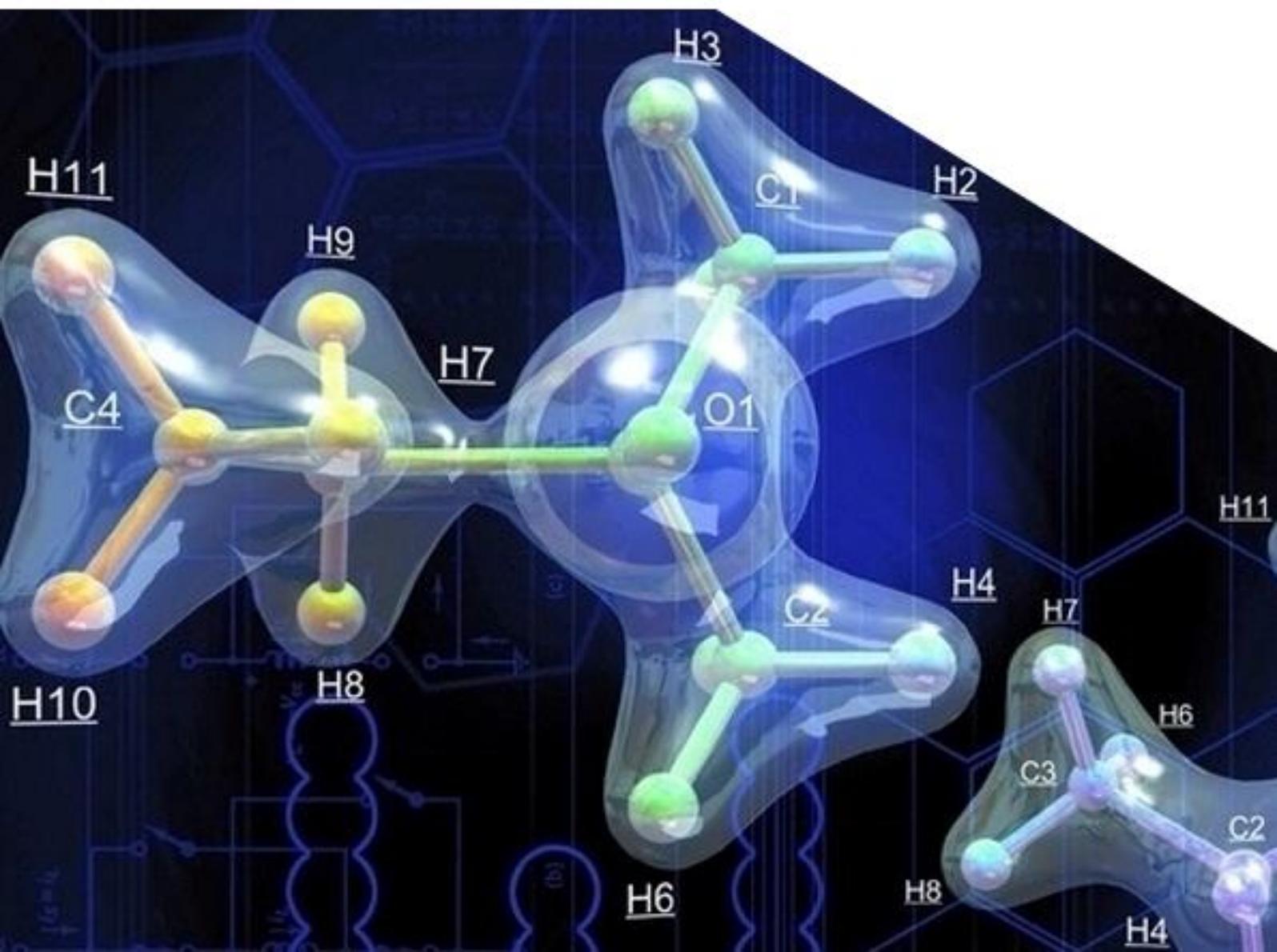


# **Mining Reagents**

## *BROCHURE*



# ABOUT US

Founded in 2001, Yantai Humon Chemical Auxiliary Co., Ltd., a large flotation reagents manufacturer under Yantai Humon Group Company, is located in Shandong Peninsula with beautiful scenery, and convenient transportation. The company always adheres to the business principle “quality first, credit first, customers first”, and through optimizing operational processes, constantly developing new and efficient flotation reagents, we help our customers to maximize their economic benefits. Today, Yantai Humon Chemical Auxiliary Co., Ltd. has developed into a modern large-scale flotation reagents manufacturer with 150,000 square meters of production base, and involved in new products development, production, sales and service. The company has passed the ISO9001: 2008 and ISO14001: 2004. Yantai Humon Chemical Auxiliary Co., Ltd. is taking its own power and looking globally to step into the international arena.

The company produces about 50,000 tonnes of various flotation reagents every year, which includes Xanthate Series 30,000 tonnes per year, Dithiophosphate Series 5000 tonnes per year, Isopropyl Ethyl Thionocarbamate 3,500 tonnes per year, Sodium Mercaptoacetic 4500 tonnes per year, Isooctyl Thioglycolate 3,000 tons per year, Coal Dressing 5000 tons per year, and MIBC, Diethyldithiocarbamate, Foaming agents,

Activators, sewage treatment agents, nonmetallic flotation reagents etc. More than 60% products are exported to Canada, Australia, New Zealand, Chile, Peru, South Africa, Vietnam, Philippines and other dozens of countries and regions. Based on the excellent products and services, Humon Chemical Auxiliary has won a good reputation among our customers.

Based on strong economic power, Humon Chemical Auxiliary has always taken its own advantages to introduce advanced equipment, technologies and talents in scientific research. Currently, the company has 52 sets of advanced xanthate synthesizing reactors, 80 sets of xanthate granulators and driers, 10 sets of advanced dithiophosphate reactors, and more than 100 sets of equipment used in the production of Isopropyl Ethyl Thionocarbamate, Sodium Mercaptoacetic and Isooctyl Thioglycolate etc. Besides, we've set up new projects for comprehensive utilization of mixing alcohol, reagents application analysing lab, mineral analysing lab, and reagents analysing lab, which has helped to build a solid foundation for the high quality and high demand products.

“Social commitment, integrity based”. With glory and dream, Humon people are willing to work together with our customers to create a better tomorrow.

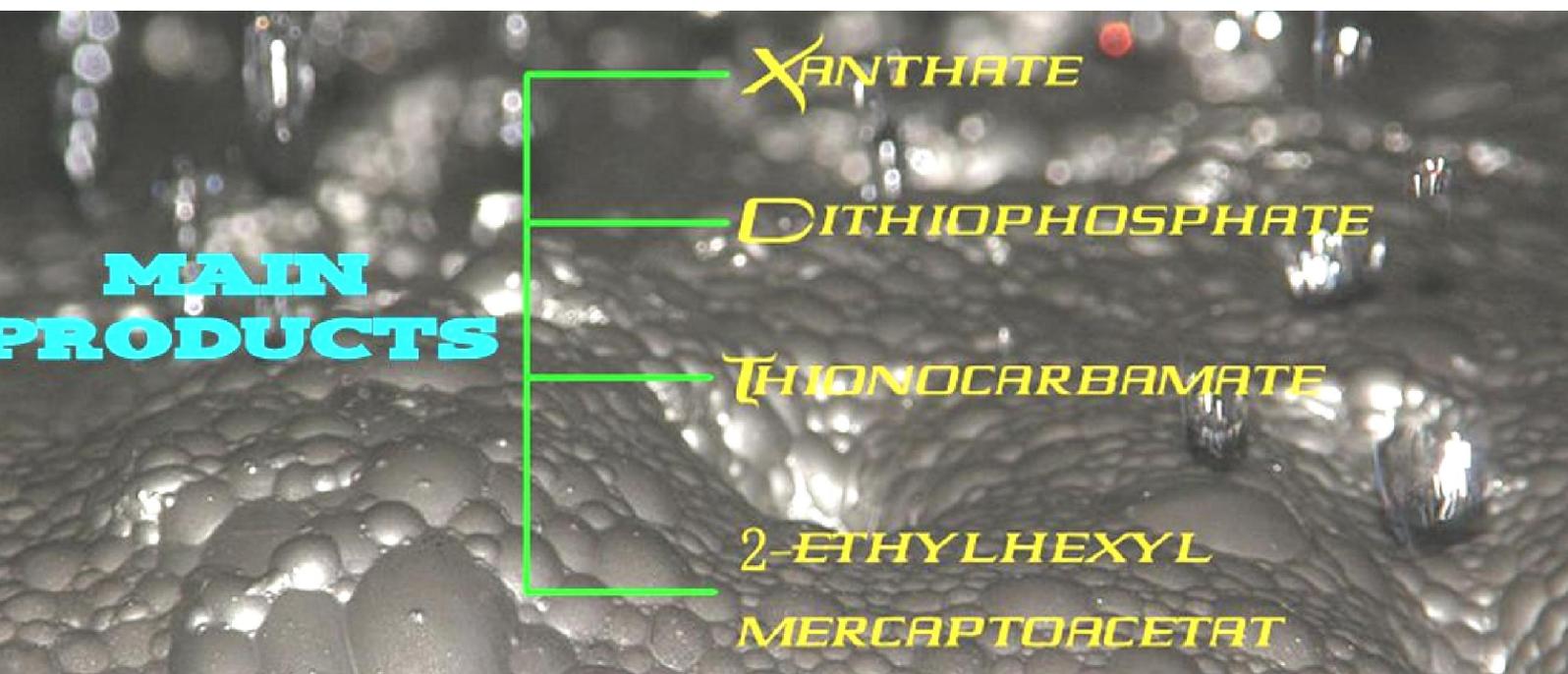


**QUALITY  
ABOVE ALL**



*Our main products*

Reagent	Name	Cas No	MF	Form
<b><i>Xanthate</i></b>	Sodium Ethyl Xanthate (SEX)	140-90-9	C <sub>2</sub> H <sub>5</sub> OCSNa	Solid
	Sodium Isopropyl Xanthate (SIPX)	140-93-2	C <sub>4</sub> H <sub>7</sub> NaOS <sub>2</sub>	Solid
	Sodium Isobutyl Xanthate (SIBX)	25306-75-6	(CH <sub>3</sub> ) <sub>2</sub> CHCH <sub>2</sub> OCS <sub>2</sub> Na	Solid
	Potassium Ethyl Xanthate (PEX)	140-89-6	CH <sub>3</sub> CH <sub>2</sub> OCS <sub>2</sub> K	Solid
	Potassium Isobutyl Xanthate (PIBX)	13001-46-2	(CH <sub>3</sub> ) <sub>2</sub> CHCH <sub>2</sub> OCS <sub>2</sub> K	Solid
	Potassium butyl Xanthate (PBX)	871-58-9	C <sub>4</sub> H <sub>9</sub> OCS <sub>2</sub> K	Solid
	Potassium Amyl Xanthate (PAX)	2720-73-2	C <sub>6</sub> H <sub>12</sub> OS <sub>2</sub> K	Solid
<b><i>Dithiophosphate</i></b>	Sodium diethyl dithiophosphate	3338-24-7	C <sub>4</sub> H <sub>10</sub> NaO <sub>2</sub> PS <sub>2</sub>	Liquid
	Sodium Diisopropyl Dithiophosphate	27205-99-8	C <sub>6</sub> H <sub>14</sub> NaO <sub>2</sub> PS <sub>2</sub>	Liquid
	Sodium Dibutyl Dithiophosphate	10533-41-2	C <sub>8</sub> H <sub>18</sub> NaO <sub>2</sub> PS <sub>2</sub>	Liquid
	Sodium Diisobutyl Dithiophosphate	53378-51-1	C <sub>8</sub> H <sub>18</sub> NaO <sub>2</sub> PS <sub>2</sub>	Liquid
	Sodium Disecbutyl Dithiophosphate	33619-92-0	C <sub>8</sub> H <sub>18</sub> NaO <sub>2</sub> PS <sub>2</sub>	Liquid
	Dithiophosphate 25	27157-94-4	(C <sub>7</sub> H <sub>7</sub> O) <sub>2</sub> PSSH	Liquid
<b><i>Thionocarbamate</i></b>	Isopropyl Ethyl Thionocarbamate	141-98-0	(CH <sub>3</sub> ) <sub>2</sub> CHOCSNHC <sub>2</sub> H <sub>5</sub>	Liquid



**MINING**  
*Technical data sheet*

**Sodium Ethyl Xanthate**

**Specification**

Classification: Sodium Organic Salt

Cas No: 140-90-9

Appearance: pale yellow or yellow-green granula or free-flowing powder

Purity: 85.00% or 90.00% Min

Free Alkali: 0.2% Max

Moisture & Volatile: 4.00% Max

Validity: 12 Months

**Application**

Sodium Ethyl Xanthate is the shortest carbon chain of the available xanthates, which is widely used as flotation reagent and improve the grade and recovery. This mining flotation reagent is a low-cost but a high selective collector of available

xanthates, and it is most useful in the flotation of sulphide ore and multi-metallic ore for maximum selectivity.

Feeding method: 10-20% solution

Usual dosage: 10-100g/ton

**Storage & Handling**

**Storage:** Store solid xanthates in original properly sealed containers under cool dry conditions away from sources of ignition.

**Handling:** Wear protective equipment. Keep away from sources of ignition. Use non sparking tools. Equipment should be earthed to avoid static discharge. All electronic equipment should be adjusted for work in explosive environment.

**Packaging**

<i>Type</i>	<i>Packing</i>	<i>Quantity</i>
Steel drum	UN approved 110kg net full opened head steel drum with polyethylene bag lining inside	134 drums per 20'FCL, 14.74MT
	UN approved 170kg net full opened head steel drum with polyethylene bag lining inside 4 drums for each pallet	80 drums per 20'FCL, 13.6MT
Wooden box	UN approved 850kg net jumbo bag inside UN approved wooden box on pallet	20 boxes per 20'FCL, 17MT

## Sodium Isopropyl Xanthate

### Specification

Classification: Sodium Organic Salt

Cas No: 140-93-2

Appearance: slight yellow to yellow-green or grey granula or free-flowing powder

Purity: 85.00% or 90.00% Min

Free Alkali: 0.2% Max

Moisture & Volatile: 4.00% Max

Validity: 12 Months

### Application

Sodium Isopropyl Xanthate is widely used as flotation reagents in the mining industry for multi-metal sulphide ore for good compromise between collecting power and selectivity. It can float all sulfides but is not recommended for scavenging or high grade sulfides because of the larger retention time required to get desired recovery levels. It is most commonly used in zinc flotation circuits because it is selective against iron sulfides at high pH (10 Min) while aggressively collecting the copper-activated zinc.

It has also been used to float pyrite and pyrrhotite if the iron sulfide grade is fairly low and the pH is low. It is recommended for copper-zinc ores, lead-zinc ores, copper-lead-zinc ores, low grade copper ores, and low grade refractory gold ores, but not recommended for oxidized or tarnished ores due to its lack of pulling power. It is also used as vulcanization accelerator for rubber industry as well.

Feeding method: 10-20% solution

Usual dosage: 10-100g/ton

### Storage & Handling

**Storage:** Store solid xanthates in original properly sealed containers under cool dry conditions away from sources of ignition.

**Handling:** Wear protective equipment. Keep away from sources of ignition. Use non sparking tools. Equipment should be earthed to avoid static discharge. All electronic equipment should be adjusted for work in explosive environment.

### Packaging

<i>Type</i>	<i>Packing</i>	<i>Quantity</i>
Steel drum	UN approved 110kg net full opened head steel drum with polyethylene bag lining inside	134 drums per 20'FCL, 14.74MT
	UN approved 170kg net full opened head steel drum with polyethylene bag lining inside 4 drums for each pallet	80 drums per 20'FCL, 13.6MT
Wooden box	UN approved 850kg net jumbo bag inside UN approved wooden box on pallet	20 boxes per 20'FCL, 17MT



## Sodium Isobutyl Xanthate

### Specification

Classification: Sodium Organic Salt

Cas No: 25306-75-6

Appearance: pale yellow or yellow-green granula or free-flowing powder

Purity: 85.00% or 90.00% Min

Free Alkali: 0.2% Max

Moisture & Volatile: 4.00% Max

Validity: 12 Months

### Application

Sodium isobutyl xanthate is a stronger collector in the flotation of various nonferrous metallic sulfide ores. It is mainly used in the flotation of copper, lead, zinc ect. sulfide ores. It has displayed

especially effective in the flotation of copper ores and of pyrites in natural circuits.

Feeding method: 10-20% solution

Usual dosage: 10-100g/ton

### Storage & Handling

**Storage:** Store solid xanthates in original properly sealed containers under cool dry conditions away from sources of ignition.

**Handling:** Wear protective equipment. Keep away from sources of ignition. Use non sparking tools. Equipment should be earthed to avoid static discharge. All electronic equipment should be adjusted for work in explosive environment.

### Packaging

<i>Type</i>	<i>Packing</i>	<i>Quantity</i>
Steel drum	UN approved 110kg net full opened head steel drum with polyethylene bag lining inside	134 drums per 20'FCL, 14.74MT
	UN approved 170kg net full opened head steel drum with polyethylene bag lining inside 4 drums for each pallet	80 drums per 20'FCL, 13.6MT
Wooden box	UN approved 850kg net jumbo bag inside UN approved wooden box on pallet	20 boxes per 20'FCL, 17MT

## Sodium N-Butyl Xanthate

### Specification

Classification: Sodium Organic Salt  
 Cas No: 141-33-3  
 Appearance: pale yellow or yellow-green granula or free-flowing powder

Purity: 85.00% or 90.00% Min  
 Free Alkali: 0.2% Max  
 Moisture & Volatile: 4.00% Max  
 Validity: 12 Months

### Application

Sodium N-Butyl Xanthate is a very powerful collector with strong selectivity, widely used in the flotation treatment of sulfide multi-metallic ores, especially used in the flotation of natural circuit for copper ores and pyrite, like chalcopyrite, sphalerite, pyrite etc. It is also used in flotation of nickel ores, especially for the flotation treatment of Cu-Ni compound sulfide ore as well as gold mine associated with pyrite. It can also get

satisfactory results when used in lead oxide copper ores. Commonly used in the process of rough flotation and scavenging flotation. Under the proper conditions, it can be used in the selective flotation of copper sulfide minerals from iron sulfide minerals and in the flotation of sphalerite after activation with copper sulphate.

Feeding method: 10-20% solution  
 Usual dosage: 10-100g/ton

### Storage & Handling

**Storage:** Store solid xanthates in original properly sealed containers under cool dry conditions away from sources of ignition.

**Handling:** Wear protective equipment. Keep away from sources of ignition. Use non sparking tools. Equipment should be earthed to avoid static discharge. All electronic equipment should be adjusted for work in explosive environment.

### Packaging

<i>Type</i>	<i>Packing</i>	<i>Quantity</i>
Steel drum	UN approved 110kg net full opened head steel drum with polyethylene bag lining inside	134 drums per 20'FCL, 14.74MT
	UN approved 170kg net full opened head steel drum with polyethylene bag lining inside 4 drums for each pallet	80 drums per 20'FCL, 13.6MT
Wooden box	UN approved 850kg net jumbo bag inside UN approved wooden box on pallet	20 boxes per 20'FCL, 17MT

**MINING**  
*Technical data sheet*

**Potassium Amyl Xanthate**

**Specification**

Classification: Potassium Organic Salt  
 Cas No: 140-90-9  
 Appearance: pale yellow or yellow-green granula or free-flowing powder

Purity: 90.00% Min  
 Free Alkali: 0.2% Max  
 Moisture & Volatile: 4.00% Max  
 Validity: 12 Months

**Application**

Potassium amyl xanthate is one of the most powerful flotation collector widely used in mineral processing. It is relatively unselective, and has a strong tendency to float iron sulfides unless depressants are used. It is used as a good mining reagent for the flotation treatment of all sulfide minerals, Cu/Ni sulphide ore, zinc ores, as well as gold associated with pyrite( gold containing iron sulfides). This mining chemical tends to recover

all sulfides if circuit pH is maintained between pH 7 and pH 9.

It can be mixed with Potassium ethyl xanthate (PEX) and Sodium isopropyl xanthate (PAX) to create a collector with the selectivity of PEX and SIPX and the collecting power of Potassium amyl xanthate (PAX)

Feeding method: 10-20% solution  
 Usual dosage: 10-100g/ton

**Storage & Handling**

**Storage:** Store solid xanthates in original properly sealed containers under cool dry conditions away from sources of ignition.

**Handling:** Wear protective equipment. Keep away from sources of ignition. Use non sparking tools. Equipment should be earthed to avoid static discharge. All electronic equipment should be adjusted for work in explosive environment.

**Packaging**

<i>Type</i>	<i>Packing</i>	<i>Quantity</i>
Steel drum	UN approved 120kg net full opened head steel drum with polyethylene bag lining inside	134 drums per 20'FCL, 16.08MT
	UN approved 180kg net full opened head steel drum with polyethylene bag lining inside 4 drums for each pallet	80 drums per 20'FCL, 14.4MT
Wooden box	UN approved 900kg net jumbo bag inside UN approved wooden box on pallet	20 boxes per 20'FCL, 18MT

**MINING**  
*Technical data sheet*

**Potassium Ethyl Xanthate**

**Specification**

Classification: Potassium Organic Salt  
 Cas No: 140-89-6  
 Appearance: pale yellow or yellow-green granula  
 or free-flowing powder

Purity: 85.00% or 90.00% Min  
 Free Alkali: 0.2% Max  
 Moisture & Volatile: 4.00% Max  
 Validity: 12 Months

**Application**

Potassium ethyl xanthate (PEX) is best for the recovery of sulfides that are relatively hydrophobic like galena. It is recommended for lead-zinc ores, low grade copper ores, and ores that contain a minimal amount of zinc, but it is not recommend for partially oxidized ores because it

will not have the pulling strength to recover wanted minerals.  
 Collector PEX will be more selective against iron sulfides than other xanthates at low PH.  
 Feeding method: 10-20% solution  
 Usual dosage: 10-100g/ton

**Storage & Handling**

**Storage:** Store solid xanthates in original properly sealed containers under cool dry conditions away from sources of ignition.

**Handling:** Wear protective equipment. Keep away from sources of ignition. Use non sparking tools. Equipment should be earthed to avoid static discharge. All electronic equipment should be adjusted for work in explosive environment.

**Packaging**

<i>Type</i>	<i>Packing</i>	<i>Quantity</i>
Steel drum	UN approved 110kg net full opened head steel drum with polyethylene bag lining inside	134 drums per 20'FCL, 14.74MT
	UN approved 170kg net full opened head steel drum with polyethylene bag lining inside 4 drums for each pallet	80 drums per 20'FCL, 13.6MT
Wooden box	UN approved 850kg net jumbo bag inside UN approved wooden box on pallet	20 boxes per 20'FCL, 17MT

**MINING**  
*Technical data sheet*

**Potassium Isobutyl Xanthate**

**Specification**

Classification: Potassium Organic Salt

Cas No: 13001-46-2

Appearance: pale yellow or yellow-grey granula or free-flowing powder

Purity: 85.00 or %90.00% Min

Free Alkali: 0.2% Max

Moisture & Volatile: 4.00% Max

Validity: 12 Months

**Application**

Sodium isobutyl xanthate is a stronger collector in the flotation of various nonferrous metallic sulfide ores. It is mainly used in the flotation of copper, lead, zinc ect. sulfide ores. It has displayed

especially effective in the flotation of copper ores and of pyrites in natural circuits.

Feeding method: 10-20% solution

Usual dosage: 10-100g/ton

**Storage & Handling**

**Storage:** Store solid xanthates in original properly sealed containers under cool dry conditions away from sources of ignition.

**Handling:** Wear protective equipment. Keep away from sources of ignition. Use non sparking tools. Equipment should be earthed to avoid static discharge. All electronic equipment should be adjusted for work in explosive environment.

**Packaging**

<i>Type</i>	<i>Packing</i>	<i>Quantity</i>
Steel drum	UN approved 110kg net full opened head steel drum with polyethylene bag lining inside	134 drums per 20'FCL, 14.74MT
	UN approved 170kg net full opened head steel drum with polyethylene bag lining inside 4 drums for each pallet	80 drums per 20'FCL, 13.6MT
Wooden box	UN approved 850kg net jumbo bag inside UN approved wooden box on pallet	20 boxes per 20'FCL, 17MT

**MINING**  
*Technical data sheet*

**Potassium N-Butyl Xanthate**

**Specification**

Classification: Potassium Organic Salt

Cas No: 871-58-9

Appearance: pale yellow or yellow-grey granula or free-flowing powder

Purity: 85.00 or %90.00% Min

Free Alkali: 0.2% Max

Moisture & Volatile: 4.00% Max

Validity: 12 Months

**Application**

Sodium N-Butyl Xanthate is a very powerful collector with strong selectivity, widely used in the flotation treatment of sulfide multi-metallic ores, especially used in the flotation of natural circuit for copper ores and pyrite, like chalcopyrite, sphalerite, pyrite etc. It is also used in flotation of nickel ores, especially for the flotation treatment of Cu-Ni compound sulfide ore as well as gold mine associated with pyrite. It can also get

satisfactory results when used in lead oxide copper ores. Commonly used in the process of rough flotation and scavenging flotation. Under the proper conditions, it can be used in the selective flotation of copper sulfide minerals from iron sulfide minerals and in the flotation of sphalerite after activation with copper sulphate.

Feeding method: 10-20% solution

Usual dosage: 10-100g/ton

**Storage & Handling**

**Storage:** Store solid xanthates in original properly sealed containers under cool dry conditions away from sources of ignition.

**Handling:** Wear protective equipment. Keep away from sources of ignition. Use non sparking tools. Equipment should be earthed to avoid static discharge. All electronic equipment should be adjusted for work in explosive environment.

**Packaging**

<i>Type</i>	<i>Packing</i>	<i>Quantity</i>
Steel drum	UN approved 110kg net full opened head steel drum with polyethylene bag lining inside	134 drums per 20'FCL, 14.74MT
	UN approved 170kg net full opened head steel drum with polyethylene bag lining inside 4 drums for each pallet	80 drums per 20'FCL, 13.6MT
Wooden box	UN approved 850kg net jumbo bag inside UN approved wooden box on pallet	20 boxes per 20'FCL, 17MT

**MINING**  
*Technical data sheet*

**Sodium Diethyl Dithiophosphate**

***Specification***

Classification: General Reagents  
 Cas No: 3338-24-7  
 Appearance: Yellow brown liquid  
 Solubility in water: Complete

Purity: 49-51%  
 PH: 10-13  
 Specific gravity(20°C ): 1.10+/-0.05

***Application***

The mining reagent is an aqueous solution of dialkyl dithiophosphate. It is the most selective collector in the dithiophosphate range. It has no frothing characteristics. Being a selective reagent, it is useful as a rougher collector producing a high grade first concentrate. For optimum recovery a scavenger collector, e.g.a stronger dithiophosphate or a xanthate in conjunction with it is used. Sodium Diethyl Dithiophosphate (DSP-01) is very selective towards pyrite and other iron sulphides and is therefore used in the flotation of copper sulphide mineral and Cu-activated sphalerite, particularly in the presence of pyrite. It does not float lead sulphide. The collector being a selective

reagent is applicable on easy floating liberated copper sulphide like Skim-Air flotation in the grinding circuit. It can be added undiluted or preferably diluted with clear water to 5-20% solutions to better control the dosage. It is good practice to stir before use. The dosage of this product varies with the type of ore, usually falling within the range of 20 to 100 grams per metric ton ore. It is effective in the pH range of 4 to 12. Because of its selectivity against iron sulphides, It can be used at lower alkalinity than xanthates.

***Packaging***

<i>Type</i>	<i>Packing</i>	<i>Quantity</i>
Plastic Drum	Net weight 200 kg per plastic drum 4 drums on a wooden pallet tightly strapped	80 drums per 20'FCL, 16MT
IBC Tank	Net weight 1100kgs per IBC	20 IBCs per 20'FCL, 22MT

A blue banner with a wavy, liquid-like texture. The word "MINING" is written in large, bold, black, sans-serif capital letters. Below it, the words "Technical data sheet" are written in a smaller, italicized, black, sans-serif font.

**MINING**  
*Technical data sheet*

### ***Safety and Handling***

DSP-01 is manufactured under carefully controlled conditions. However, to varying degrees they can be considered harmful and therefore before handling this product always carefully read and understand the MSDS for this product.

This flotation collector causes irritation to eyes and skin. Safe handling includes the use of safety glasses, natural rubber gloves and protective clothing.

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### ***Storage***

Store in a dry and well-ventilated place away from heat and sunlight after the principle “first in/first out”.

Avoid freezing

Store in plastic drums or coated steel drums

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### ***Environmental Impact***

It is biodegradable. The majority of the collector is tied up with the concentrate and is destroyed in the subsequent processing operations. The remainder is transferred to the tailings . Release into the water systems should be avoided.

**MINING**  
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**Sodium Diisopropyl Dithiophosphate**

***Specification***

Classification: General Reagents

Cas No: 27205-99-8

Appreance: Faint yellow or jasper liquid

Solubility in water: Complete

Purity: 49-51%

PH: 10-13

Specific gravity(20°C ): 1.10+/-0.05

***Application***

The mining reagent is an aqueous solution of dialkyl dithiophosphate. It has little frothing properties. The main application is the flotation of zinc sulphides, e.g. sphalerite and marmatite, where the selectivity of the product towards pyrite is advantageous. Another application is flotation of copper sulphides. In both cases, for optimum recovery a scavenger collector is often needed.

It can be added undiluted or preferably diluted with clear water to 5-20% solutions. It is good practice to stir before use.

Its dosage varies with the type of ore, usually falling within the range of 10-100 grams per metric ton ore.

The product is effective in the pH range of 4 to 12

***Packaging***

<i>Type</i>	<i>Packing</i>	<i>Quantity</i>
Plastic Drum	Net weight 200 kg per plastic drum 4 drums on a wooden pallet tightly strapped	80 drums per 20'FCL, 16MT
IBC Tank	Net weight 1100kgs per IBC	20 IBCs per 20'FCL, 22MT

A graphic with a blue and white wavy background. The word 'MINING' is written in large, bold, black capital letters. Below it, the words 'Technical data sheet' are written in a smaller, italicized black font.

**MINING**  
*Technical data sheet*

### ***Safety and Handling***

DSP-02 is manufactured under carefully controlled conditions. However, to varying degrees they can be considered harmful and therefore before handling this product always carefully read and understand the MSDS for this product.

This flotation collector causes irritation to eyes and skin. Safe handling includes the use of safety glasses, natural rubber gloves and protective clothing.

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### ***Storage***

Store in a dry and well-ventilated place away from heat and sunlight after the principle “first in/first out”.

Avoid freezing

Store in plastic drums or coated steel drums

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### ***Environmental Impact***

It is biodegradable. The majority of the collector is tied up with the concentrate and is destroyed in the subsequent processing operations. The remainder is transferred to the tailings . Release into the water systems should be avoided.

**MINING**  
*Technical data sheet*

**Sodium Diisobutyl Dithiophosphate**

**Specification**

Classification: General Reagents

Cas No: 27205-99-8

Appearance: Faint yellow or jasper liquid

Solubility in water: Complete

Purity: 49-51%

PH: 10-13

Specific gravity(20°C): 1.10+/-0.05

**Application**

Sodium Diisobutyl Dithiophosphate (DSP-03) is an aqueous solution of dialkyl dithiophosphate.

It has practically no frothing characteristics. It is fast and compared to other thiol collectors more selective in the flotation of copper sulphide in the presence of zinc and of iron sulphides and copper activated zinc sulphides from iron sulphides. Other applications are flotation of copper activated iron sulphides, flotation of nickel-bearing minerals, antimony minerals, chalcocite and for improvement in the recovery of precious metals, e. g. gold, silver, platinum.

Sodium Diisobutyl Dithiophosphate floats oxide copper minerals as well as sulphide copper in a sulphide-oxide ore very well. This collector has found application in the bulk flotation of copper and cobalt minerals in conjunction with other thiol collectors, usually at neutral pH. It requires only very short conditioning time and is therefore

useful for staged addition. It can be used alone or in some cases in combination with an auxiliary collector, such as xanthates.

Experience has shown that a mixture of alkyldithiophosphate and a xanthate is often better than either of these two types of collectors alone.

Sodium Diisobutyl Xanthate can be added undiluted or preferably diluted with clear water to 5-20% solutions. It is good practice to stir before use. The dosage of Sodium Diisobutyl Xanthate is usually considerably less than for other sulphide collectors and varies with the type of ore, usually falling within the range of 10 to 50 grams per metric ton ore. Experience has shown that DSP-03 is effective in the pH range of 4-12. Because of its selectivity towards iron sulphides, the mining reagent can be used at slightly lower pH than xanthates.

**Packaging**

<i>Type</i>	<i>Packing</i>	<i>Quantity</i>
Plastic Drum	Net weight 200 kg per plastic drum 4 drums on a wooden pallet tightly strapped	80 drums per 20'FCL, 16MT
IBC Tank	Net weight 1100kgs per IBC	20 IBCs per 20'FCL, 22MT

A graphic with a blue and white wavy background. The word 'MINING' is written in large, bold, black capital letters. Below it, 'Technical data sheet' is written in a smaller, italicized black font.

**MINING**  
*Technical data sheet*

### ***Safety and Handling***

DSP-03 is manufactured under carefully controlled conditions. However, to varying degrees they can be considered harmful and therefore before handling this product always carefully read and understand the MSDS for this product.

This flotation collector causes irritation to eyes and skin. Safe handling includes the use of safety glasses, natural rubber gloves and protective clothing.

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### ***Storage***

Store in a dry and well-ventilated place away from heat and sunlight after the principle “first in/first out”.

Avoid freezing

Store in plastic drums or coated steel drums

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### ***Environmental Impact***

It is biodegradable. The majority of the collector is tied up with the concentrate and is destroyed in the subsequent processing operations. The remainder is transferred to the tailings . Release into the water systems should be avoided.

**MINING**  
*Technical data sheet*

**Sodium Disecbutyl Dithiophosphate**

***Specification***

Classification: General Reagents

Cas No: 33619-92-0

Appearance: Faint yellow or jasper liquid

Solubility in water: Complete

Purity: 49-51%

PH: 10-13

Specific gravity(20°C): 1.10+/-0.05

***Application***

Sodium Disecbutyl Dithiophosphate (DSP-04) is an aqueous solution of dialkyl dithiophosphate.

It has little or no frothing properties. It is a selective collector towards iron sulphides in an alkaline circuit, usually at slightly lower pH than for xanthates. The main application of this reagent is in the flotation of copper sulphides in the presence of pyrite. It is also an effective collector for gold, silver and sphalerite. In many cases a scavenger collector, e.g. small amounts of xanthate, is used. Other applications of this product are the flotation of metallic copper in a low lime circuit and copper oxides and copper sulphides in a mixed oxidesulphide ore.

The flotation collector requires only short conditioning time and is therefore useful for

staged addition. Experience has shown that mixture of alkyl dithiophosphate and a xanthate or a mixture of two dithiophosphates is often better than either of the collectors alone.

It can be added undiluted or preferably diluted with clear water to 5-20% solutions. It is good practice to stir before use.

Its dosage is usually considerably less than for other sulphide collectors. It varies with the type of ore, usually falling in the range of 10 to 50 grams per metric ton ore.

Experience has shown that this collector is effective in the pH range of 4 to 12. Because of its selectivity towards pyrite, it can be used at slightly lower pH than xanthates.

***Packaging***

<i>Type</i>	<i>Packing</i>	<i>Quantity</i>
Plastic Drum	Net weight 200 kg per plastic drum 4 drums on a wooden pallet tightly strapped	80 drums per 20'FCL, 16MT
IBC Tank	Net weight 1100kgs per IBC	20 IBCs per 20'FCL, 22MT

A graphic with a blue and white wavy background. The word 'MINING' is written in large, bold, black capital letters. Below it, 'Technical data sheet' is written in a smaller, italicized black font.

**MINING**  
*Technical data sheet*

### ***Safety and Handling***

DSP-04 is manufactured under carefully controlled conditions. However, to varying degrees they can be considered harmful and therefore before handling this product always carefully read and understand the MSDS for this product.

This flotation collector causes irritation to eyes and skin. Safe handling includes the use of safety glasses, natural rubber gloves and protective clothing.

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### ***Storage***

Store in a dry and well-ventilated place away from heat and sunlight after the principle “first in/first out”.

Avoid freezing

Store in plastic drums or coated steel drums

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### ***Environmental Impact***

It is biodegradable. The majority of the collector is tied up with the concentrate and is destroyed in the subsequent processing operations. The remainder is transferred to the tailings . Release into the water systems should be avoided.

**MINING**  
*Technical data sheet*

**Dithiophosphate 25**

***Specification***

Classification: General Reagents

Cas No: 27157-94-4

Appearance: Pungent Dark Brown Liquid

Solubility in water: Complete

Purity: 60-70%

Specific gravity(20°C ): 1.17-1.20

***Application***

It is efficient collecting agent for sulphide ores such as copper sulphide, silver sulphide, lead sulphide that all include iron and activation zinc sulphide ore. It is normally used in preferentially separation and flotation of lead and zinc, and has

both collecting ability and foaming ability. It has a special effect to heavy metal oxidized ore. It is a strong non-selectivity collecting agent for sulphide ores.

***Storage & Handling***

**Storage:** Store in a dry and well-ventilated place away from heat and sunlight after the principle “first in/first out”.

**Handling:** Wear protective equipment. Safe handling includes the use of safety glasses, natural rubber gloves and protective clothing. Keep it away from skin, oral cavity and eyes. If it happens, rinse with plenty of clean water immediately with at least fifteen minutes.

***Packaging***

<i>Type</i>	<i>Packing</i>	<i>Quantity</i>
Plastic Drum	Net weight 200 kg per plastic drum 4 drums on a wooden pallet tightly strapped	80 drums per 20'FCL, 16MT
IBC Tank	Net weight 1100kgs per IBC	20 IBCs per 20'FCL, 22MT

**MINING**  
*Technical data sheet*

**Isopropyl Ethyl Thionocarbamate**

**Specification**

Classification: General Reagents

Cas No: 141-98-0

Appearance: Amber to dun liquid

Solubility in water: relatively insoluble

Purity: 95% Min

Specific gravity(20°C): 0.968-1.04

Isopropyl alcohol: 2.0 Max

Thiourea: 0.5 Max

**Application**

Isopropyl Ethyl Thionocarbamate offers good selectivity against pyrite in sulfide flotation and can provide excellent flotation response to various copper minerals, including but not exclusively, chalcopyrite, bornite, chalcocite and covellite. Other applications include copper activated sphalerite, tetrahedrite and, depending on ore mineralogy, gold ore flotation. The mercaptan component makes this product a good metallic element collector and often enhances the flotation of tarnished and slightly oxidized minerals.

While the product is often used as a single collector, a xanthate reagent can be used as a partial replacement, and depending on mineralogies and flotation circuit conditions, the dosage level typically is lower than xanthate on a comparative basis. It has a greater frothing property compared to xanthate.

Because Isopropyl Ethyl Thionocarbamate is relatively insoluble, water dilutions are not stable.

Consequently, the product should be fed to the circuit undiluted. It has sufficient solubility particularly under normal sulfide slurry conditions that the adsorption kinetics are relatively fast.

Because of their high collecting power in moderately alkaline circuits, and their high selectivity against iron sulfide minerals, the preferred rougher flotation pH for these collectors is usually in the range of 8 to 10, compared to the typical range of 10 to 12 required with other collectors. Similarly, in the cleaner circuits, the pH required is lower than that necessary with other collectors.

They are stable hydrolytically in a wide pH range, and generally enhances the recovery of precious metals.

Typical dosage levels depend on ore feed grades, mineralogies and flotation responses, but typical dosage levels range between 10 to 50 grams per metric ton ore .

**Packaging**

<i>Type</i>	<i>Packing</i>	<i>Quantity</i>
Plastic Drum	Net weight 200 kg per plastic drum 4 drums on a wooden pallet tightly strapped	80 drums per 20'FCL, 16MT
IBC Tank	Net weight 1000kgs per IBC	20 IBCs per 20'FCL, 20MT

A blue banner with a wavy, liquid-like texture. The word 'MINING' is written in large, bold, black capital letters. Below it, 'Technical data sheet' is written in a smaller, italicized black font.

**MINING**  
*Technical data sheet*

### ***Safety and Handling***

The collectors are manufactured under the highest quality standards; nonetheless, these chemicals can be hazardous and harmful. Always read and understand the MSDS before handling the product. Safe handling includes use of safety glasses, splash shield over face, natural rubber gloves and protective clothing. Additionally, avoid inhalation of vapours.

This flotation collector causes irritation to eyes and skin. Safe handling includes the use of safety glasses, natural rubber gloves and protective clothing.

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### ***Storage***

Store in a dry and well-ventilated place away from heat and sunlight after the principle “first in/first out”.

Avoid freezing

Store in plastic drums or coated steel drums

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### ***Environmental Impact***

It is biodegradable. The majority of the collector is tied up with the concentrate and is destroyed in the subsequent processing operations. The remainder is transferred to the tailings . Release into the water systems should be avoided.