMPA; Ethylene Diamine Tetra (Methylene Phosphonic Acid) Sodium; EDTPO; ETHYLENEDIAMINE TETRA(METHYLENEPHOSPHONICACID)

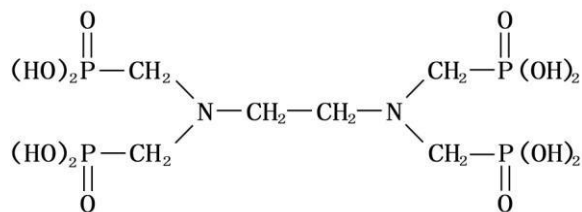
**Ethylene Diamine Tetra (Methylene Phosphonic Acid)  
EDTMPA (Solid)**

**CAS No.** 1429-50-1

**Molecular formula:** C<sub>6</sub>H<sub>20</sub> N<sub>2</sub>O<sub>12</sub>P<sub>4</sub>

**Molecular weight:** 436.13

**Structural formula**



**Properties**

EDTMPA is white crystal powder at room temperature, with melting point 215-217°C, hard to be dissolved in water, the solubility is less than 5% at room temperature, easily dissolved in ammonia. EDTMPA has strong metal ion chelating capacity, whose chelating constant with copper ion is larger than that of edta.

EDTMPA has high capacity for chelating metal ions. The complex constant with Cu is the largest in all chelating agents including edta. EDTMPA is a kind of high-pure grade reagent and innocuous, it can be used as detergent in semiconductor chip to prepare integrated circuit, as carrying agent for radioelement in medical industry, and as agent for inspection and therapy. The chelating capacity of EDTMPA largely exceeds that of edta and dtpa, and can replace edta for chelating agent at almost any situation.

**Specification**

Items	Index
Appearance	White crystal powder
Active acid %	96.0min
Total phosphonic acid(as PO <sub>4</sub> <sup>3-</sup> )%	82.0min
Chloride (Cl <sup>-</sup> ) %	0.1max
pH(1% solution)	2.0max
Moisture %	2.0max
Fe, mg/l	5max

**Package and storage**

25kg/bag, customers' requirement. Storage for one year in shady room and dry place.

**Keywords**

EDTMPA; EDTMP; EDTMP(A); Ethylene Diamine Tetra (Methylene Phosphonic Acid); EDTPO;

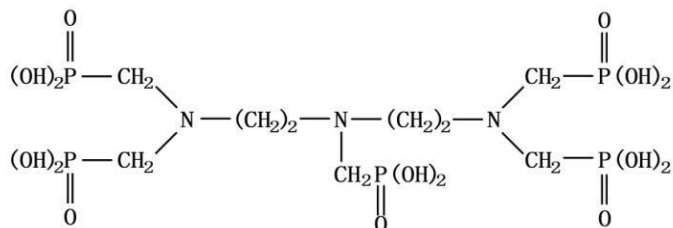
## Diethylene Triamine Penta (Methylene Phosphonic Acid) (DTPMPA)

**CAS No.** 15827-60-8

**Molecular formula:** C<sub>9</sub>H<sub>28</sub>O<sub>15</sub>N<sub>3</sub>P<sub>5</sub>

**Molecular weight:** 573.2

**Structural formula**



### Properties

DTPMPA is innocuous, easy to be dissolved in acid solution. DTPMPA has excellent scale and corrosion inhibition and good thermal tolerance ability. DTPMPA can inhibit the scale formation of carbonate, sulfate and phosphate. On situation of alkali environment and high temperature (above 210 °C) DTPMPA has better scale and corrosion inhibition effect than other organophosphines.

### Specification

Items	Index
Appearance	Brown transparent liquid
Active acid %	48.0-52.0
Chloride (as Cl <sup>-</sup> )%	12-17
pH(1% solution)	2.0 max
Density (20°C)g/cm <sup>3</sup>	1.35-1.45
Fe,mg/l	35max

### Usage

DTPMPA can be used as scale and corrosion inhibitor in circulating cool water system and boiler water, and especially in alkali circulating cool water system without additional pH regulation, it can also be used in oilfield refill water, cool water and boiler water with high concentration of barium carbonate. When used alone, little scale sediment is found even none of dispersant is used.

DTPMPA can also be used as peroxide stabilizer, chelating agent in woven & dyeing industry, pigment dispersant, microelement's carrying agent in fertilizer and concrete modifier. In addition, DTPMPA is used in papermaking, electroplating, acid cleaning and cosmetics.

### Package and storage

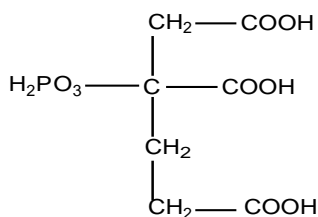
200L plastic drum,IBC(1000L),customers' requirement. Storage for ten months in shady room and dry place.

### Safety protection

Acidity, avoid contact with eye and skin, once contacted, flush with water.

### Keywords

DTPMP;DTPMPA;DETPMP; Diethylene Triamine Penta (Methylene Phosphonic Acid); DIETHYLENE TRIAMINE PENTA;DETPMP(A)

**2-Phosphonobutane -1,2,4-Tricarboxylic Acid(PBTCA)****CAS No.** 37971-36-1**Molecular formula:** C<sub>7</sub>H<sub>11</sub>O<sub>9</sub>P**Molecular weight:** 270.13**Structural formula****Properties**

PBTCA has low content of phosphoric and structural features of both phosphoric acid and carboxylic acid group, which enable its excellent scale and corrosion inhibition properties. Its antiscaling property under high temperature is far better than that of organophosphines. It can improve zinc salt solubility, has good chlorine oxidation tolerance and good composite synergy.

**Specification**

Items	Index
Appearance	Colorless or light yellow transparent liquid
Active acid %	50.0-51.0
Phosphorous acid(as PO <sub>3</sub> <sup>3-</sup> )%	0.5max
Phosphoric acid (as PO <sub>4</sub> <sup>3-</sup> )%	0.2max
pH(1% water solution)	1.5~2.0
Chloride, ppm	10.0max
Fe, ppm	10.0max
Density (20℃)g/cm <sup>3</sup>	1.27min

**Usage**

PBTCA is a high efficient agent as scale and corrosion inhibitor. PBTCA is the excellent stabilizer for zinc salt. It is widely used in circulating cool water system and oilfield refill water system as scale and corrosion inhibitor, suitable to composite with zinc salt and copolymer. PBTCA can be used in situations of high temperature, high hardness, high alkali and high concentration index. In lavation fields, it is used as chelating agent and metal detergent.

PBTCA is usually used together with zinc salt, copolymer, organophosphine, imidazole and other water treatment agents. When used alone, the dosage of 5-15mg/l is preferred.

**Package and storage**

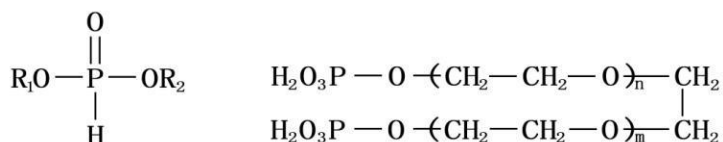
200L plastic drum,IBC(1000L),customers' requirement. Storage for one year in shady room and dry place.

**Safety protection**

Acidity, avoid contact with eye and skin, once contacted, flush with water.

**Keywords**

PBTCA;PBTCA;PHOSPHONOBUTANE TRICARBOXYLIC ACID;2-Phosphonobutane -1,2,4-Tricarboxylic Acid;2-Phosphonobutane-1,2,4-tricarboxylic acid PBTCA;

**Polyhydric Alcohol Phosphate Ester (PAPE)****Structural formula****Properties**

PAPE is a new kind of water treatment chemicals. It has good scale and corrosion inhibition ability. Because more than one polyethylene glycol group is introduced into the molecular, the scale and corrosion inhibition for calcium scale is improved. It has good inhibition effect for barium and strontium scales. PAPE has good scale inhibition effect for calcium carbonate and calcium sulfate, it can mix well with polycarboxylic acid, organophosphonic acid, phosphate and zinc salt.

PAPE can be used as scale inhibitor for oilfield (recommended as alternatives of Nalco visco 953) and industrial cooling water system.

**Specification**

Items	Index
Appearance	Colorless or light yellow transparent liquid
Solid content %	50.0min
Total phosphoric acid( $\text{PO}_4^{3-}$ )%	30.0min
Organophosphonic acid( $\text{PO}_4^{3-}$ ),%	15.0min
pH (1% water solution)	2.0-3.0

**Usage**

When used as scale inhibitor, less than 15mg/l is preferred, when used in closed circulating system, 150mg/l can be expected.

**Package and storage**

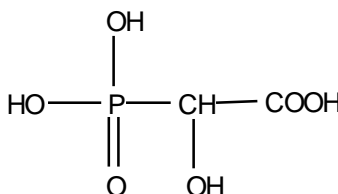
200L plastic drum, IBC(1000L), customers' requirement. Storage for ten months in shady room and dry place.

**Safety protection**

Acidity, avoid contact with eye and skin, once contacted, flush with water.

**Keywords**

PAPE; PAE; Polyol phosphate ester; Polyhydric alcohol phosphate ester

**2-Hydroxyphosphonocarboxylic Acid (HPAA)****CAS No.** 23783-26-8**Molecular formula:** C<sub>2</sub>H<sub>5</sub>O<sub>6</sub>P**Structural formula****Molecular weight:** 156**Properties**

HPAA is chemically stable, hard to be hydrolyzed, hard to be destroyed by acid or alkali, safety in use, no toxicity, no pollution. HPAA can improve zinc solubility. Its corrosion inhibition ability is 5-8 times better than that of HEDP and EDTMP. When built with low molecular polymers, its corrosion inhibition effect is even better.

**Specification**

Items	Index
Appearance	Dark umber transparent liquid
Solid content %	50.0min
pH(1% solution)	3.0max
Density(20℃)g/cm <sup>3</sup>	1.30min

**Usage**

HPAA is mainly used as cathode corrosion inhibitor in oilfield refill water system in fields such as steel & iron, petrochemical, power plant and medical industries. When built with zinc salt, the effect is even better.

**Package and storage**

200L plastic drum,IBC(1000L),customers' requirement. Storage for one year in shady room and dry place.

**Keywords**

HPAA;HPA;2-Hydroxyphosphonocarboxylic Acid; Hydroxyphosphono-acetic acid; 2-HYDROXY PHOSPHONOACETIC ACID

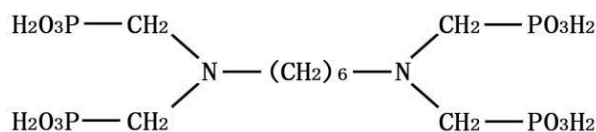
## HexaMethyleneDiamineTetra (Methylenephosphonic Acid) HMDTMPA

**CAS No.** 23605-74-5

**Molecular formula:**  $C_{10}H_{28}N_2O_{12}P_4$

**Molecular weight:** 492.3

**Structural formula**



### Properties

HMDTMPA is a white crystal powder at room temperature, slightly soluble in water, with solubility less than 5%.

HMDTMPA can inhibit most scale formation such as calcium carbonate, calcium sulfate, barium sulfate and ferric oxide. As water treatment chemicals, HDTMPA is used as scale inhibitors for calcium sulfate and barium sulfate, for calcium sulfate in particular. It has high scale inhibition rate and can last for long effective time. HMDTMPA can be used for crush treatment in oilfield and for water treatment in boiler.

### Specification

Items	Index
Appearance	White crystal powder
Active component(as hmdtpma <sup>-</sup> )%	97.0min
Chloride (Cl <sup>-</sup> )%	0.5max
pH (1% water solution)	2.0max
Fe,mg/l	35max

### Package and storage

200L plastic drum,IBC(1000L),customers' requirement. Storage for twelve month in shady room and dry place.

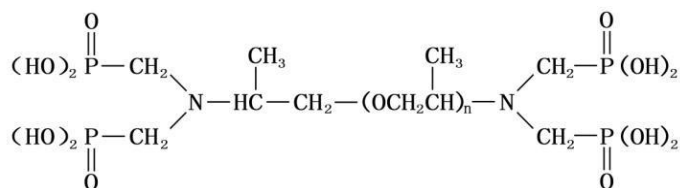
### Keywords

HMDTMPA; HDTMP; HDTMPA;HDTMP(A); HexaMethyleneDiamineTetra(MethylenePhosphonic Acid); HexaMethyleneDiamineTetra (MethylenePhosphonic Acid) HMDTMPA; Hexamethylenediaminetetrakis-(methylenephosphonic acid)

## Polyamino Polyether Methylene Phosphonic Acid (PAPEMP)

**Molecular weight:** About 600

**Structural formula**



**Properties**

PAPEMP is a new kind of water treatment agent. PAPEMP has high chelation and dispersion effects, high value of calcium tolerance, and good scale inhibition effects. PAPEMP can be used as scale and corrosion inhibitor in circulating cool water system and oilfield refill water system in situations of high hardness, high alkali and high pH value. PAPEMP has excellent scale inhibition ability to calcium carbonate, calcium sulfate and calcium phosphate. PAPEMP can efficiently inhibit the formation of silica scale, stabilize metal ions such as Zn, Mn and Fe.

PAPEMP can be used as scale inhibitor for reverse osmosis system and multistep flash vaporization system in which high salt concentration, high turbidity and high temperature are usually encountered (such as high temperature and high turbidity in coal vaporization system), accessory agent for woven & dyeing (for example, yellow turnback inhibition agent), as alternatives of EDTA, DTPA and NTA.

**Specification**

Items	Index
Appearance	Amber transparent liquid
Active component %	40.0min
Phosphoric acid (as PO <sub>4</sub> <sup>3-</sup> )%	1.0max
pH(1% solution)	2.0±0.5
Density(20℃)g/cm <sup>3</sup>	1.20±0.05

**Usage**

The dosage of 5-100mg/l is preferred. Different from other water treatment agents, the more quantity is, the better the effect. PAPEMP can be built with polycarboxylic acids.

**Package and storage**

200L plastic drum,IBC(1000L),customers' requirement. Storage for ten months in shady room and dry place.

**Keywords**

PAPEMP



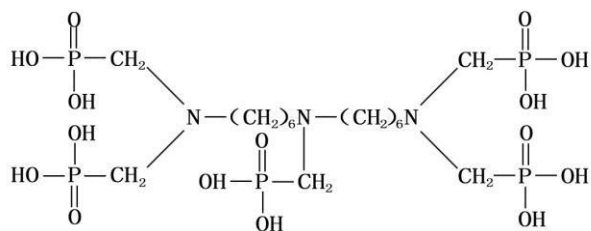
**Bis(Hexamethylene Triamine Penta (Methylene Phosphonic Acid)  
BHMTMPMA**

**CAS No.** 34690-00-1

**Molecular formula:** C<sub>17</sub>H<sub>44</sub>O<sub>15</sub>N<sub>3</sub>P<sub>5</sub>

**Molecular weight:** 685

**Structural formula**



**Properties**

BHMTMPMA is a high-efficient chelating scale inhibitor, it has good effect to carbonate and sulfate scale. BHMTMPMA has good water soluble properties and heat tolerance. BHMTMPMA has high calcium ion tolerance in a wide pH ranges and temperature as high as 120°C.

**Specification**

Items	Index
Appearance	Dark amber liquid
Active component %	43.0-48.0
Chloride(as Cl <sup>-</sup> )%	8.0max
pH(1%water solution)	2.0max
Density(20°C)g/cm <sup>3</sup>	1.20min
Fe,mg/l	65max

**Usage**

BHMTMPMA can be used as scale and corrosion inhibitor for oilfield water, industrial circulating cool water and boiler.

**Package and storage**

200L plastic drum,IBC(1000L),customers' requirement. Storage for ten months in shady room and dry place.

**Safety and protection**

Acidity, avoid contact with eye and skin, once contacted, flush with water.

**Keywords**

BHMTMPMA;BHMT;BHMTPh.PN(Nax);Bis(HexaMethylene Triamine Penta (Methylene Phosphonic Acid));PARTIALLY NEUTRALISED SODIUM SALT OF BIS HEXAMETHYLENE;Bis(HexaMethylene Triamine Penta (Methylene Phosphonic Acid)) BHMTMPMA

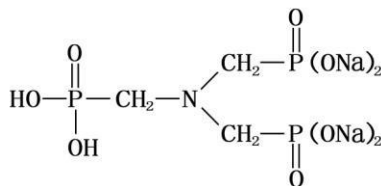
**Tetra Sodium Salt of Amino Trimethylene Phosphonic Acid  
(ATMP•Na<sub>4</sub>)**

**CAS No.** 20592-85-2

**Molecular formula:** C<sub>3</sub>H<sub>8</sub>NO<sub>9</sub>P<sub>3</sub>Na<sub>4</sub>

**Molecular weight:**387

**Structural formula**



**Properties and usage**

ATMP•Na<sub>4</sub> is the salt of ATMP, it can inhibit the scale formation, calcium carbonate in particular, in water system. ATMP•Na<sub>4</sub> can be used in circulating cool system in power plant, oil refinery plant and oilfield refill water system. ATMP•Na<sub>4</sub> has good synergistic effects with other additives, in neutral to acidic condition, no ammonia smell is let off.

**Specification**

Items	Index
Appearance	Colorless or light yellow transparent liquid
Active content (ATMP) %	29.4-32.4
Active content (ATMP•Na <sub>4</sub> ) %	38.0-42.0
pH (1% water solution)	6.5-7.5
Density (20°C) g/cm <sup>3</sup>	1.35-1.45
Fe,mg/l	35max

**Usage**

ATMP•Na<sub>4</sub> is used together with other organophosphonic acid, polycarboxylic acid or salt to form organic alkaline agents, it is used in circulating cool water system for all water quality.

**Package and storage**

200L plastic drum,IBC(1000L),customers' requirement. Storage for ten months in shady room and dry place.

**Keywords**

ATMP•Na<sub>4</sub>

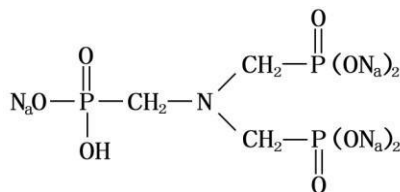
**Penta Sodium Salt of Amino Trimethylene Phosphonic Acid  
(ATMP•Na<sub>5</sub>)**

**CAS No.** 20592-85-2 (x-Na), 2235-43-0 (5-Na)

**Molecular formula:** C<sub>3</sub>H<sub>7</sub>NO<sub>9</sub>P<sub>3</sub>Na<sub>5</sub>

**Molecular weight:**409

**Structural formula**



**Properties and usage**

ATMP•Na<sub>5</sub> is the salt of ATMP, it can inhibit calcium carbonate particularly in water treatment system. ATMP•Na<sub>5</sub> can be used in circulating cool system in power plant, oil refinery plant and oilfield refill water system. ATMP•Na<sub>5</sub> is a general low cost scale inhibitor, it has good corrosion inhibition to zinc salt and phosphate, its chelating ability is good as well.

**Specification**

Items	Index
Appearance	Colorless to light yellow transparent liquid
Active content (ATMP) %	27.8-30.7
Active content (ATMP•Na <sub>5</sub> ) %	38.0-42.0
Total phosphoric acid (PO <sub>4</sub> <sup>3-</sup> ) %	26.6-28.6
Chloride (as Cl <sup>-</sup> ) %	1.0max
pH (1% water solution)	10.0-11.0
Density (20℃) g/cm <sup>3</sup>	1.38-1.48
Fe,mg/l	20max

**Usage**

ATMP•Na<sub>5</sub> is used together with other organophosphonic acid, polycarboxylic acid or salt to form organic alkaline agents. ATMP•Na<sub>5</sub> can be used in circulating cool water system for all water quality.

**Package and storage**

200L plastic drum,IBC(1000L),customers' requirement. Storage for ten months in shady room and dry place.

**Keywords**

ATMP•Na<sub>5</sub>

**Potassium Salt of Amino Trimethylene Phosphonic Acid  
(ATMP•Kx)****CAS No.** 27794-93-0**Molecular formula:** C<sub>3</sub>H<sub>12-x</sub>NO<sub>9</sub>P<sub>3</sub>K<sub>x</sub>**Properties**

Equivalent of Dequest 2004A is the partial potassium salt solution of ATMP. ATMP•Kx has better dissolution ability than that of sodium salt. ATMP•Kx can inhibit scale formation, calcium carbonate in particular, in water system .ATMP•Kx can be used in oilfield refill water system.

**Specification**

Items	Index
Appearance	Colorless or yellowish transparent liquid
Active content(ATMP)%	35.0-40.0
Total phosphoric acid (PO <sub>4</sub> <sup>3-</sup> ) %	34.8-36.8
pH (1% water solution)	2.0-2.5
Density (20°C) g/cm <sup>3</sup>	1.25-1.35
Fe,mg/l	35max

**Usage**

ATMP•Kx is usually used together with organophosphoric acid, polycarboxylic acid, or salts to form organic alkaline agents. ATMP•Kx can be used in circulating cool water system in almost all types of water quality.

**Package and storage**

200L plastic drum,IBC(1000L),customers' requirement. Storage for ten months in shady room and dry place.

**Safety protection**

Weak acidity, avoid contact with eye and skin, once contacted, flush with water.

**Keywords**

ATMP•Kx

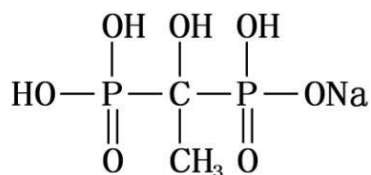
**Monosodium of 1-Hydroxy Ethylidene-1,1-Diphosphonic Acid  
(HEDP·Na)**

**CAS NO.** 29329-71-3

**Molecular formula:** C<sub>2</sub>H<sub>7</sub>O<sub>7</sub>P<sub>2</sub>Na

**Structural formula**

**Molecular weight:** 228



**Properties**

HEDP·Na is an organophosphonic acid corrosion inhibitor, it can chelate with fe, cu, and zn ions. HEDP·Na can dissolve the oxidized materials, it has good scale and corrosion inhibition effects even under 250°C, it is stable under high pH value, not easy to be hydrolyzed, not easy to be decomposed under normal light and heat condition, its acid/alkaline and chloride oxidation tolerance are better than that of other organophosphonic acids. HEDP·Na can form six-ring chelating compounds with metal ions in water system, ca<sup>2+</sup> in particular. HEDP·Na has good scale inhibition effects and obvious dissolution threshold effects. When used with other water treatment agents, the synergistic effects is better. HEDP·Na is suitable for acidic scale inhibitor and detergent, can be used for metal surface treatment.

**Specification**

Items	Index
Appearance	Colorless or yellowish transparent liquid
Active content(HEDP)%	19.0-21.0
pH (1% water solution)	2.3-2.9
Density (20°C) g/cm <sup>3</sup>	1.11-1.21
Fe,mg/l	20max

**Usage**

HEDP·Na is used in circulating cool water system, medium and low pressure boiler, oil field water pipelines as scale and corrosion inhibitor in fields such as power plant, chemical industry, metallurgy, fertilizer, etc.. In light woven industry, this product is used as detergent for metal and nonmetal. In dyeing industry, this product is used as peroxide stabilizer and dye-fixing agent; in non-cyanide electroplating, this product is used as chelating agent.

When used as scale inhibitor, the dosage 2-20mg/l is preferred, when used as corrosion inhibitor, the dosage 20-100mg/l is preferred, when used as cleaning agent, the dosage 1000-2000mg/l is preferred. Usually, HEDP·Na is used together with polycarboxylic acid.

**Package and storage**

200L plastic drum,IBC(1000L),customers' requirement. Storage for ten months in shady room and dry place.

**Safety protection**

Acidity, avoid contact with eye and skin, once contacted, flush with water.

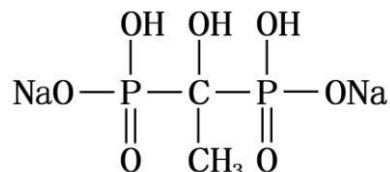
**Disodium of 1-Hydroxy Ethylidene-1,1-Diphosphonic Acid  
(HEDP·Na<sub>2</sub>)**

**CAS No.** 7414-83-7

**Molecular formula:** C<sub>2</sub>H<sub>6</sub>O<sub>7</sub>P<sub>2</sub>Na<sub>2</sub>

**Structural formula**

**Molecular weight:** 250



**Properties**

HEDP·Na<sub>2</sub> is an organophosphonic acid corrosion inhibitor, it can chelate with Fe, Cu, and Zn ions, it can dissolve the oxidized materials, it has good scale and corrosion inhibition effects even under 250°C, it is stable under high pH value, not easy to be hydrolyzed, not easy to be decomposed under normal light and heat condition, its acid/alkaline and chloride oxidation tolerance are better than that of other organophosphonic acids. HEDP·Na<sub>2</sub> can form six-ring chelating compounds with metal ions in water system, Ca<sup>2+</sup> in particular. HEDP·Na<sub>2</sub> has good scale inhibition effects and obvious dissolution threshold effects. When used with other water treatment agents, the synergistic effects is better.

**Specification**

Items	Index	
	Appearance	Colorless to yellowish transparent liquid
Active content(HEDP)%	16.5min	74.0-79.0
Active content(HEDP·Na <sub>2</sub> )%	20.0min	89.8min
Phosphorous acid(PO <sub>3</sub> <sup>3-</sup> )%	--	3max
pH (1% water solution)	4.0-6.0	4.0-6.0
Density(20°C)g/cm <sup>3</sup>	1.12-1.22	--
Fe,mg/l	--	35max
Moisture,%	--	3.0-6.0

**Usage**

HEDP·Na<sub>2</sub> is widely used in circulating cool water system, medium and low pressure boiler, oil field water pipelines as scale and corrosion inhibitor in fields such as electric power, chemical industry, metallurgy, fertilizer, etc.. In light woven industry, HEDP·Na<sub>2</sub> is used as detergent for metal and nonmetal. In dyeing industry, HEDP·Na<sub>2</sub> is used as peroxide stabilizer and dye-fixing agent; in non-cyanide electroplating, HEDP·Na<sub>2</sub> is used as chelating agent.

**Package and storage**

Liquid: 200L plastic drum,IBC(1000L),customers' requirement. Storage for ten months in shady room and dry place.

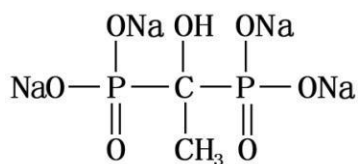
Solid: 200L plastic drum,IBC(1000L),customers' requirement. Storage for ten months in shady room and dry place.

**Safety protection**

Weak acidity, avoid contact with eye and skin, once contacted, flush with water.

**Keywords**

HEDP·Na<sub>2</sub>

**Tetra Sodium of 1-Hydroxy Ethylidene-1,1-Diphosphonic Acid (HEDP·Na<sub>4</sub>)****CAS No.** 29329-71-3 (x-Na), 3794-83-0 (4-Na)**Molecular formula:** C<sub>2</sub>H<sub>4</sub>O<sub>7</sub>P<sub>2</sub>Na<sub>4</sub>**Molecular weight:** 294**Structural formula****Properties**

Equivalent of dequest 2016 is the sodium salt of equivalent of dequest 2010, HEDP·Na<sub>4</sub> is a good scale inhibitor for calcium carbonate, it can be used in low pressure boiler water system, circulating water system, industrial and municipal cleaning water system and swimming pool.

The solid HEDP·Na<sub>4</sub> is white powder, soluble in water, easily deliquescent, suitable for use in winter and freezing districts. It is a kind of organophosphonic acid scale and corrosion inhibitor, can form stable complex with Fe, Cu and Zn ions, it can dissolve the oxides on metal surface, it has good scale and corrosion inhibition effect under 250°C.

HEDP·Na<sub>4</sub> is widely used in circulating cool water system, medium and low pressure boiler, oil field water pipelines as scale and corrosion inhibitor in fields such as electric power, chemical industry, metallurgy, fertilizer, etc.. In light woven industry, HEDP·Na<sub>4</sub> is used as detergent for metal and nonmetal. In dyeing industry, HEDP·Na<sub>4</sub> is used as peroxide stabilizer and dye-fixing agent; in non-cyanide electroplating, HEDP·Na<sub>4</sub> is used as chelating agent.

**Specification**

Items	Index	
Appearance	White powder	Colorless to yellowish transparen
Active content(HEDP)%	56.0min	20.3-21.7
Active content(HEDP·Na <sub>4</sub> )%	79.9min	29.0-31.0
Total phosphoric acid (as PO <sub>4</sub> <sup>3-</sup> )%	52.0min	18.4-20.4
pH	11.0-12.0 (1% water solution)	10.0-12.0 (as it)
Density(20°C)g/cm <sup>3</sup>	--	1.26-1.36
Fe,mg/l	35.0max	20max
Moisture,%	15max	--

**Package and storage**

Liquid: 200L plastic drum,IBC(1000L),customers' requirement.

Solid: 25kg/bag,customers' requirement. Storage for ten months in shady room and dry place.

**Safety protection**

Weak alkine, avoid contact with eye and skin, once contacted, flush with water.

**Keywords**

HEDP·Na<sub>4</sub> China, Tetra sodium of 1-Hydroxy Ethylidene-1,1-Diphosphonic Acid

**Potassium Salt of 1-Hydroxy Ethylidene-1,1-Diphosphonic Acid  
(HEDP·K<sub>x</sub>)****CAS No.** 67953-76-8**Molecular formula:** C<sub>2</sub>H<sub>8-x</sub>O<sub>7</sub>P<sub>2</sub>K<sub>x</sub>**Properties**

Equivalent of dequest 2014 is the potassium salt of equivalent of dequest 2010, HEDP·K<sub>x</sub> has better dissolution ability than that of sodium salt under neutral condition. HEDP·K<sub>x</sub> is a good scale inhibitor for calcium carbonate, it can be used in metal corrosion inhibitor, antifouling agent of swimming pool, metal cleaning, volume cleaning, iron dust controlling, metal pretreatment, low pressure boiler water treatment and circulating water treatment, etc.

**Specification**

Items	Index
Appearance	Colorless to yellowish transparent liquid
Active content(HEDP)%	26.0-30.0
Total phosphoric acid (as PO <sub>4</sub> <sup>3-</sup> ) %	24.7-26.7
pH value(1% water solution)	6.0-8.0
Density (20°C) g/cm <sup>3</sup>	1.30-1.40
Fe,mg/l	20max

**Package and storage**

200L plastic drum,IBC(1000L),customers' requirement. Storage for ten months in shady room and dry place.

**Keywords**HEDP·K<sub>x</sub>



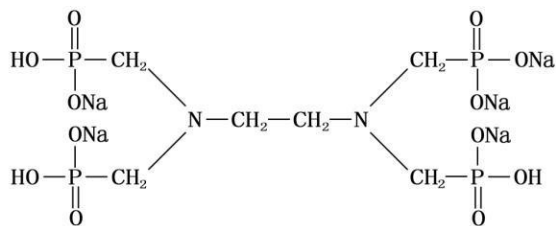
**Pentasodium Salt of Ethylene Diamine Tetra (Methylene Phosphonic Acid)  
(EDTMP·Na<sub>5</sub>)**

**CAS No.** 7651-99-2

**Molecular formula:** C<sub>6</sub>H<sub>15</sub>O<sub>12</sub>N<sub>2</sub>P<sub>4</sub>Na<sub>5</sub>

**Molecular weight:** 546.13

**Structural formula**



**Properties**

EDTMP·Na<sub>5</sub> is a neutral solid product. It is nitrogenous organic polyphosphonic acid, which is a part of cathodic corrosion inhibitor. EDTMP·Na<sub>5</sub> can be fully dissolved in water, innocuous and none pollution to environment, has good chemical stability and thermal tolerance. EDTMP·Na<sub>5</sub> has good scale inhibition property under temperature 200℃. EDTMP·Na<sub>5</sub> can dissociate into 8 positivenegative ions, thus can chelate with more than two metal ions to form more than two polymer reticulation complex, the complex can be quickly dissolved in water to destroy the normal crystallization of calcium scale. EDTMP·Na<sub>5</sub> shows better scale inhibition effects to calcium sulfate and barium sulfate.

EDTMP·Na<sub>5</sub> can be used as scale and corrosion inhibitor for circulating water and boiler water system, chelating agent in non-cyanide electroplating, water-softening agent in dyeing industry, etc.

The solid state EDTMP·Na<sub>5</sub> is slightly easy to deliquescence, convenient in transportation and suitable for usage in winter and freezing districts.

**Specification**

Items	Index	
	Appearance	Amber transparent liquid
Active content (EDTMP·Na <sub>5</sub> )%	30.0-32.6	81.4min
Active content (EDTMPA)%	24.0-26.0	65.0min
Chloride( as Cl <sup>-</sup> ) %	2.0max	2.0 max
pH	6.0~8.0(as it)	6.0~8.0(1% water solution)
Density (20℃)g/cm <sup>3</sup>	1.25min	-
Fe,mg/l	20max	20 max

**Package and storage**

Liquid: 200L plastic drum,IBC(1000L),customers' requirement. Storage for ten months in shady room and dry place.

Solid: 25kg/bag,customers' requirement. Storage for one year in shady room and dry place.

**Keywords**

EDTMP·Na<sub>5</sub>

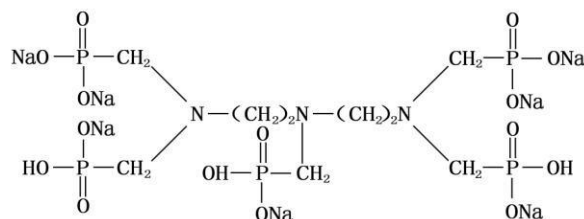
**Hepta Sodium Salt of Diethylene Triamine Penta (Methylene Phosphonic Acid)  
(DTPMP·Na<sub>7</sub>)**

**CAS No.** 22042-96-2 (x-Na) 68155-78-2 (7-Na)

**Molecular formula:** C<sub>9</sub>H<sub>21</sub>O<sub>15</sub>N<sub>3</sub>P<sub>5</sub>Na<sub>7</sub>

**Molecular weight:** 727

**Structural formula**



**Properties and usage**

DTPMP·Na<sub>7</sub> is a scale inhibitor, for barium sulphate in particular and a chelating agent. DTPMP·Na<sub>7</sub> can be used as stabilizer for peroxide bleaching, detergent auxiliaries, in industrial & municipal cleaning water, terrestrial heat water, oilfield water, etc.

**Specification**

Items	Index	
Appearance	Umber transparent liquid	
Active content (DTPMPA)%	31.5-33.5	24.0-26.0
Active content (DTPMPA·Na <sub>7</sub> )%	40.0-42.5	30.5-33.0
Total phosphoric acid(PO <sub>4</sub> <sup>3-</sup> )%	25.9-27.9	19.7-21.7
Chloride ( as Cl <sup>-</sup> ) %	5.0max	5.0max
pH(as it)	6.0-8.0	6.0-8.0
pH(1% water solution)	7.0-9.0	7.0-9.0
Density (20°C) g/cm <sup>3</sup>	1.34-1.44	1.24-1.34
Fe,mg/l	20max	20max

**Package and storage**

200L plastic drum,IBC(1000L),customers' requirement. Storage for ten months in shady room and dry place.

**Safety protection**

Avoid contact with eye and skin, once contacted, flush with water.

**Keywords**

DTPMP·Na<sub>7</sub>

**Sodium Salt of Diethylene Triamine Penta (Methylene Phosphonic Acid)  
(DTPMP·Na<sub>x</sub>)****CAS No.** 22042-96-2**Molecular formula:** C<sub>9</sub>H<sub>28-x</sub>O<sub>15</sub>N<sub>3</sub>P<sub>5</sub>Na<sub>x</sub>**Properties**

DTPMP·Na<sub>x</sub> is a scale inhibitor, for barium sulphate in particular and a chelating agent. DTPMP·Na<sub>x</sub> can be used as stabilizer for peroxide bleaching, detergent auxiliaries, in industrial & municipal cleaning water, terrestrial heat water, oilfield water, etc.

**Specification**

Items	Index
Appearance	Dark amber transparent liquid
Active content (DTPMPA)%	45.0-49.0
Total phosphoric acid(PO <sub>4</sub> <sup>3-</sup> )%	38.0-40.0
Chloride ( as Cl <sup>-</sup> ) %	5.0max
pH(1% water solution)	2.0-3.0
Density (20℃) g/cm <sup>3</sup>	1.37-1.47
Fe,mg/l	20max

**Package and storage**

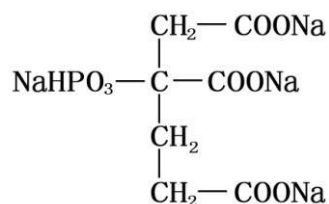
200L plastic drum,IBC(1000L),customers' requirement. Storage for ten months in shady room and dry place.

**Safety protection**

Weak acid, avoid contact with eye and skin, once contacted, flush with water.

**Keywords**

DTPMP·Na<sub>x</sub>

**2-Phosphonobutane -1,2,4-Tricarboxylic Acid, Sodium Salt (PBTCA·Na<sub>4</sub>)****CAS No.** 40372-66-5**Molecular formula:** C<sub>7</sub>H<sub>7</sub>O<sub>9</sub>P·Na<sub>4</sub>**Molecular weight:** 358**Structural formula:****Properties**

PBTCA·Na<sub>4</sub> has low content of phosphoric, its structure contains both phosphonic acid and carboxylic acid group, which enable its good scale and corrosion inhibition properties. Its scale inhibition property under high temperature is far better than that of organophosphines. PBTCA·Na<sub>4</sub> can improve the solubility of zinc salt, has good chlorine oxidation tolerance and good composite synergy. The solid state is easy deliquescence.

**Specification**

Items	Index
Appearance	White crystal powder
Active component (PBTCA) %	65.0 min
Active component (PBTCA·Na <sub>4</sub> ) %	86.0min
Total phosphoric acid(PO <sub>4</sub> <sup>3-</sup> ) %	22.5min
pH(1% water solution)	4.0-6.0
Fe,mg/l	20max

**Usage**

PBTCA·Na<sub>4</sub> is the widely used and high effective agent as composite scale and corrosion inhibitor, it is also the excellent stabilizer for zinc salt. PBTCA·Na<sub>4</sub> is used as scale and corrosion inhibitor in circulating cool water system and oilfield refill water system, especially used together with zinc salt and copolymer. PBTCA·Na<sub>4</sub> can be used in situations of high temperature, high hardness, high alkaline and high concentration index, PBTCA·Na<sub>4</sub> is used as chelating agent and metal detergent in lavation fields. PBTCA·Na<sub>4</sub> is usually used together with zinc salt, copolymer, organophosphine, imidazole and other water treatment agents.

**Package and storage**

25kg/bag,customers' requirement. Storage for one year in shady room and dryplace.

**Keywords**

PBTCA·Na<sub>4</sub>

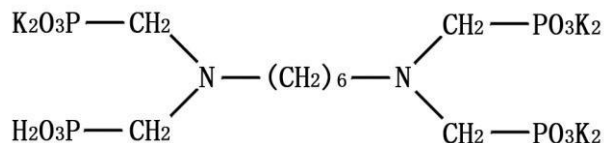
**Potassium Salt of Hexamethylenediaminetetra (Methylenephosphonic Acid)  
HMDTMPA·K<sub>6</sub>**

**CAS No.**38820-59-6(X-6) 53473-28-2(6-K)

**Molecular formula:** C<sub>10</sub>H<sub>22</sub>N<sub>2</sub>O<sub>12</sub>P<sub>4</sub>K<sub>6</sub>

**Molecular weight:**721

**Structural formula**



**Properties**

HMDTMPA·K<sub>6</sub> is soluble in water, it is a good scale inhibitor for calcium sulfate, suitable for use in situation of high pH value and high alkaline. HMDTMPA·K<sub>6</sub> can be used for water treatment in boiler and RO membrane treatment.

**Specification**

Items	Index
Appearance	Colorless to yellowish transparent liquid
Active component(as acid), %	21.2-24.6
Active component (as salt) , %	31.0-36.0
Total phosphoric acid (as PO <sub>4</sub> <sup>3-</sup> ),%	16.8min
Phosphorous acid (as PO <sub>3</sub> <sup>3-</sup> ),%	2.0max
Chloride(as Cl <sup>-</sup> )%	4.0max
pH (1% water solution)	6.0-8.0
Density(20℃)g/cm <sup>3</sup>	1.21-1.31
Fe,mg/l	35max

**Package and storage**

200L plastic drum,IBC(1000L),customers' requirement. storage for ten month in shady room and dry place.

**Keywords**

**HMDTMPA•K6**

**Partially Neutralized Sodium Salt of Bis Hexamethylene Triamine Penta (Methylene Phosphonic Acid) BHMPH·PN(Na<sub>x</sub>)**

**CAS No.** 35657-77-3

**Molecular formula:** C<sub>17</sub>H<sub>44-x</sub>O<sub>15</sub>N<sub>3</sub>P<sub>5</sub>Na<sub>x</sub>

**Molecular weight:** 731

**Properties**

BHMPH·PN is an effective scale inhibitor for carbonate and sulfate scale. BHMPH·PN is water soluble and has good heat tolerance in wide range of ph and 120°C, BHMPH·PN has high calcium ion tolerance.

**Specification**

<b>Items</b>	<b>Index</b>
Appearance	Dark brown liquid
Active content% (as acid)	35.0-39.0
pH (1%water solution)	2.5-4.5
Density(20°C)g/cm <sup>3</sup>	1.21-1.31
Fe,mg/l	65max

**Usage**

This product can be used as scale and corrosion inhibitor for oilfield water, industrial circulating cool water and boiler.

**Package and storage**

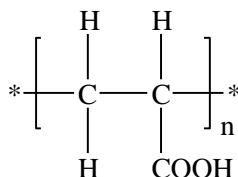
200L plastic drum,IBC(1000L),customers' requirement. Storage for ten month in shady room and dry place.

**Safety and protection**

Acidity, avoid contact with eye and skin, once contacted, flush with water.

**Keywords**

BHMPH·PN

**Polyacrylic Acid (PAA)****CAS No.** 9003-01-4**Structural Formula****Properties**

PAA is innocuous and soluble in water, it can be used in situations of alkaline and high concentration without scale sediment. PAA can disperse the microcrystals or microsand of calcium carbonate, calcium phosphate and calcium sulfate. PAA is used as scale inhibitor and dispersant for circulating cool water system, papermaking, weave, dyeing, ceramic, painting, etc.

**Specification**

Items	Index
Appearance	Amber transparent liquid
Solid content %	50min
Free monomer (as AA) %	1.0max
Density (20°C)g/cm <sup>3</sup>	1.2min
pH (1% water solution)	3.0-4.5max

30%, 40% ,60% PAA are supplied too.

**Usage**

PAA can be used as scale inhibitor and dispersant in circulating cool water systems in power plants, iron & steel factories, chemical fertilizer plants, refineries and air conditioning systems. Dosage should be in accordance with water quality and equipment materials. When used alone, 1-15mg/l is preferred.

**Package and storage**

200L plastic drum,IBC(1000L),customers' requirement. Storage for one year in shady room and dry place.

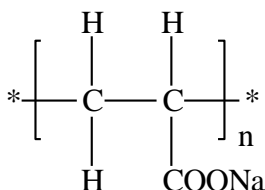
**Keywords**

PAA;Polyacrylic Acid; Acrylicresin; acrylicacidresin; acrylicacid polymers; acrycola; polyacrylateelastomers;

## Polyacrylate Sodium (PAAS)

**CAS No.** 9003-04-7

**Structural formula**



### Properties

PAAS is innocuous and soluble in water, it can be used in situations of alkaline and high concentration without scale sediment. PAAS can disperse the microcrystals or microsand of calcium carbonate, calcium phosphate and calcium sulfate. PAAS is used as scale inhibition and dispersant for circulating cool water system, papermaking, weave, dyeing, ceramic, painting, etc.

### Specification

Items	Index
Appearance	Colorless to light yellow transparent liquid
Solid content %	50min
Free monomer (as AA) %	1.0max
Density (20°C)g/cm <sup>3</sup>	1.20min
pH(as it)	6.0~8.0

40%, 45% are supplied too.

### Usage

PAAS can be used as scale inhibitor and dispersant in circulating cool water systems in power plants, iron & steel factories, chemical fertilizer plants, refineries and air conditioning systems. Dosage should be in accordance with water quality and equipment materials. When used alone, 2-15mg/l is preferred. When used as dispersant, the dosage should be determined by experiment.

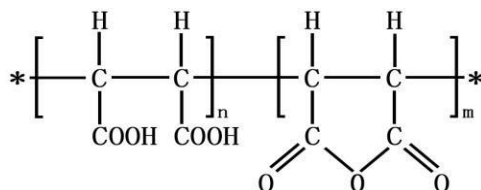
### Package and storage

200L plastic drum,IBC(1000L),customers' requirement. Storage for ten months in shady room and dry place.

### Keywords

PAAS;POLY(ACRYLATE SODIUM);Polyacrylic Acid Sodium; Poly(acrylic acid sodium salt)



**Hydrolyzed Polymaleic Anhydride (HPMA)****CAS No.** 26099-09-2**Structural formula****Properties**

HPMA is a low molecular weight polymeride, with average molecular weight 400-800. no toxicity, soluble in water, high chemical and thermal stability, decomposed temperature above 330 °C. HPMA has obvious threshold effect under high temperature (350 °C) and high pH(8.3)level, suitable to be used in alkaline water system or built with agents. It has good scale inhibition against carbonate and phosphate scales under temperature 300 °C with effective time as long as 100 hours. Due to its good scale inhibition and high temperature tolerance properties, HPMA is widely used in desalination plant of flash vaporization equipment, low pressure boiler, steam locomotive, crude oil evaporation, petroleum pipeline, and industrial circulating cool water systems. In addition, HPMA has good corrosion inhibition effect when used together with zinc salt. HPMA can also used as additives for cement.

**Specification**

Items	Index
Appearance	Pale yellow to umber transparent liquid
Solid content %	48.0min
Bromine value mg/g	80.0max
Average molecular weight	450min
Density (20°C)g/cm <sup>3</sup>	1.18min
pH(1%water solution)	2.0-3.0

**Usage**

HPMA is usually used together with organic phosphonate at dosage of 1-15ppm for circulating cool water system, oilfield fill water, crude oil dewatering and low-pressure boilers. HPMA has good scale inhibition (98%) and scale stripping properties. When used together with zinc salts, it can effectively inhibit carbon steel corrosion.

**Package and storage**

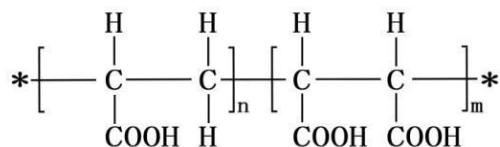
200L plastic drum,IBC(1000L),customers' requirement. storage for one year in shady room and dry place.

**Safety protection**

Acidity, avoid contact with eye and skin, once contacted, flush with water.

**Keywords**

HPMA;Hydrolyzed Polymaleic Anhydride;poly(maleicacid);MALEIC ACID POLYMER;maleic acid homopolymer

**Copolymer of Maleic andAcrylic Acid (MA/AA)****CAS No.** 26677-99-6**Structural formula****Properties**

MA/AA is a low molecular weight polyelectrolyte, a copolymer of maleic anhydride and acrylic acid. It has good dispersant performance against carboNate and scale inhibition for phosphate. It has good thermal stability,can be used under high temperature (300℃). MA/AA has good compatibility when used together with other agents. MA/AA is widely used in low-pressure boiler, centralized heating, centralized air-conditioner and circulating cool system. It can also be used as chelating dispersants in woven and dyeing fields.

**Specification**

Items	Index
Appearance	Brown transparent liquid
Solid content %	48min
Free monomer (as ma) %	9.0max
Density (20℃)g/cm <sup>3</sup>	1.18min
pH (1% water solution)	2.0~3.0

**Usage**

MA/AA is used in circulating cool water system, medium or lower pressure boiler and distillation system in which high temperature is usually encountered. MA/AA can be used alone or together with other organic phosphates. When used together, the dosage of 2-10mg/l is preferred.

The dosage for use as woven & dyeing and accessory detergent should be determined by experiments.

**Package and storage**

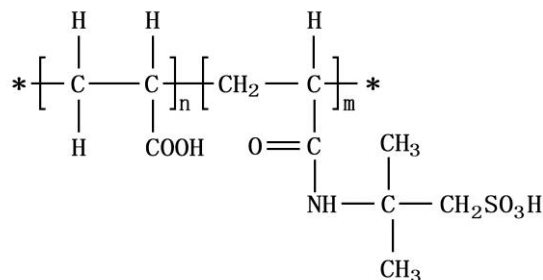
200L plastic drum,IBC(1000L),customers' requirement. Storage for one year in shady room and dry place.

**Safety protection**

Acidity, avoid contact with eye and skin, once contacted, flush with water.

**Keywords**

MA-AA;Copolymer of Maleic and Acylic Acid;ACRYLIC ACID MALEIC ANHYDRIDE COPOLYMER

**Acrylic Acid-2-Acrylamido-2-Methylpropane Sulfonic Acid Copolymer (AA/AMPS)****CAS No.** 40623-75-4**Structural formula****Properties**

AA/AMPS is the copolymer of acrylic acid and 2-acrylamido-2-methylpropanesulfonic acid (AMPS). Due to including carboxylic group (scale inhibition and dispersion) and sulfonic acid group (strong polarity) in this copolymer, AA/AMPS has high calcium tolerance and good scale inhibition for calcium phosphate, calcium carbonate and zinc scale. When built with organophosphines, the synergic effect is obvious. AA/AMPS is suitable to be used in water quality of high pH and high alkaline, it is one of the ideal scale inhibitor and dispersant on high concentration index.

**Specification**

Items	Index
Appearance	Colorless or light yellow liquid
Solid content %	40min
Free monomer (as AA)%	0.8max
Density (20°C)g/cm <sup>3</sup>	1.15min
pH(1% water solution)	3.5-4.5
Viscosity mpa.s	90-300

**Usage**

AA/AMPS can be used as scale inhibitor and dispersant in open circulating cool water system, oilfield refill water system, metallurgy system and iron & steel plants to prevent sediment of ferric oxide. When built with organophosphorines and zinc salt, the suitable pH value is 7.0~9.5.

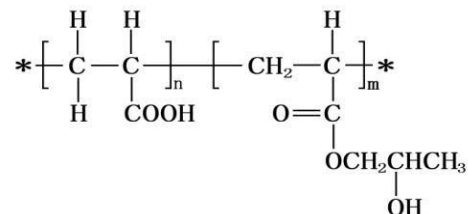
AA/AMPS can also be used as dyeing auxiliaries for textile.

**Package and storage**

200L plastic drum,IBC(1000L),customers' requirement. storage for ten months in shady room and dry place.

**Keywords**

AA-AMPS;AA-AMPSA;Acrylic Acid-2-Acrylamido-2-Methylpropane Sulfonic Acid Copolymer; Sulfonated Polyacrylic Acid Copolymer;

**Acrylic Acid-2-Hydroxypropyl Acrylate Copolymer (T-225)****CAS No.** 55719-33-0**Structural formula****Properties**

T-225 is copolymer of polyacrylic acid and hydroxypropyl acrylate, it has good scale inhibition and dispersion properties to calcium phosphate and calcium carbonate, it has good dispersion properties to ferric oxide sludge, clay and grease. T-225 can be used under high pH situation and has good compatibility with other organophosphines and BTA, T-225 can effectively withhold sediments of zinc salt and calcium phosphate, it has good scale inhibition and dispersion properties under high temperature and alkaline situations.

**Specification**

Items	Index	
	Neutro	Acid
Appearance	Colorless to yellow liquid	
Solid content %	30.0±2.0	30.0±2.0
Free monomer (as AA )%	0.5 max	0.5 max
pH(1% water solution)	7.5±1.0	2.5±0.5
Limiting viscosity number (30℃) dl/g	0.065~0.095	
Density (20℃)g/cm <sup>3</sup>	1.10 min	

**Usage**

T-225 can be used in circulating cool water system in situation of alkaline and excess of phosphate. It can be used as scale inhibitor and dispersant for heater, none-column evaporator boiler, circulating cool water and oilfield dirty refilling water with high calcium content. The dosage of 10~30mg/l is preferred. It can be built with organophosphines to form full organic alkaline formula.

**Package and storage**

200L plastic drum,IBC(1000L),customers' requirement. storage for one year in shady room and dry place.

**Keywords**

Acrylic Acid-2-Hydroxypropyl Acrylate Copolymer T-225

**Acrylic Acid /Acrylate/Phosphonic Acid/Sulfosalt Tetra-Copolymer(IR-241)****Properties**

IR-241 is copolymer of carboxylic group, hydroxylic group and sulfonic acid group, it has good scale inhibition performance to calcium phosphate and calcium carbonate. IR-241 has good synergic effects with other agents. IR-241 is used as scale inhibitor and dispersant in circulating cool water system and built with organophosphate.

**Specification**

Items	Index
Appearance	Light yellow transparent liquid
Solid content %	35.0min
Free monomer (as AA)%	0.5max
Density (20°C)g/cm <sup>3</sup>	1.1~1.2
pH(1% water solution)	3.0~5.0

**Usage**

Normally the dosage of 5~25mg/l is preferred. When built with organophosphates, 1-10mg/l is preferred, the suitable pH value is 7.0-9.5.

**Package and storage**

200L plastic drum,IBC(1000L),customers' requirement. Storage for one year in shady room and dry place.

**Keywords**

IR-241 Acrylic Acid/Acrylate/Phosphonic Acid/Sulfosalt Tetra-copolymer

**IR-613 Acrylic-Acrylate-Sulfosalt Copolymers****Properties**

IR-613 is a scale inhibitor and dispersant containing sulfosate and polyelectrolyte. In this copolymer, there exists strong acid, weak acid and non-ion group, it is suitable to be used in high temperature, high pH, high hardness and high alkaline. IR-613 has good scale inhibition for ferric oxide, calcium phosphate, zinc phosphate and calcium carbonate. It has good synergic effect with polyphosphate, zinc salt and other agents.

IR-613 can be used as scale inhibitor and dispersant in industrial circulating water system, oilfield refill water system and boiler water.

**Specification**

Items	Index
Appearance	Colorless or light yellow transparent liquid
Solid content,%	30.0min
Free monomer (as AA)%	0.5max
Density (20°C)g/cm <sup>3</sup>	1.10min
pH(1%water solution)	4.0-5.0

**Usage**

The dosage of 2~40mg/l is preferred depended on water quality and process.

**Package and storage**

200L plastic drum,IBC(1000L),customers' requirement. Storage for ten months in shady room and dry place.

**Safety protection**

Weak acidity, avoid contact with eye and skin, once contacted, flush with water.

**Keywords**

IR-613 Acrylic-acrylate-sulfosalt copolymers

**Phosphino Carboxylic Acid Polymer(PCA)****Properties**

Through the introduction of phosphonic group into carboxylic group, PCA has good dispersion property for scale of calcium carbonate and calcium phosphate in circulating cool water system. It has good scale inhibition for barium sulfate, strontium sulfate and silica scale. PCA has advantages in wide range of water quality, chemical stability, strong chlorine tolerance, etc. PCA can be used as scale and corrosion inhibitor in circulating cool water system and oilfield refill water system.

**Specification**

Items	Index
Appearance	Amber liquid
Solid content %	50.0min
Total phosphor(as $\text{PO}_4^{3-}$ )%	0.5min
Density(20°C)g/cm <sup>3</sup>	1.20-1.30
pH(1% water solution)	3.0-5.0

**Usage**

When used alone, the dosage of 5-20mg/l is preferred. It can also be used together with organophosphines, copolymer, zinc salt or BTA.

**Package and storage**

200L plastic drum,IBC(1000L),customers' requirement. Storage for ten months in shady room and dry place.

**Keywords**

PCA; POCA; dispersant PCA,Copolymer of Phosphono and carboxylic Acid;  
1-phenyl-4-amino-5-chloropyridaz-6-one

## **IR-1010 Low Molecular Weight Polyacrylate**

### **Properties**

IR-1010 is a low molecular weight polyacrylate with excellent inhibition effect for calcium carbonate in industry circulating cool water system; IR-1010 can also be used as antiscalant and dispersant in Boiler and Oil field water systems; IR-1010 shows good anti-scale efficiency at low dosage over a wide range of pH, hardness and temperature conditions.

### **Specification**

<b>Item</b>	<b>Index</b>
Appearance	Light amber transparent liquid
Solid content, %	43.0 min
Density (20°C), g/cm <sup>3</sup>	1.3 min
pH (original solution)	6.5 – 7.5

### **Usage**

IR-1010 can be used alone with the general dosage 10-30mg/L. When used with other water treatment chemicals in formulations, the dosage should be determined by experiment according to the water and equipment condition.

### **Package and Storage Safety**

200L/Drum, 1000L/IBC, or as customers' requirement.  
Storage for ten months in shady room and dry place.

### **Safety**

IR-1010 is the neutral liquid. Please be protected in handling and avoid skin and eyes contact, rinse with plenty of water immediately after contact.

### **Keywords**

IR-1010 Low Molecular Weight Polyacrylate



## **IR-1000 General Purpose Acrylic Acid Homopolymer Scale Inhibitor**

### **Properties**

Use IR-1000 general-purpose water treatment scale inhibitor to effectively inhibit precipitation of calcium carbonate, calcium oxalate, calcium sulfate, barium sulfate and other low solubility salts. (Similar to Rohm&Haas ACUMER 1000)

### **Specification**

<b>Items</b>	<b>Index</b>
Appearance	Clear to slightly hazy
Solid content; %	47.0-49.0
pH (1% water solution)	3.0-4.5
Density(20℃),g/cm <sup>3</sup>	1.20 min

### **Usage**

Water treatment

Cooling waters

Boiler

Oilfield formation and production

Prevents the formation of deposits on heat transfer surfaces

Prevents inorganic and sedimentation fouling

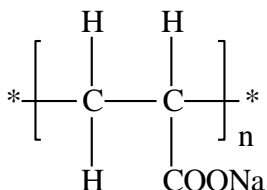
Very effective calcium salt scale inhibition including carbonate, oxylate, and sulfate

### **Package and Storage**

200L plastic drum,IBC(1000L),customers' requirement. Storage for ten months in shady room and dry place.

### **Keywords**

IR-1000 General Purpose Acrylic Acid Homopolymer Scale Inhibitor

**IR-1100 Sodium Polyacrylate****Structural formula****Properties**

IR-1100 is the homopolymer of low molecular polyacrylic acid and its salts. Free of phosphate, it can be used in situations of low or none content of phosphate. IR-1100 can be used as high effective scale inhibitor for sugar processing. IR-1100 obtains the scale inhibition effect by dispersing calcium carbonate or calcium sulfate in water system. IR-1100 is an ordinary used dispersant, it can be used as scale inhibitor and dispersant in circulating cool water system, PAPERmaking, woven and dyeing, ceramics and pigments. (similar to Rohmhaas co. Acumer 1100)

**Specification**

Items	Index
Appearance	Light amber liquid
Solid content %	47.0-49.0
Density(20°C)g/cm <sup>3</sup>	1.20min
pH(1% solution)	3.0-4.5

**Usage**

When used alone, the dosage of 10-30mg/l is preferred. When used as dispersant in other fields, the dosage should be determined by experiment.

**Package and storage**

200L plastic drum,IBC(1000L),customers' requirement. Storage for ten months in shady room and dry place.

**Keywords**

IR-1100 Sodium Polyacrylate

## **IR-2000 Modified Sodium Polyacrylate**

### **Properties**

IR-2000 is the copolymer of acrylic-acrylate-sulfosate, it is a good scale inhibitor for calcium phosphate, calcium carbonate and other inorganic minerals. IR-2000 can effectively stabilize calcium phosphate in formula containing phosphate. It can also stabilize zinc in formula containing zinc. It can disperse inorganic microparticles without pH influence.

IR-2000 is an effective dispersant in all organic water treatment formula, it can be used as dispersant for minerals, stabilizer for calcium phosphate. (similar to Rohmhaas Acumer 2000)

### **Specification**

<b>Items</b>	<b>Index</b>
Appearance	Light amber liquid
Solid content %	42.5-43.5
Density (20℃)g/cm <sup>3</sup>	1.15min
pH (1% water solution)	3.8 - 4.6

### **Usage**

IR-2000 can be used as scale inhibitor for circulating cool water and boiler water, for phosphate, zinc ion and inorganic minerals in particular. When used alone, the dosage of 10-30mg/l is preferred. When used in other fields, the dosage should be determined by experiment.

### **Package and storage**

200L plastic drum,IBC(1000L),customers' requirement. Storage for ten months in shady room and dry place.

### **Keywords**

IR-2000 Modified SodiumPolyacrylate

### **IR-2100 Modified Sodium Polyacrylate**

#### **Property**

IR-2100 is a good anti-scaling efficiency against calcium carbonate, calcium sulfate and calcium oxalate; IR-2100 is exceptional stability in the presence of hypochlorite and very strong dispersant activity; IR-2100 is good thermal stability, contains no phosphorus - meets discharge after legislation requirements.

#### **Specification**

<b>Items</b>	<b>Index</b>
Appearance	Clear Solution To Slightly Hazy
Chemical Nature	Carboxylate/Sulfonate Copolymer
Average Molecular Weight	11,000 (Mw)
Total Solids (%)	37
PH (at 25°C)	4.0-5.0
Viscosity Brookfield(mPa.s/cps at 25°C)	100-300

#### **Usage**

IR-2100 is a copolymer that functions as a scale inhibitor and dispersant by combining strong acid (sulfonate) and weak acid (carboxylate) that provide optimal anti-scale/dispersant efficiency. IR-2100 can be mainly used in industrial water treatment and pulp& water process.

#### **Package and Storage**

Normally IR-2100 can be packed in 250kg net Plastic Drum, IBC drum can also be used as required. Storage for ten months in room shady and dry place.

#### **Keywords**

IR-2100 Modified Sodium Polyacrylate

**IR-3100 Carboxylate-Sulfonate-Nonion Tri-polymer****Properties**

IR-3100 is a good scale inhibitor and dispersant for cool water treatment, it has good inhibition for dry or hydrated ferric oxide. IR-3100 is a all organic dispersant and scale inhibitor, it can be also used as stabilizer of corrosion inhibitor for phosphate and phosphinic salt. (Similiar to RohmHaas ACUMER 3100)

**Specification**

<b>Items</b>	<b>Index</b>
Appearance	Light amber liquid
Solid content %	43.0-44.0
Density (20℃)g/cm <sup>3</sup>	1.15min
pH(1% water solution)	2.1-2.6

**Usage**

IR-3100 can be used as scale inhibitor for circulating cool water and boiler water, for phosphate, zinc ion and ferric in particular. When used alone, the dosage of 10-30mg/L is preferred. When used in other fields, the dosage should be determined by experiment.

**Package and Storage**

Normally In 250kg net Plastic Drum, IBC drum can also be used as required. Storage for ten months in room shady and dry place.

**Keywords**

IR-3100 Carboxylate-Sulfonate-Nonion Tri-polymer

### **IR-5000 Modified Sodium Polyacrylate**

#### **Properties**

IR-5000 is a superior scale inhibitor and dispersant. It has good inhibition for silica and magnesium silicate when used in recirculation cooling circuits and boilers. It is a superior phosphate scale inhibitor for dry or hydrated ferric oxide. Acting as rust inhibitor, IR-5000 can also be used in systems like industrial RO, pools and fountains etc (Similar to Rohm & Haas ACUMER 5000)

#### **Specification**

<b>Items</b>	<b>Index</b>
Appearance	Amber liquid
Solid content %	44.5-45.5
Density(20°C)g/cm <sup>3</sup>	1.15-1.25
pH(1% water solution)	2.5 – 4.0

#### **Usage**

When used alone, the dosage of 15-30mg/L. When used as dispersant in other fields, the dosage should be determined by experiment.

#### **Packing and storage**

Normally in 25kg or 250kg net plastic drum. Storage for 10 months in room shady and dry place.

#### **Safety and Protection**

Weak acidity, avoid contact with eye and skin. Once contacted, flush with water.

#### **Keywords**

IR-5000 Modified Sodium Polyacrylate

**IR-904 Aqueous Dispersant**

**Alias: viscosity reducer, water reducer, grind aider**

**Properties**

The main composition of dispersant IR-904 is anion polymer. It can be adsorb on surface of microparticles resulting in static repulsion, resulting in dispersing and preventing sedimentation and coarse turn-back. IR-904 is little foaming, innocuous, non-corrosiveness and non-hazardous.

IR-904 is used as chelant in papermaking coating, building coating, concrete retarder, water reducer, woven and dyeing. Its performance can reach to that of SN-5040. adding IR-904 to slurry during grinding process of bolus alba, lime carbonate, pottery clay, titanium pigment, french chalk, barium sulfate, coal-water slurry, etc., the viscosity can be largely reduced and the dispersed slurry is stable.

**Specification**

Items	Index
Appearance	Colorless to light yellow liquid
Solid content %	40.0min
pH (50% water solution)	8.0~11.0
Density(20℃)g/cm <sup>3</sup>	1.20min
Viscosity(25℃)mpa.s	50—400

**Usage**

The dosage of 0.2-2% is preferred (solid/solid), the optimal dosage should be determined by experiment.

**Package and storage**

200L plastic drum,IBC(1000L),customers' requirement. Storage for ten months in shady room and dry place.

**Keywords**

Aqueous dispersant viscosity reducing agent, water reducing agent, grinding aid agent

## Polycarboxylic Acid Water-Reducing Agent

Polycarboxylic acid water-reducing agent is a kind of concrete superplasticizer with good comprehensive properties and good perspective. It is a composite admixture of polycarboxylate copolymers and other auxiliaries. Compared with other similar products, this product is better in its performance and performance/cost ratio.

### Properties

1. Low dosage and high range of water reduction efficiency. Its water reduction efficiency can be up to 45%;
2. High slump-retaining ability. Slump loss of the concrete is less than 5% in 1h, and less than 10% in 2h.
3. High compressive strengths. It can increase the compressive strengths of concrete by 50-110% in 3 days, 40-80% in 28 days, 30-60% in 90 days;
4. Excellent workability. High ability against bleeding or segregation, low resistance and easy for pumping
5. Suitable bubble content, no bad influence on concrete modulus of elasticity, good freeze resistance;
6. Less than 0.2% alkali content,
7. Nontoxic, no formaldehyde and no pollution;
8. Stable performance, no delamination and no sedimentation for long storage period, no crystallization in low temperature.
9. High compatibility, compatibly with many cement types and mineral admixtures, particularly fit for high durability concrete and self compacting concrete.

### Specification:

Items	Index
Appearance	light brown liquid
Density (20℃) g/ml	1.09±0.02
Solid content %	20±1
Cement paste fluidity (cement base) (mm)	250(W/C=0.29)
pH	6-8
Chloride % ≤	0.02
pH value(1% water solution)	1.5~2.0
Alkali (Na <sub>2</sub> O+0.658K <sub>2</sub> O)(%) ≤	0.2

### Usage methods:

1. The dosage is 0.4-2.0% of the cementitious materials by weight, normally 0.4-1.2%. Do concrete mixture tests beforehand.
2. No mixture with naphthalene-base water-reducer. Compatibility tests should be conducted beforehand when mixed with other auxiliaries.
3. Slump retention is sensitive to water, water content should be strictly controlled.
4. Concrete cure should be paid attention to.

### Scope of applications:

Polycarboxylic acid water-reducing agent is suitable for pumping or normal concrete engineering of C15-C60, particularly for engineering with high durability, excellent fluidity, strong slump retention ability and excellent aesthetic appearance. For high fluidity, self compacting and as cast finish concrete, this product is a good choice.

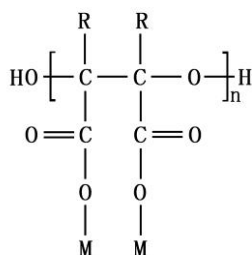
### Package and Storage:

Liquid, package in barrel, storage for one year in dry and shady place, avoiding frost.

### Keywords

superplasticizer, Concrete superplasticizer



**Polyepoxysuccinic Acid (PESA)****Synonym:** Polyoxirane-2,3-Dicarboxylic Acid**Molecular formula:**  $\text{HO}(\text{C}_4\text{H}_2\text{O}_5\text{M}_2)_n\text{H}$ **Structural formula****CAS No.** 51274-37-4**Molecular weight:** 400-1500Notes:  $n=2-10$  $\text{M}=\text{Na}^+$  or  $\text{H}^+$ 、 $\text{K}^+$  $\text{R}=\text{H}$  or  $\text{C}_{1-4}$  alkyl**Properties:**

PESA is a multivariate scale and corrosion inhibitor with non-phosphor and non-nitrogen, it has good scale inhibition and dispersion for calcium carbonate, calcium sulfate, calcium fluoride and silica scale, with effects better than that of ordinary organophosphines. When built with organophosphates, the synergism effects are obvious.

PESA has good biodegradation properties, it can be widely used in circulating cool water system in situation of high alkaline, high hardness and high pH value. PESA can be operated under high concentration index. PESA has good synergism with chlorine and other water treatment agents.

**Specification**

Items	Index
Appearance	Colorless or light amber transparent liquid
Solid content %	40.0min
Density (20°C)g/cm <sup>3</sup>	1.28min
pH(1% water solution)	9.0-12.0

**Usage**

PESA can be used in system of oilfield refill water, crude oil dehydration and boiler.

PESA can be used in circulating cool water system of steel, petrochemical, power plant, medicine.

PESA can be used in boiler water, circulating cool water, desalination plant, and membrane separation in situation of high alkaline, high hardness, high pH value and high concentration index.

PESA can be used in detergent fields.

**Package and storage**

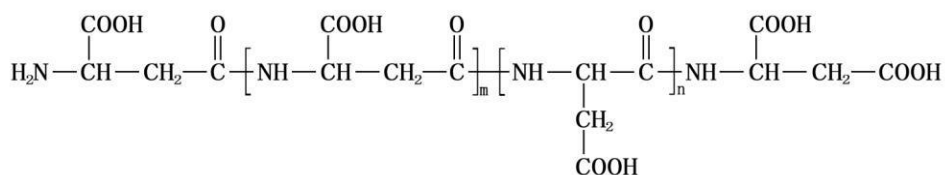
200L plastic drum,IBC(1000L),customers' requirement. Storage for ten months in shady room and dry place.

**Safety protection**

Alkaline, avoid contact with eye and skin, once contacted, flush with water.

**Keywords**

PESA, Polyepoxysuccinic Acid

**Sodium of Polyaspartic Acid (PASP)****CAS No.** 181828-06-8,35608-40-6**Molecular weight:** 1000-5000**Molecular formula:** C<sub>4</sub>H<sub>6</sub>NO<sub>3</sub>(C<sub>4</sub>H<sub>5</sub>NO<sub>3</sub>)<sub>m</sub>C<sub>4</sub>H<sub>6</sub>NO<sub>4</sub>**Structural formula****Properties**

PASP is a water soluble polymer. It is a green water treatment agent, with properties of non-phosphor, non-nitrogen, non-pollution and fully biodegradation. PASP has good scale inhibition on calcium carbonate, calcium sulfate, barium sulfate, calcium phosphate, etc.. Its scale inhibition rate for calcium carbonate is 100%. Moreover, PASP has dispersion and corrosion inhibition properties to metal equipment.

PASP is an alternative of phosphor-containing water treatment agents, avoiding water system eutrophication and second pollution..

**Specification**

Items	Index
Appearance	Yellow to umber liquid
Solid content %	40.0min
Density (20°C)g/cm <sup>3</sup>	1.20min
pH(1% water solution)	9.0-11.0

**Usage**

PASP can be used as scale and corrosion inhibitor in industrial circulating cool water system, boiler water, reverse osmosis, oilfield water and desalination plant. The effects will be even better than ordinary organophosphines when used in situation of high hardness, high alkaline, high pH value and high concentration index. When built with PBTCA, the synergism is obvious.

Due to its green and non-pollution to environment, PASP can be used as accessory ingredients in daily and fine chemicals.

PASP can be used in agricultural as nutrient absorption intensifier to improve the production of vegetable, melon and fruit, and flowers. When used together with pesticide, its effects will be improved.

**Package and storage**

200L plastic drum,IBC(1000L),customers' requirement. Storage for ten months in shady room and dry place.

**Safety protection**

Alkaline, avoid contact with eye and skin, once contacted, flush with water.

**Keywords**

PASP;Sodium of Polyaspartic Acid;Sodium PASP;polyaspartate;Sodium of Polyaspartic Acid

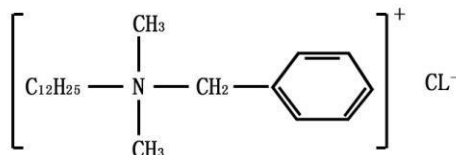
## Dodecyl Dimethyl Benzyl Ammonium Chloride (Benzalkonium Chloride,1227)

**CAS No.** 8001-54-5 Or 63449-41-2, 139-07-1

**Molecular weight:** 340.0

**Molecular formula:** C<sub>21</sub>H<sub>38</sub>NCl

**Structural formula**



### Properties

Benzalkonium chloride is a kind of cationic surfactant, belonging to nonoxidizing boicide. It can efficiently withhold algae propagation and sludge reproduction. Benzalkonium chloride also has dispersing and penetrating properties, can penetrate and remove sludge and algae, has advantages of low toxicity, no toxicity accumulation, soluble in water, convenient in use, unaffected by water hardness. Benzalkonium chloride can be also used as anti-mildew agent, antistatic agent, emulsifying agent and amendment agent in woven and dyeing fields.

### Specification

Items	Index		
Appearance	Colorless to yellowish transparent liquid	Yellowish transparent liquid	Yellowish transparent liquid
Solid content %	44.0 min	80 min	88 min
Amine salt %	2.0 max	2.0 max	2.0 max
pH(1% water solution)	6.0~8.0(origin)	6.0-8.0	6.0-8.0
Flowability	normal	good fluidity	bad fluidity

### Usage methods

As nonoxidizing boicide, dosage of 50-100mg/l is preferred; as sludge remover, 200-300mg/l is preferred, adequate organosilyl antifoaming agent should be added for this purpose. This product can be used together with other fungicidal such as isothiazolinones, glutaraldehyde, dithionitrile methane for synergism, but cannot be used together with chlorophenols. If sewage is appeared after thrown of this product in circulating cool water, the sewage should be filtered or blown off in time to prevent their deposit in bottom of collecting tank after froth disappearance.

No blending with anion surfactant.

### Package and storage

200L plastic drum,IBC(1000L),customers' requirement. Storage for two year in shady room and dry place.

### Safety protection

A little smell of almond, no visible stimulation to skin. When contacted, flush with water.

### Keywords

Benzalkonium Chloride;BKC;Dodecyl Dimethyl Benzyl ammonium Chloride 1227;Lauryl dimethyl benzyl ammonium chloride;Benzyl-Lauryl dimethyl ammoniumchloride

## Poly (Quaternary Ammonium) Salt

### Properties

Poly (quaternary ammonium) salt is a kind of cationic high molecular weight polymer, it has good water solubility, belonging to non-oxidative bactericide, it has the properties of algae disinfectant and fungicide with advantage of wide range and high efficiency, can effectively inhibit algae propagation and sludge growth, it has good sludge stripping effect. Also, it has properties of dispersing, penetration, de-oiling, deodorization and corrosion inhibition. This product is widely used as bactericide in circulating cooling system in fields such as petroleum, chemical industry and electronic power. In fields of printing and dyeing, this product can be used as anti-mildew agent, softening agent, antistatic agent, emulsifier, amendment, surfactant, etc.

### Specification

Items	Index	
	Appearance	Light yellow liquid
Solid content	40min	20min
Ammonium content	5.0max	5.0max
pH (1%water solution)	5.0 - 7.0	5.0 - 7.0
Density(20°C)g/cm <sup>3</sup>	1.04 min	1.02min

### Usage

As non-oxidative bactericide, the dosage of 10-30mg/l is preferred. As sludge stripper, the dosage of 50-200mg/l is preferred. No blend with anionic surfactant.

### Package and storage

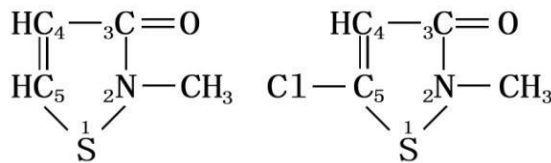
200L plastic drum,IBC(1000L),customers' requirement. Storage for two years in shady room and dry place. Avoid contacting with strong oxidant, ferric, copper or aluminum materials.

### Safety and protection

No obvious stimulation to skin, avoid contacting with eye and skin, once contacted, flush with water.

### Keywords

Poly (quaternary ammonium) salt

**Isothiazolinones(CMIT/MIT)****CAS No.** 26172-55-4, 2682-20-4**Molecular weight:** 115.16**Structural formula**

2-methyl-4-thiazoline-3-ketone(MI)

5-chloro-Methyl-4-thiazoline-3-ketone(CMI)

**Properties**

Isothiazolinones is composed of 5-chloro-2-methyl-4-thiazoline-3-ketone (CMI) and 2-methyl-4-thiazoline-3-ketone(MI). The bactericidal effect of isothiazolinones is carried out through breaking the bond between bacteria and algae protein. When contacted with microbes, isothiazolinones can quickly inhibit their growth, thus leading to death of these microbes. Isothiazolinones has strong inhibition and biocidal effects on ordinary bacteria, fungi and alga, and has many advantages such as high biocidal efficiency, good degradation, no residual, safety in operation, good compatibleness, good stabilization, low cost in operation.

Isothiazolinones can mix with chlorine and most cation, anion, and non-ionic surfactants. When used at high dosage, its biosludge stripping effect is excellent.

Isothiazolinones is a kind of fungicidal with properties of broad spectrum, high efficiency, low toxicity and non-oxidative, it is the ideal biocidal in industrial circulating cool water system and in wastewater treatment in oilfield, papermaking, pesticide, cutting oil, leather, detergent and cosmetics etc.

**Specification**

Items	Index	
	Grade I	Grade II
Appearance	Amber transparent liquid	Light yellow or light green transparent liquid
Active content %	14.0-15.0	1.5-1.8
Density (20℃)g/cm <sup>3</sup>	1.26-1.32	1.02-1.05
pH (as it)	2.0-4.0	2.0-5.0
CMI/MI (wt %)	2.5-3.4	2.5-3.4

notes: 2%, 4% and 8% or any concentration can be supplied on demands.

**Usage**

When used as sludge stripper for grade ii, the dosage of 150-300mg/l is preferred, when used as boicide, the dosage of 80-100mg/l is preferred, and charges every 3-7 days. No used together with oxidative fungicidal such as chlorine, and no used in cooling water system containing sulfur. When used together with quaternary amine, the effect will be better. When used as industrial fungicide, the dosage of 0.05-0.4% is preferred.

**Package and storage**

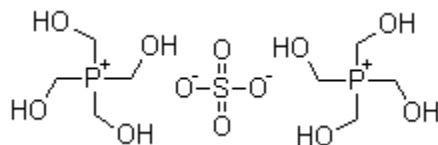
200L plastic drum,IBC(1000L),customers' requirement. Storage for ten months in shady room and dry place.

**Safety protection**

Corrosive, avoid contact with eye and skin, wear splash resistant safety goggles and rubber gloses.once contacted, flush with water.

**Keywords**

Isothiazolinones;CMIT/MIT, 3(2H)-Isthiazolone,5-chloro-2-methyl;2-Methyl-3(2H)-Isothiazolone

**Tetrakis(Hydroxymethyl)Phosphonium Sulfate(THPS)****CAS No.** 55566-30-8**Molecular Formula:** C<sub>8</sub>H<sub>24</sub>O<sub>12</sub>P<sub>2</sub>S**Molecular Weight:** 406.27**Structural Formula****Property**

THPS is a kind of environmental anti-microbial reagent. THPS is characterized by its low solidity point and fine stability. THPS can be reserved for long time and can easily dissolve in water. It is a kind of new environmental pesticide with high efficacy, low toxicity and low rudimental. THPS can kill germ and aquatic plants. In 1995, the EPA of the United States ratified it with zero toxicity and awarded it with US Green Chemical prize.

**Specification:**

Item	Index
Active Content % $\geq$	75.0
Viscosity (at 25 deg c.)	30.0-36.0mPa. S
Density(25°C):	1.350-1.420
Fe(%)	$\leq$ 0.002
pH:	2.5-5.0

**Usage**

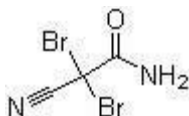
THPS is mainly used in water treatment systems, oil field operations, and paper-making industry. The advantage is THPS will soon degrade to a nontoxic substance immediately after use. Also it can be applied to fabric coating as flame retardant, obviously improving flame retarding property.

**Package and Storage**

THPS is packed in plastic drum with net weight of 250kg. Keep hermetic.

**Keywords**

THPS, Tetrakis(Hydroxymethyl)Phosphonium Sulfate

**2,2-Dibromo-3-Nitrilopropionamide (DBNPA)****CAS No.** 10222-01-2**Molecular Formula:** C<sub>3</sub>H<sub>2</sub>Br<sub>2</sub>N<sub>2</sub>O**Molecular Weight:** 242**Structural Formula:****Property**

DBNPA is white crystals, mp.125°C, soluble in actone, polyethyleneglycol, benzen, ethanol and the like. DBNPA is stable in acidic conditions, and decomposed in alkaline conditions or in the presence of Hydrogen Sulphide. DBNPA is an efficient germicide for recycling water system. DBNPA can penetrate in the cytocyst of microbes quikly and kill them by reacting with some proteins in it, s topping the Redox of cells.

DBNPA has a good stripping properties, little poison, and no foam in system. The organic solutions can miscible with water.

**Specifications**

Item	Index
Assay	99% min
Melting Point	122-128°C
pH(1% Aqueous Solution)	4.0-6.5
Loss on Drying	1% max

**Usage**

Biocides in broad spectrum. DBNPA is widely used in industrial circulating water system, large air-condition and the large center of sewage treatment to eliminate microorganism and alga and shuck off clay. DBNPA is also used in the process of paper making to prevent reducing quality of paper by generation of microorganism. DBNPA is suitable for metal cutting of cooling liquor, recovery system of oil, latex and ply-woods as anti-spy biocides. DBNPA has following advantages: easy to handle; no unusual oxidation hazards; similar performance and safety in paper and oilfield applications; used for slime control in the wet-end of the paper mill and performs exceptionally well against slime-forming bacteria. DBNPA has exhibited outstanding efficiency against in bio-films and against a broad spectrum of bacteria, fungus and yeasts.

Additionally, DBNPA series products are used in the short-term preservation of coatings and coating additives such as latex, starch and mineral slurries. DBNPA is a fast-acting/quick-kill biocide that is broad-spectrum, and does not contain or release formaldehyde

**Package and Storage:**

25kg fiber drum, keep dry

**Keywords**

2,2-Dibromo-2-Crbamoylacetoneitrile; 2,2-Dibromo-2-Cyanoacetamide;  
2,2-Dibromo-3-Nitrilopropionamide; DBNPA; Dbromocyanoacetamide

### **IR-401 Composite Bactericide**

#### **Properties**

IR-401 is composed of quaternary ammonium salt and peroxide. IR-401 has the advantages of high efficiency, wide range, low toxicity, quick effect and durable, strong penetration, convenience in use, low price, wide range of suitable temperature and pH.

#### **Specification**

<b>Items</b>	<b>Index</b>
Appearance	Colorless transparent liquid
pH(1% water solution)	2.0-4.0
Density (20°C)g/cm <sup>3</sup>	1.0±0.05

#### **Usage**

IR-401 can be used as fungi disinfectant in industrial circulating cool water system in power plant, chemical industry, fertilizer, oil refining and metallurgy.  
Impact charge, dosage of 100-200mg/L will kill all algae. Enlarge dosage if wish to quickly remove multitude algae. Clean out the removed sludge and floats to prevent their deposit. Once existed more foams, antifoaming agent should be added .

#### **Package and Storage**

25kg in plastic barrel, or confirmed by clients. Storage for three months.

#### **Safety Protection**

Stimulation to skin, once contacted, flush with water.

#### **Keywords**

TIR-401 Composite Bactericide



**IR-402 Composite Bactericide****Properties**

IR-402 is composed of quaternary ammonium salt and isothiazolinone. IR-402 has the advantages of high efficiency, wide range, low toxicity, quick effect and durable, strong penetration, convenience in use, and wide range of suitable temperature and pH, no drug resistance even after long period of using.

**Specification**

Items	Index
Appearance	Yellow greenish transparent liquid
pH(1% water solution)	2.5-4.5
Density (20°C)g/cm <sup>3</sup>	1.0±0.05

**Usage**

IR-402 can be used as fungi disinfectant and sludge stripper in industrial circulating cool water systems in fields such as power plant, chemical industry, fertilizer, oil refining and metallurgy. Its effect is better than that of 1227. In addition, this product has certain effect of corrosion inhibition.

Impact charge, dosage of 80-200mg/L will kill all algae. Enlarge dosage if wish to quickly remove multitude algae. Clean out the removed sludge and floatages to prevent their deposit. Once existed more foams, antifoaming agent should be added. NO blend with anion surfactant.

**Package and Storage**

25kg in plastic barrel, or confirmed by clients. Storage for six months.

**Safety Protection**

Stimulation to skin, once contacted, flush with water.

**Keywords**

IR-402 Composite Bactericide

### **IR-406 Composite Bactericide**

#### **Properties**

IR-406 is a kind of fungi disinfectant composed of quaternary ammonium salt. IR-406 has the advantages of high efficiency, low toxicity, quick effect and durable, strong penetration, convenience in use, and wide ranges of suitable temperature and pH.

IR-406 can be used as fungi disinfectant and sludge stripper in industrial circulating cool water systems in power plant, chemical industry, fertilizer, oil refining and metallurgy. Its effect is better than that of 1227.

#### **Specification**

<b>Items</b>	<b>Index</b>
Appearance	Colorless transparent liquid
Active content, %	30.0min
Amine salt %	2.0 max
pH (as it)	6.0-8.0

#### **Usage**

Impact charge, dosage of 80-100mg/L will kill all algae. Enlarge dosage if wish to quickly remove multitude algae. Clean out the removed sludge and floatage to prevent their deposit. Once existed more foams, antifoaming agent should be added.

#### **Package and Storage**

25kg in plastic barrel, or confirmed by clients. Storage for one year.

#### **Safety Protection**

A little smell of almond, no visible stimulation to skin. When contacted, flush with water.

#### **Keywords**

IR-406 Composite Bactericide

## IR-409 Sludge Stripper

### Properties

IR-409 is composed of cationic surfactant, penetrating agent and dispersant. IR-409 has the advantages of high efficiency, wide range, sterilization, fungicidal, sludge stripping and cleaning. IR-409 has good disperse and penetration properties, low toxicity, fast effective, it has good sludge stripping effect for sludge, plastocene, bacteria secretion, and fungus. IR-409 can soften and clean the scale on metal surface. IR-409 is not corrosive to metal, rubble and plastics, soluble in water, not affected by water hardness. IR-409 is used as sludge stripper in circulating water system, it can also used as algae disinfectant, cleaning agent and papemaking anticorrosive.

### Specification

Items	Index
Appearance	Colorless, slightly hazy liquid
Active content %	30.0 min
pH (as it)	6.0-8.0

### Usage

The dosage of 100-200ppm is preferred according to water content. Enlarge dosage if wish to quickly remove multitude algae. Clean out the removed sludge and floatage to prevent their deposit. When used as fungicidal, 50-100ppm is preferred. No blend with anion surfactant and no blend with chlorophenol agents.

### Package and Storage

25kg or 200kg in plastic barrel, or confirmed by clients. Storage for one year in room shady and dry place.

### Safety Protection

No visible stimulation to skin. When contacted, flush with water.

### Keywords

IR-409 Sludge Stripper

## **IR-503 Scale and Corrosion Inhibitor for Boiler**

### **Properties**

IR-503 is built with organophosphine and polycarboxylic acid. It has advantages of high efficiency of scale & corrosion inhibition and good temperature tolerance. IR-503 can be used in water treatment of low pressure boiler. Boilers include radiator, steam, locomotive, etc. This product can also be used as scale and corrosion inhibitor in situation of desalination plant, distillation and bus water tank.

### **Usage**

Add 200g per ton water of this product into boiler make-up water. During operation, blow-off every hour, 5-10 second each time. If the boiler has heavy scale, increase the quantity, and frequently blow-off. After 10-20 days' continuous operation, stop the boiler, open the handhole, remove the visible scale deposit to prevent conduit blockage, then, the boiler may turn into normal operation again. IR-503 would be better if the condense index of boiler water was controlled within 10. Other parameters may refer to related regulations (boiler water pH10-12, for example). pH value should not be lower than 7.

The material of medicate tank should be in plastic, concrete tank should be pretreated by anticorrosion method, otherwise, it will be eroded by the medicine, and the hardness will be increased much high. Total hardness of boiler make-up water should be lower than 200mg/L. Once too high hardness is countered, lime or other methods should be used to lower it .

### **Package and Storage**

25kg in plastic barrel. Storage in room shady and dry place for one year.

### **Safety Protection**

Though no toxic, this product is acidic and corrosive, once contacted with skin, flush with water.

### **Keywords**

IR-503 Scale and Corrosion Inhibitor for Boiler

## **IR-503B Scale and Corrosion Inhibitor for Boiler**

### **Properties and Usage**

IR-503B is composed of chelating, cleaning and dispersing agents. IR-503B has effects of both cleaning and corrosion inhibition, and has the advantages of fast cleaning, good effect, low corrosion rate. IR-503B has little damage to boiler body and is not affected by Fe and Cu ions in water system, it is suitable for medium/low pressure boiler.

### **Specification**

<b>Items</b>	<b>Index</b>
Appearance	Amber liquid
Solid content, %	40.0 min
Density,(20°C)g/cm <sup>3</sup>	1.25±0.1
pH,(1% water solution)	2.0±1.0

### **Usage**

The dosage of 1-3‰ is preferred according to boiler body volume and scale quantity.

### **Package and Storage**

25kg in plastic barrel. Storage in room shady and dry place for one year.

### **Keywords**

IR-503B Scale and Corrosion Inhibitor for Boiler

## **IR-504 Scale and Corrosion Inhibitor for Heating Water**

### **Properties**

IR-504 is mainly composed of high efficient chelating agent. Through reaction between chelating agent and metal surface, a protective film is formed. IR-504 has crystal distortion effect on calcium carbonate and calcium sulfate, thus the formed scale cannot firmly absorb on vessel wall. This product has the advantages of high temperature tolerance, high scale inhibition effect, hard to decomposed, free of carcinogenic substance such as sodium nitrite, full organic composite, good bio-degradation property. IR-504 is a kind of environmental greenish scale and corrosion inhibitor for heating water. IR-504 can be directly used as scale and corrosion inhibitor for heating water. Because the process of softening is omitted, the cost for heating is largely decreased, great economic and social profits to enterprises may be expected.

### **Usage**

According to water quality, 50-200g per ton water is preferred to the heating water system. If the make-up water is in midway, add quantity in proportion.

### **Package and Storage**

25kg in plastic barrel, or confirmed by clients. Storage for one year in room shady and dry place.

### **Safety Protection**

Nontoxic, once contact skin, flush with water.

### **Keywords**

IR-504 Scale and Corrosion Inhibitor for Heating Water

**IR-601 Scale and Corrosion Inhibitor for Iron & Steel Plant****Properties**

IR-601 is built with organophosphoric acid, polycarboxylic acid and carbon iron corrosion inhibitor, it can effectively chelate and disperse calcium carbonate and calcium phosphate scales. IR-601 has good scale inhibition effect on steel & iron in open wide circulating cool water system. It has the advantages of effective and strong corrosion inhibition.

**Specification**

Items	Index
Appearance	Amber liquid
Solid content,%	30.0 min
Total phosphoric acid,(as $\text{PO}_4^{3-}$ )%	15.0 min
pH,(1%water solution)	2.0±1.0
Density(20°C) , g/cm <sup>3</sup>	1.10

**Usage**

Add IR-601 into plastic pool (or box) every day, dilute with water and continuously add into inlet of dosage pump or metering valve (outlet of collecting tank). Dosage of 5-20mg/L is preferred (according to quantity of makeup water).

**Package and Storage**

25kg or 200kg in plastic barrel, or confirmed by clients. Storage for ten months in room shady and dry place.

**Keywords**

IR-601 Scale and Corrosion Inhibitor for Iron & Steel Plant

## IR-604 Scale and Corrosion Inhibitor for Power Plant

### Properties

IR-604 is built with organophosphoric acid, polycarboxylic acid, carbon iron and copper corrosion inhibitor. IR-604 can effectively chelate and disperse calcium carbonate, calcium sulfate and calcium phosphate scales. IR-604 has good scale inhibition effect on steel & iron and copper. IR-604 is mainly used in circulating cool water system in power plant, chemical plant, petrochemical, steel & iron. It has the advantages of effective and strong corrosion inhibition.

### Specification

Items	Index		
	A	B	C
Thiazole(C <sub>6</sub> H <sub>5</sub> N <sub>3</sub> )%	--	1.0 min	3.0 min
Total phosphoric acid (as PO <sub>4</sub> <sup>3-</sup> )%		6.8	
Phosphorous acid(as PO <sub>3</sub> <sup>3-</sup> )%		2.25 max	
phosphoric acid (as PO <sub>4</sub> <sup>3-</sup> )%		0.75 max	
Solid content %		32.0 min	
PH(1% water solution)		3.0±1.5	
Density 20°C (g/cm <sup>3</sup> )		1.15 min	

### Usage

Add IR-604 into plastic pool (or box) every day, dilute with water and continuously add into inlet of dosage pump or metering valve (outlet of collecting tank). Dosage of 5-20ppm is preferred (according to quantity of makeup water).

### Package and Storage

25kg or 200kg in plastic barrel, or confirmed by clients. Storage for one year in room shady and dry place.

### Keywords

IR-604 Scale and Corrosion Inhibitor for Power Plant



### **IR-607 Scale Inhibitor for Oilfield Refill Water**

#### **Properties**

IR-607 is built with organophosphoric acid, special surfactant and synergistic agents, It can chelate with Ca<sup>2+</sup> and Mg<sup>2+</sup>. IR-607 can effectively chelate and disperse calcium carbonate, calcium sulfate and calcium phosphate scales. IR-607 is used as scale inhibitor for pipeline of oilfield refill water. It has the advantages of high temperature tolerance, alkaline tolerance, salt tolerance, stable in oilfield reservoir, low dosage, etc.

#### **Specification**

<b>Items</b>	<b>Index</b>
Appearance	colorless or light yellow liquid
Solid content,%	30.0 min
pH,(1%water solution)	2.0±1.5
Density(20℃), g/cm <sup>3</sup>	1.10 min

#### **Usage**

Add IR-607 into plastic pool (or box) every day, dilute with water and continuously add into inlet of dosage pump or metering valve (outlet of collecting tank). Dosage of 10-50ppm is preferred (according to quantity of makeup water).

#### **Package and Storage**

25kg or 200kg in plastic barrel, or confirmed by clients. Storage for ten months in room shady and dry place.

#### **Keywords**

IR-607 Scale Inhibitor for Oilfield Refill Water

### **IR-607B Scale Inhibitor for Barium and Strontium**

#### **Properties**

IR-607B is designed for stabilizing of Ba<sup>2+</sup> and Sr<sup>2+</sup>. IR-607B can effectively stabilize Ba<sup>2+</sup> and Sr<sup>2+</sup> in water system. IR-607B has good scale inhibition effect for calcium carbonate, calcium sulfate, and magnesium sulfate, it can be used in oilfield refill water system and industrial circulating cool system.

#### **Specification**

<b>Items</b>	<b>Index</b>
Appearance	Amber transparent liquid
Solid content,%	40.0 min
pH,(1%water solution)	6.0 min
Density(20°C), g/cm <sup>3</sup>	1.10 min

#### **Usage**

Add IR-607B into plastic pool (or box) every day, dilute with water and continuously add into inlet of dosage pump or metering valve (outlet of collecting tank). Dosage of 10-50ppm is preferred (according to quantity of makeup water).

#### **Package and Storage**

25kg or 200kg in plastic barrel, or confirmed by clients. Storage for ten months in room shady and dry place.

#### **Keywords**

IR-607B Scale Inhibitor for Barium and Strontium

**IR-610 Scale Inhibitor for Dusty Water****Properties**

IR-610 is composed of organophosphines acid, polycarboxylic acid and sulfosalt copolymers. It has properties of chelation and dispersion, has good synergistic effect and can bring about crystal distortion. The particles are dispersed in water system and are removed later, through which the dusty water system can be operated normally.

**Specification**

Items	Index
Appearance	Amber transparent liquid
Solid content,%	40.0 min
Total phosphoric acid,(as PO <sub>4</sub> <sup>3-</sup> )%	25.0 min
Density(20℃) , g/cm <sup>3</sup>	1.20 min
pH,(1%water solution)	2.0±0.5

**Usage**

Add IR-610 into plastic pool (or box) every day, dilute with water and continuously add into inlet of dosage pump or metering valve (outlet of collecting tank). The dosage of 3.0-10.0 ppm is preferred.

**Package and Storage**

25kg in plastic barrel, or confirmed by clients. Storage for one year.

**Keywords**

IR-610 Scale Inhibitor for Dusty Water

**IR-619B Scale and Corrosion Inhibitor****Properties**

IR-619B is composed of organophosphoric acid, polycarboxylic acid, sulfosalt copolym-ers, copper corrosion inhibitor, special surfactant, etc. The organophosphine acid forms protection membrane and brings corrosion inhibition on metal surface. IR-619B has good chelation and lattice distortion effect on calcium carbonate, calcium sulfate and calcium phosphate. Through rational prescription, IR-619B has good synergistic effect, with high corrosion inhibition ratio, high temperature tolerance, high scale inhibition ratio and not easy to degradation.

**Specification**

Items	Index
Appearance	Amber transparent liquid
Solid content, %	30.0 min
Total phosphoric acid,(as $PO_4^{3-}$ )%	8.0 min
pH,(1%water solution)	2.0±1.0
Density(20℃) , g/cm <sup>3</sup>	1.10 min
Thiazole (as $C_6H_5N_3$ )	1.5 min

**Usage**

Add IR-619B into plastic pool (or box) every day, dilute with water and continuously add into inlet of dosage pump or metering valve (outlet of collecting tank). The dosage of 5-30ppm is preferred.

**Package and Storage**

25kg or 200kg in plastic barrel, or confirmed by clients. Storage for one year in room shady and dry place.

**Keywords**

IR-619B Scale and Corrosion Inhibitor

**IR-628 Scale and Corrosion Inhibitor****Properties**

IR-628 is composed of organophosphine acid, polycarboxylic acid, sulfosalt copolymers and thiazole. It can chelate and disperse calcium carbonate and calcium phosphate scales. IR-628 has good scale inhibition effect on steel & iron and copper. IR-628 can be operated under high concentration index in power plant, chemical plant and central air conditioner.

**Specification**

Items	Index
Appearance	Amber liquid
Solid content,%	30.0 min
Total phosphoric acid,(as $PO_4^{3-}$ )%	15.0 min
Thiazole (as $C_6H_4NHN:N$ )	2.0 min
pH,(1%water solution)	$2.5\pm 1.0$
Density( $20^\circ C$ ), g/cm <sup>3</sup>	1.10 min

**Usage**

Add IR-628 into plastic pool (or box) every day, dilute with water and continuously add into inlet of dosage pump or metering valve (outlet of collecting tank). The dosage of 5-20ppm is preferred.

**Package and Storage**

25kg or 200kg in plastic barrel, or confirmed by clients. Storage for ten months in room shady and dry place.

**Keywords**

IR-628 Scale and Corrosion Inhibitor

**IR-682 Scale and Corrosion Inhibitor for low hardness water****Properties**

IR-682 is built with surfactant, dispersant, corrosion inhibitor, etc. It is suitable for system using soft water and other low hardness water as cool media. Because there are little contents of  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$  ions in soft water, scale cannot be formed. Many corrosion inhibitors use  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$  ions in water system to form protection membrane on metal surface, but there are little contents of  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$  ions in soft water, the corrosion inhibition is a difficult question for soft water system. Through experiments, we develop this greenish scale and corrosion inhibitor for soft water system. IR-682 is a composite corrosion inhibitor by inhibition of metal polarization. IR-682 has no contents of such noxious subjects as nitrite and chromate, no pollution to environment, its corrosion ratio to carbon steel far lower than that of national standard.

**Specification**

Items	Index
Appearance	yellow transparent liquid
Solid content, %	30.0 min
pH,(1%water solution)	3.0±1.5
Density(20°C) , g/cm <sup>3</sup>	1.20 min

**Usage**

Add IR-682 into plastic pool (or box) every day, dilute with water and continuously add into inlet of dosage pump or metering valve (outlet of collecting tank). The dosage of 30-70ppm is preferred.

**Package and Storage**

25kg in plastic barrel, or confirmed by clients. Storage for ten months in room shady and dry place.

**Keywords**

IR-682 Scale and Corrosion Inhibitor for low hardness water

**IR-701 Nonstop Cleaning and Pretreatment Filming Agent****Properties**

IR-701 is composed of chelating, detergent, dispersant and pretreatment filming agent. It has properties of fast cleaning, quick filming, film homogeneization, and low corrosion ratio. It is not affected by ferric and copper ions in pretreatment filming, especially suitable to be used in nonstop cleaning of circulating water system.

**Specification**

Items	Index
Appearance	Amber liquid
Solid content,%	40.0 min
Total phosphoric acid acid (asPO <sub>4</sub> <sup>3-</sup> ) %	20.0 min
Density(20℃) , g/cm <sup>3</sup>	1.25±0.1
pH,(1%water solution)	2.0±1.0

**Usage**

The dosage of 150-250mg/L is preferred.

**Package and Storage**

25kg barrel or confirmed by clients. Storage for one year in room shady and dry place.

**Keywords**

IR-701 Nonstop Cleaning and Pretreatment Filming Agent

## **IR-706 Deoiling Detergent**

### **Properties**

IR-706 is composed of chelating, cleaning, deoiling, dispersant and penetrating agent. It is a good deoiling detergent with properties of deoiling, descaling and cleaning. IR-706 can effectively remove the scale, oil film and emulsified oil. IR-706 is compatible with phosphorus series scale and corrosion inhibitors.

### **Specification**

<b>Items</b>	<b>Index</b>
Appearance	Umbe hazy liquid
Solid content,%	30.0 min
Density(20℃) , g/cm <sup>3</sup>	1.25±0.1
pH,(1%water solution)	2.0±1.0

### **Usage**

The dosage is determined by the actual circulating cool water system, ask the engineer for detail.

### **Package and Storage**

25kg barrel or confirmed by clients. Storage for six months in room shady and dry place.

### **Safety Protection**

Acidity, avoid contact with eye and skin, once contacted, flush with water.

### **Keywords**

IR-706 Deoiling Detergent



**IR-707 Pretreatment Filming Agent****Properties**

IR-707 is composed of chelating agent, dispersant, pretreatment filming and surfactant. The chelating agent can chemically adsorb ferric and calcium, forming a hard film on metal surface. It has the advantages of quick filming, film homogeneity, chemical stability and low corrosion ratio. It can be used as pretreatment filming agent for equipment and pipeline of new system or after heavy repair. IR-707 is not affected by copper and ferric ions in water system.

**Specification**

Items	Index
Appearance	Umber transparent liquid
Solid content,%	40.0 min
Density(20℃), g/cm <sup>3</sup>	1.25±0.1
pH,(1%water solution)	2.0±1.0

**Usage**

The dosage of 200-500mg/L is preferred. Pretreatment filming time for cold state is 48-72 hours, and for heat state is 24-48 hours.

**Package and Storage**

25kg barrel or confirmed by clients. Storage for one year in room shady and dry place.

**Safety Protection**

Acidity, avoid contact with eye and skin, once contacted, flush with water.

**Keywords**

IR-707 Pretreatment Filming Agent

**1,2,3-Benzotriazole (BTA)****CAS No.** 95-14-7**Molecular Formula:** C<sub>6</sub>H<sub>5</sub>N<sub>3</sub>**Molecular Weight:** 119**Specification:**

Items	Index
Appearance	White needle-shape crystalloids
Purity	≥99.8%
Chroma	≤40
Moisture	≤0.04%
Melting point	≥97℃
Ash content	≤0.03%
PH value	5.0-6.0

**Properties and Usage**

BTA is bitter, odorless, boiling point is 204 °C (15mmHg),soluble in alcohol, benzene, toluene, chloroform and dimethylformamide, and slightly soluble in water. It's mainly used as rust-preventer, antifreezing liquid, antioxidant additive(including lubricating oil, hydraulic oil, brake oil, transformer's oil), emulent, water stabilizer, the additive for high molecular materials (polyester and polyestamide) capacity of ultraviolet resistance and anti-static electricity, photographic antifogging agent, copper mine flotation, metal's slow corrosion etc.

**Package and Storage**

plastic woven bag,20Kg/bag or customers' requirement.

**Synonyms**

BTA; 1,2,3-Benzotriazole;1,2-Aminoazophenylene;1,2,3-Triazindene

**Sodium Salt of 1,2,3-Benzotriazole (BTA•Na)****CAS No.** 15217-42-2**Molecular formula:** C<sub>6</sub>H<sub>4</sub>N<sub>3</sub>Na**Molecular Weight:** 141.11**Specification**

Items	Index
Appearance	Pale yellow transparent liquid
Active content (wt) %	50.0min
Density (20℃) g/cm <sup>3</sup>	1.20 min

**Properties**

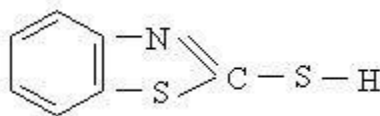
BTA•Na can be absorbed on metal surface and form a thin film to protect copper and other metals. BTA•Na can be used together with many scale inhibitors and fungi disinfectants in circulating cool water system, and it has good corrosion inhibition effect in circulating cool water system. The dosage of 2-4mg/l is preferred. BTA•Na can also be used as anti-discolor agent, coating additive and lubeoil additive.

**Package and Storage**

200L plastic drum,IBC(1000L),customers' requirement. Storage for six months in shady room and dry place.

**Synonyms**

BTA•Na; sodium salt of 1,2,3-Benzotriazole;1,2-Aminoazophenylene;1,2,3-Triazaindene

**2-Mercaptobenzothiazole (MBT)****CAS No.** 149-30-30**Molecular Weight:** 167.24**Molecular Formula:** C<sub>7</sub>H<sub>5</sub>NS<sub>2</sub>**Structural Formula****Specification**

Items	Index
Appearance	grayish-white or light yellow powder
Content % min	99.0
Melting point, °C, min	171.0
Heating loss, %, max	0.40
Ash content, %, max	0.30
Residue(150um), %, max	0.10

**Properties and Usage**

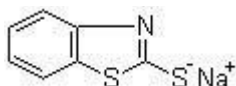
Slightly foul odour and bitter taste, non-poisonous. Easily soluble in ethyl acetone, acetone, dilute solution of sodium hydroxide and sodium carbonate, soluble in ethyl alcohol, not easily soluble in benzene, insoluble in water and gasoline. The product is a hemi-ultra accelerator, extensively used in vulcanization of natural and synthetic rubbers. Mainly used in manufacture of rubber tire, rubber belts, rubber shoes and other technical rubber goods.

**Package and Storage**

In plastic bag or kraft paper bag., 25Kg/bag or customers' requirement.

**Keywords**

MBT;2-MBT;2-Mercaptobenzothiazole;2-Benzothiazolethione

**Sodium Salt of 2-Mercaptobenzothiazole (MBT•Na)****CAS No.** 2492-26-4**Molecular formula:** C<sub>7</sub>H<sub>4</sub>NNaS<sub>2</sub>**Molecular Weight:** 189.22**Molecular Structure****Specification**

Items	Index
Appearance	Pale yellow transparent liquid
Active content (wt) %	50.0min
Density (20°C) g/cm <sup>3</sup>	1.20 min

**Properties**

MBT•Na can be used as the copper corrosion inhibitor in circulating cool water system. The mechanism is due to the chemical absorption of MBT•Na on copper surface, or chelation reaction between them. The dosage of 4mg/L is preferred. This product can also be used as plasticizer and photometer for acid copper plating.

**Package and Storage**

200L plastic drum, IBC(1000L),customers' requirement. Storage for six months in shady room and dry place.

**Keywords:**

MBT•Na;2-MBT;2-Mercaptobenzothiazole;2-Benzothiazolethione

**Methylbenzotriazole(TTA)****CAS No.** 29385-43-1**Molecular formula:** C<sub>7</sub>H<sub>7</sub>N<sub>3</sub>**Molecular Weight:** 133.16**Specification**

Items	Index
Appearance	White granular
Purity	≥99.5%
Moisture	≤0.2%
Melting point	80-86℃
Ash content	≤0.05%
PH value	5.5-6.5

**Properties**

Pure TTA is white granule or powder, TTA is a mixture of 4-methyl-benzotriazole and 5-methyl-benzotriazole, the melting point is from 80℃ to 86℃, soluble in alcohol, benzene, toluene, chloroform and watery lye, and hardly soluble in water.

**Usage**

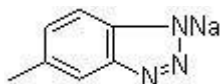
TTA is mainly used as antirust and corrosion inhibitor for metals (such as silver, copper, zinc, lead, nickel, etc.), and for antirust oil (tallow) products, the gas phase corrosion inhibitor of copper and alday, lubricant additive, cycle water treating compound and auto antifreeze. TTA also can be concernedly used with manifold sterilization algacide and has a very fine corrosion mitigation effect on close cycle cooling water system.

**Package and Storage**

25Kg/bag or customers' requirement. Easy to wet, please put in aeration, dryness place, do not mix it with food and seed.

**Synonyms**

TTA;Methylbenzotriazole;Tolyltriazole;

**Sodium Salt of Methylbenzotriazole (TTA•Na)****CAS No.** 64665-57-2**Molecular formula:** C<sub>7</sub>H<sub>6</sub>N<sub>3</sub>Na**Molecular Weight:** 155.13**Molecular Structure****Specification**

Items	Index
Appearance	Amber transparent liquid
Active content (wt) %	50.0min
Density (20°C) g/cm <sup>3</sup>	1.2min

**Properties**

**TTA•Na** can be used as corrosion inhibitor of copper and copper alloy, it also has corrosion inhibition for black metals. **TTA•Na** is absorbed on metal surface to form a thin membrane to protect copper and other metals from corrosion of air and other harmful subjects. The membrane is more uniform. When used together with MBT, the effect is better.

**Usage**

First, dissolved with alcohol or alkali, then added into circulating water system, the dosage of 2-10mg/L is preferred. If the metal is badly corroded, 5-10 times of normal dosage should be expected.

**Package and Storage**

200L plastic drum,IBC(1000L),customers' requirement. Storage in shady room and dry place.

**Keywords**

TTA•Na ; Sodium Salt of Methylbenzotriazole;Sodium of Tolyltriazole; Sodium 4(or 5)-methyl-1H-benzotriazolide

## Corrosion Inhibitor for Hydrochloric Acid Cleaning

### Properties and Usage

Corrosion Inhibitor for Hydrochloric Acid Cleaning is a kind of imidazoline corrosion inhibitor. When cleaning metal using hydrochloric acid, this product can effectively inhibit steel corrosion.

### Specification

Items	Index
Appearance	Dark brown liquid
Solid content,%	50.0 min

### Usage

The condition for using Corrosion Inhibitor for Hydrochloric Acid Cleaning is that the cleaning media is hydrochloric acid and the cleaning object is black metals. Corrosion Inhibitor for Hydrochloric Acid Cleaning is suitable for acid cleaning of all types of high, medium and low pressure boiler, large scale of equipment and pipelines. When the dosage is 1-3‰, The corrosion ratio will be lower than 1g/m<sup>2</sup>•h.

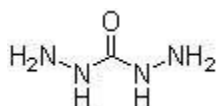
### Package and Storage

25kg or 250kg in plastic barrel, or confirmed by clients. Storage for ten months in room shady and dry place.

### Keywords

Corrosion Inhibitor for Hydrochloric Acid Cleaning



**Carbohydrazide****CAS No.** 497-18-7**Molecular Formula:** CH<sub>6</sub>N<sub>4</sub>O**Structural Formula****EINECS:** 207-837-2**Molecular Weight:** 90.08**Property**

Carbohydrazide is a white crystal line powder or pellets. The active content of Carbohydrazide is 98.0-100.9%.

**Specification**

Items	Index
Appearance	White crystal line powder or pellets
Active Content (%)	98.0-100.9%
PH (12% Solution, @ 25 °C)	8.45±1.25
Free Hydrazine	≤250ppm
Chloride (Cl)	≤10ppm
Sulfate (SO <sub>4</sub> )	≤20ppm
Silica (SiO <sub>2</sub> )	≤10ppm
Copper (Cu)	≤1ppm
Iron (Fe)	≤4ppm
Sodium (Na)	≤4ppm
Lead (Pb)	≤4ppm
Moisture	≤0.2%

**Usages**

Carbohydrazide can be used as an oxygen scavenger to prevent corrosion especially in boiler feed system, a rocket propellant components, color images and the quality of soap stabilizers, antioxidants rubber, boiler water deoxidants and metal passivation agents, Carbohydrazide also used as an intermediate for organic synthesis.

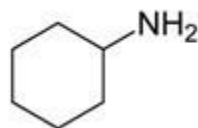
**Package and Storage**

Packed in 25kg or 50kg in woven bag or in fibre drum.

Store in a cool, dry, well-ventilated area away from incompatible substances. Keep container closed when not in use.

**Keywords**

Carbohydrazide; 1,3-Diaminourea; Carbonic Dihydrazide; CHZ Oxygen Scavenger

**Cyclohexylamine (CHA)****CAS No.** 108-91-8**Molecular Formula:** C<sub>6</sub>H<sub>13</sub>N**Structural Formula****Molecular Weight:** 99.17**Properties**

Cyclohexylamine is colorless to pale yellow clear liquid, no visible impurities. Cyclohexylamine has strange odor. Cyclohexylamine is a strong organic caustic liquid, Cyclohexylamine can form azeotrope with water at 96.40°C, miscible with a lot of organic solvents.

**Specification**

Item	Index
Appearance	Colorless liquid and smelly odor
Purity	99.5%
Relative Density	0.8647(25/25°C)
BP	134.5°C
Flash Point (open)	32.22°C
Melting Point	-17~-18°C
Refractive Index	1.4585

**Use**

Cyclohexylamine is used as an intermediate for organic synthesis. Additionally, Cyclohexylamine could also be especially used for herbicides, antioxidants & vulcanization accelerator, corrosion inhibitors, artificial sweetener and so on.

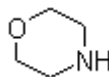
**Package and Storage**

Sealed, in metal pail , 150kg or 170kg/drum.

Cyclohexylamine should be packed in cool, dry and airiness place, far away from fire and heat, toxic chemicals.

**Keywords**

Cyclohexylamine, aminocyclohexane, hexamethylene, hexahydrobenzene, hexanaphthene, CHA

**Morpholine****CAS NO.** 110-91-8**Molecular formula:** C<sub>4</sub>H<sub>9</sub>NO**Molecular Structure****EINECS:** 203-815-1**Molecular weight:** 87.12**Specification**

Items	Index
Active content:	99%
Density:	0.999 g/ml
Melting pointMelting point:	-4.9°C
Boiling point:	128°C
Flammable temperature:	310°C
Flash point:	35°C
Danger class:	8 (corrosive liquid)
Chroma (platinum-cobalt )	≦ 15
Boiling range°C	126-130

**Applications**

Morpholine are mainly used to manufacture rubber accelerant (such as NOBS, OTOS and MDS), sulfuration agent (like DT-DM), cleanser, descaling agent, antirust, anti-scorching agent, antiseptic, surfactant, textile printing & dyeing agent, optical bleaching agent, chemical plating bath, antioxidant, hydrolyzing agent, initiator, developer, fruit preserving agent, deodorizer, brightener and organic solvents. It is widely used in many industries such as medicine, pesticide, animal medicine, petroleum and extraction of coke aromatic hydrocarbont.

In foreign countries, a great deal of morpholine is used for antirust, descaling and metal cleaning, especially for antirust and anticorrosive in high temperature conditions. In boiler maintenance fields, amount of morpholkine is also used as descaling agent. Owing to its unique chemical characters, morpholine has become one of the most important fine petroleum chemical products.

**Keywords**

Morpholine, 1-Oxa-4-azacyclohexane, Tetrahydro-2H-1,4-oxazine

**Hydrazine hydrate****CAS No.** 10217-52-4**Molecular Formula:**  $H_4N_2 \cdot H_2O$ **Molecular Weight:** 50.06**Specification**

<b>Item</b>	<b>Index</b>	
Appearance	Colorless transparent liquid	
N <sub>2</sub> H <sub>4</sub> ·H <sub>2</sub> O %	80.0 min	55.0 min
N <sub>2</sub> H <sub>4</sub> %	51.2 min	35.2 min
Non-volatile Matter %	0.02max	0.09 max
Fe %	0.0005 max	0.009 max
Pb %	0.0005 max	0.002 max
Chloride %	0.003 max	0.03 max
SO <sub>4</sub> <sup>2-</sup> %	0.002 max	0.005 max
PH(1% water solution)	10-11	
TOC (mg/L)	5 max	

**Applications**

It could mix with water and ethanol in any proportion, not soluble in chloroform and ether, Once it meet with carbon dioxide in the air can produce white smoke.

With a weak alkaline and strong reduction, reacts with the acid and it could be combustion by oxidant, It could be used as Pharmaceutical intermediates, manufacturing high-purity metals, synthetic fibers, dyes, ADC foaming agent of raw materials, high-pressure boiler oxygen scavenger, reducing agent.

**Packaging**

Polyethylene plastic drum, net weight 200kg.

**Keywords**

Hydrazine hydrate

## IR-0100 Antiscalant and Dispersant for RO Membrane

### Properties

IR-0100 is a high-effective scale inhibitor, it is suitable for reverse osmosis (RO), nanofiltration (NF) and ultrafiltration (UF) system. It can inhibit the scale deposit on membrane surface, improve water quality, lower operation expense. This product has the following properties:

- (1). Inhibit inorganic scale formation for a wide concentration span, the largest permitted LSI value is 2.8 when no acid is added.
- (2). Not flocculate with ferric oxide, alumina oxide or silica oxide to form suspended substance;
- (3). Inhibit the pollution from ferric, aluminium or heavy metals pollutants. The permitted ferric concentration for inlet water supply can reach to 8.0ppm.
- (4). Inhibit the flocculate and deposit of silica, the permitted silica concentration for condense side can reach to 290ppm.
- (5). Be used in CA, TFC, NF and UF membranes for RO system.
- (6). Good solubility and stability.
- (7). Effective in pH 5-10.

### Specification

Items	Index	
	Appearance	Clear liquid
pH Value, (1% water solution)	2.0±0.5	2.5±0.5
Density (20°C)g/cm <sup>3</sup>	1.03-1.06	1.45±0.05
Main content	Micromolecular containing P	Micromolecular containing P
Decomposition product under high temperature	orthophosphate	orthophosphate

### Package and Storage

The original package is 8 times condense liquid, 5 gallon (27.55kg) per barrel. After diluting 8 times, 220.4kg per barrel.

### Usage Method

The dosage is determined by water quality analysis and condition of reverse osmosis system. In the recommended range of dosage, most scales can be under control such as calcium carbonate, calcium sulfate, barium sulfate, ferric hydroxide, aluminium hydroxide and silica.

The following formula can be used to calculate the IR-0100 volumes required to add to medicine box:

$$U = \frac{Q \times a \times V}{8 \times 1000 \times \rho \times x}$$

where: U— condense liquid volumes required, Litre, (L)

Q— reverse osmosis water supply flow, tons/hour (T/h)

a— dosage required, gram/ton, (ppm, g/T) (standard liquid) V—

— effective volume of medicine box, litre (L)

ρ— density of the IR-0100, kg/L, the density is 1.45

x— the actual flow of medicine operation pump, litre/hour (L/h)

1000 — conversion coefficient

8 — condense index

Notes: the value a (dosage required) can refer to the special software of QingLi Company.

### Keywords

IR-0100 Antiscalant and Dispersant for RO Membrane

## **IR-150 Antiscalant and Dispersant for RO Membrane**

### **Properties**

IR-150 is a high-effective scale inhibitor, it is suitable for reverse osmosis (RO), nanofiltration (NF) and ultrafiltration (UF) system. IR-150 can inhibit the scale deposit on membrane surface, improve water quality, lower operation expense. IR-150 has the following properties:

1. Used together with organic flocculants.
2. Used for drinking water system.
3. Inhibit scales formation of calcium carbonate, calcium sulfate, barium sulfate and strontium sulfate, no scale is formed even when LSI value is 3.0.
4. Used for almost all RO membranes.
5. Maintain the surface of RO membrane clean by dispersing particle blockage.
6. Effective in pH 5-9.
7. Used directly, or after dilution.
8. Good resistance to alumina oxide and ferric oxide.

### **Specification**

<b>Items</b>	<b>Index</b>
Appearance	Amber transparent liquid
pH Value, (1% water solution)	2.85±1.0
Density (20°C)g/cm <sup>3</sup>	1.10 min

### **Package and Storage**

25kg barrel or confirmed by clients.

### **Usage Method**

For best effective, IR-150 should be added before static mixer or cylindrical filter, the dosage of 3-6mg/L is expected, it can be diluted by RO liquid or by deionized water.

Notes: extra or insufficient dosage will do harm to the RO membrane.

### **Keywords**

IR-150 Antiscalant and Dispersant for RO Membrane

## **IR-200 RO Antiscalant and Dispersant**

### **Properties**

IR-200 is a high-effective scale inhibitor, it is suitable for reverse osmosis (RO), nanofiltration (NF) and ultrafiltration (UF) system. It can inhibit the scale deposit on membrane surface, improve water quality, lower operation expense. This product has the following properties:

1. Used together with organic flocculants.
2. Used for drinking water system.
3. Inhibit scales formation of calcium carbonate, calcium sulfate, barium sulfate and strontium sulfate, no scale is formed even when LSI value is 3.0.
4. Used for almost all RO membranes.
5. Maintain the surface of RO membrane clean by dispersing particle blockage.
6. Effective in pH 5-9.
7. Used directly, or after dilution.
8. Good resistance to alumina oxide and ferric oxide.

### **Specification**

<b>Items</b>	<b>Index</b>
Appearance	Orange transparent liquid
pH , (1% water solution)	5.0±1.5
Density (20℃)g/cm <sup>3</sup>	1.10±0.05

### **Package and Storage**

25kg barrel or confirmed by clients.

### **Usage Method**

For best effective, IR-200 should be added before static mixer or cylindrical filter, the dosage of 3-6mg/L is expected, it can be diluted by RO liquid or by deionized water.

Notes: extra or insufficient dosage will do harm to the RO membrane.

### **Keywords**

IR-200 Reverse Osmosis Chemicals

## IR-191 Antiscalant and Dispersant for RO Membrane

### Properties

IR-191 is mainly used in RO membrane system, it can be used as antiscalant and anti-choking agent in high salt water and drinking water. It has the following properties:

1. Used in many water quality system, high scale inhibition ability.
2. Lower scale deposit and reduce RO pipeline cleaning frequency.
3. Reduce or replace the acid fill treatment.
4. Good economic effect.
5. Suitable for all RO pipeline type, and as an effective ferrum insulator.
6. Stable and effective than calgon(SHMP).
7. High water flux density for RO pipeline.

### Specification

Items	Index
Appearance	Light yellow transparent liquid
pH Value, (1% water solution)	10.0-11.0
Density (20°C)g/cm <sup>3</sup>	1.16-1.36
Solubility	Soluble well in any ratio

### Package and Storage

25kg barrel or confirmed by clients. It can be stored for one years.

### Usage Method

For best effective, IR-200 should be added before static mixer or cylindric filter, the dosage of 1-4mg/L is expected, it can be diluted by RO liquid or by deionized water.

Notes: extra or insufficient dosage will do harm to the RO membrane.

### Keywords

IR-191 Antiscalant and Dispersant for RO Membrane



**IRASD-200 Antiscalant and Dispersant for RO Membrane**

**Properties**

IRASD-200 is used for RO, nf and uf system, it can effectively inhibit scaling on membrane surface, improve water quality and lower operation cost. IRASD-200 has the following properties:

- (1)original liquid is 11 times concentrate, 90% transportation cost and storage space is saved.
- (2)prevent pollution from inorganic salt, metal scale and some organic substances;
- (3)not flocculate with ferric oxide, alumina oxide or silica oxide to form suspended substance;
- (4)effectively control the pollution of ferric, aluminium and heavy metal;
- (5)no content of any phosphate or phosphorous;
- (6)used in RO ca, tfc, nf and uf membranes;
- (7)good solubility and stability;
- (8)stable in extreme pH and temperature;
- (9)due to IRASD-200 special molecular structure, it is safe to membrane. Even high medicine input (equipment trouble, for example) will not lead to its deposit, crystallization or adsorption on membrane surface and lead to membrane blockage.

**Specification**

<b>Items</b>	<b>11 times concentrated solution</b>
Appearance	Clear transparent liquid
pH(1% water solution)	2.5±0.5
Density (20°C)g/cm <sup>3</sup>	1.20±0.05

**Usage**

Mix with RO outflow or desalted water. The dosage should be determined by water quality and referred to suppliers. The dosage of 3ppm is preferred.

**Package**

200L plastic drum,IBC(1000L),customers' requirement.

**Keywords**

IRASD-200 Antiscalant and Dispersant For RO Membrane

### **IR-260 Acid Detergent for RO Membrane**

#### **Properties**

1. Suitable for all aromatic polyamide membranes.
2. Low froth formula.
3. Diluent pH 3.0-4.0.
4. Liquid chemicals, mix well.
5. Can be used repeatedly.

IR-260 is an acid liquid formula, it can remove metal hydroxide, calcium carbonate and other types of scales.

#### **Dosage**

Dilute to 1-3%(1:45)

#### **Specification**

<b>Items</b>	<b>Index</b>
Appearance	Amber transparent liquid
pH , (1% water solution)	1.0-3.0
Density (20°C)g/cm <sup>3</sup>	1.30±0.05
Storage temperature	Not lower than -10°C

#### **Usage**

- (1)Check water box, pipeline and filter, change the filter material if needed.
- (2)Input q.v. RO effluence to water box.
- (3)Input q.v. IR-260 to water box, mix the solution with water pump, measure pH.
- (4)Clean the system repeatedly, measure pH 5-20 minutes. After pH rise to 4, input q.v. IR-260 or acid, till pH not rise, meaning cleaning is end.
- (5)If pollution is serious, sometimes the first batch detergent should be evacuated and the next batch should be required.
- (6)Pay attention to solution temperature, don't exceed the required temperature .

#### **Package**

25kg per barrel.

#### **Keywords**

IR-260 Acid Detergent for RO Membrane

**IR-261 Alkali Detergent for RO Membrane****Properties**

The operation stability of RO system is determined by the pretreatment of original water quality. For any RO system, after 3-12 months, it should be polluted, thus the chemical cleaning is required. IR-261 is an alkali detergent designed for removal of oil, organic substances and bio-mucosa. It has the following properties

1. Suitable for all aromatic polyamide and acetate acid membranes.
2. Effectively remove oil, organic substances and bio-mucosa from membrane surface.
3. Temperature increased, the effect will be better.
4. Diluent pH  $10.5\pm 0.5$
5. Liquid chemicals, mix well.
6. Can be used repeatedly.

IR-261 is an alkali liquid formula, it can remove oil, organic substances and bio-mucosa.

**Dosage**

Dilute to 1-3%(1:45)

**Specification**

Items	Index
Appearance	Amber liquid
pH , (1% water solution)	10.0-11.0
Density (20°C)g/cm <sup>3</sup>	1.10±0.05
Storage temperature	Not lower than -5°C

**Usage**

- (1) Check water box, pipeline and filter, change the filter material if needed.
- (2) Input q.v. RO effluence to water box.
- (3) Input q.v. IR-260 to water box, mix the solution with water pump, measure pH.
- (4) Clean the system repeatedly, measure pH 5-20 minutes. After pH rise to 4, input q.v. IR-260 or acid, till pH not rise, meaning cleaning is end.
- (5) If pollution is serious, sometimes the first batch detergent should be evacuated and the next batch should be required.
- (6) Pay attention to solution temperature, don't exceed the required temperature .

**Package**

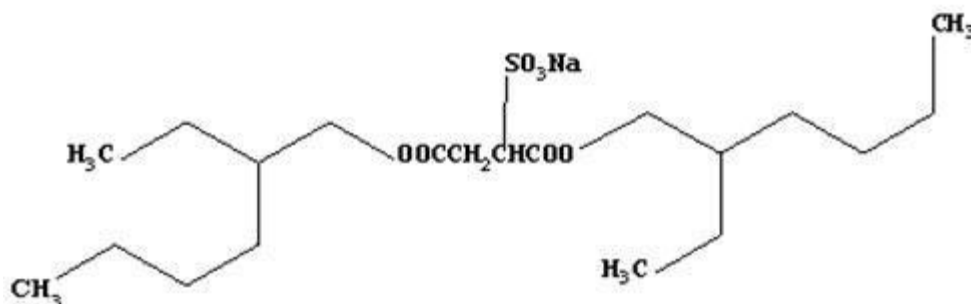
25kg per barrel.

**Safety and Protection**

Alkaline, Avoid contact with eye and skin, once contacted, flush with water.

**Keywords**

IR-261 Alkali Detergent for RO Membrane

**Sodium Diethylhexyl Sulfosuccinate****Synonyms: Penetrant OT, Penetrating agent T****CAS No.** 1639-66-3**Molecular weight:** 444.56**Molecular formula:** C<sub>20</sub>H<sub>37</sub>NaO<sub>7</sub>S**Structural Formula****Properties**

This product is an anionic surfactant, it has properties of rapid penetration, homogeneity, wetting, emulsification and better frothing. It is intolerant with strong acid, strong alkali, heavy metals and reductant.

This product is soluble in water, lower alcohol, benzene, ccl4 and kerosene oil solvents. The solution is milk white, pH (1% water solution) is 6.5±0.5.

This product can penetrate rapidly and homogeneously, and has good effect at temperature lower than 40°C and pH 5-10. The treated fabric is stable even temperature acidic and alkalic condition changed. It's widely used textile & dyeing, pesticide emulsification, tanning and mineral separation.

**Specification**

Items	Index
Appearance	Colorless or yellowish liquid
pH (1% water solution)	6.5±0.5
Penetrating (1% water solution)	≤5s
Solid content %	50±2

**Methods and Usage**

- (1) Cotton wool dyeing: 2g/l of this product is heated from room temperature to 95°C, 20 min dehydration, then rolling drift after cooling, cleaning, dechloridation.
- (2) Cotton wool lian drift: cotton wool is pretreated at 20°C for 5 min, then other additives can be added, it is heated to 80-90°C in 20-30 min, and is treated for 45 min. When cotton shell is removed, it can be dyed. The preferred dosage is 2-3g/l.
- (3) Cotton wool lian, drift and dyeing: The direct or active dye which is oxidant tolerance is selected. The method is the same as 2, dyeing is added directly.
- (4) Scouring of adhesive: addition of penetrant t in scouring of adhesive can reduce 2 h and decrease damage to silk.
- (5) Usage in asbestos: for froth asbestos, the preferred dosage is 10-15% of asbestos; for dustless asbestos, the preferred dosage is 15-20% of asbestos.
- (6) Usage in tanning: for dry tanning, this product is usually mixed with jfc, and the preferred dosage is 0.5-1.0%. For tanning additives, the preferred dosage is 10%.

**Package and Storage**

Package: 200L plastic drum,IBC(1000L),customers' requirement.

Shelf life: two years.

**Attentions**

- (1) This product should better be used under 40°C for silk, it can decomposed in high temperature and alkali. Thus, it is first treated with silk under 40°C, then it is heated. For asbestos, it is first pulped into slurry with asbestos, then it is heated to 200-300°C.
- (2) This product is intolerant with strong alkali. Diluted with water first.
- (3) This product is anionic surfactant, it cannot mixed with cationic surfactant or cationic dye.
- (4) The slurry should better be cleaned in lian drift in order to guarantee its effect.
- (5) If too many froth is occurred, antifother such as octanol, tributyl phosphate can be used.