

# Introductions of rust preventive products of KS-Fine Chem



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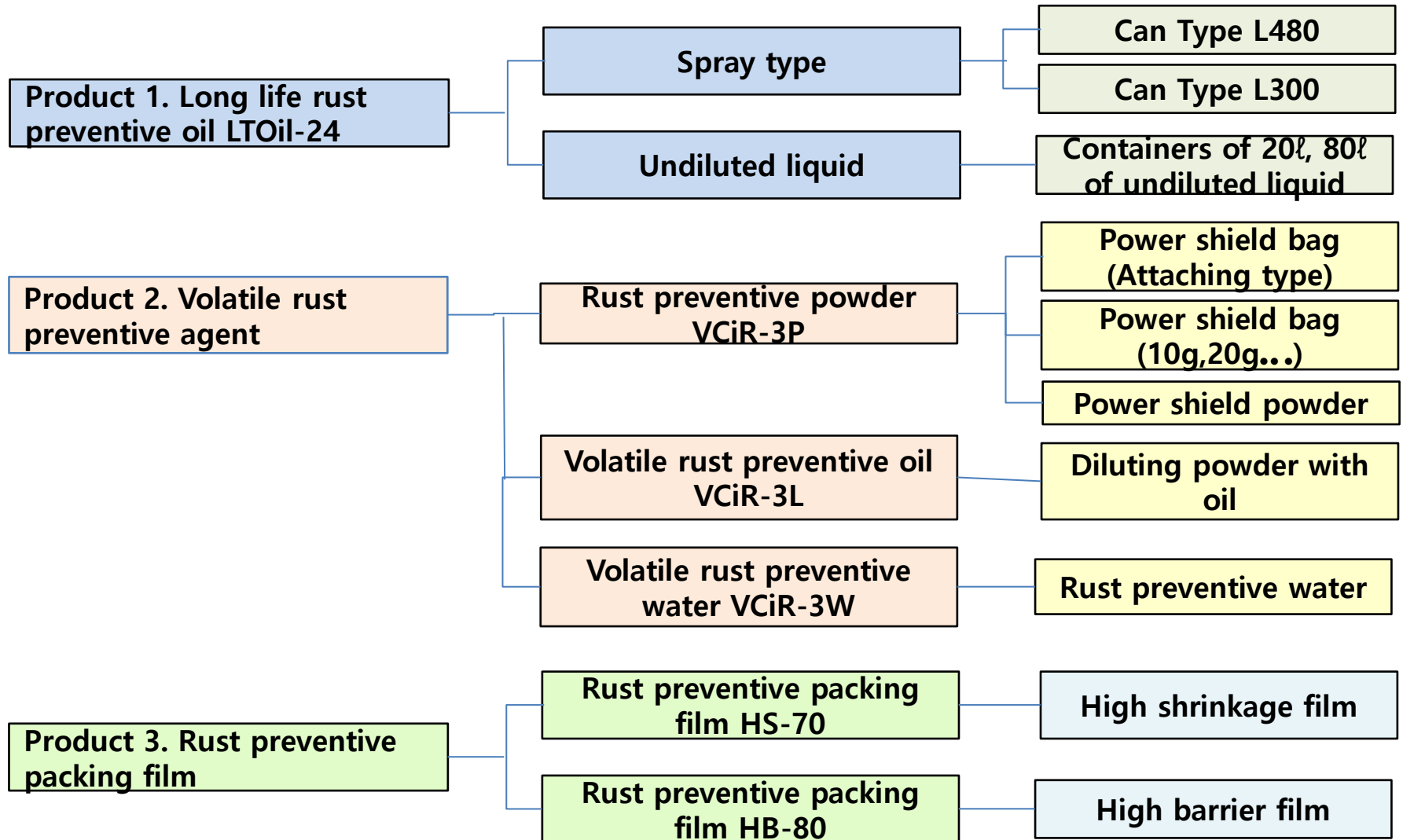
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# Composition of products (Power shield) of KS-Fine Chem

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# Summary of LTOil-24

## (1) Advantages of LTOil-24, a long life rust preventive oil

There are many long life rust preventive oil products of competitors in the market, but many of them have crosslinked surface and become hard after a time, so it is difficult to remove (removal is compulsory).

Our product LTOil-24 has the research result that it is excellent in rust inhibiting ability compared to competitive (15 times better), and has no hard surface after a time so that it is easy to remove, and it helps to smooth when assembling without removing rust preventive oil at connecting parts.

## (2) Features of LTOil-24, a long life rust preventive oil

- ▶ Excellent rust inhibiting ability, and high and precise absorption capacity with metal surface
- ▶ As its flashpoint is high, it is safe against fire and not degraded by oxygen or UV rays
- ▶ It does not leave stain on the surface of metal and change metallic nature
- ▶ Excellent in acid resistant
- ▶ Excellent rust inhibiting ability in the environment of high temperature, humidity, and salinity
- ▶ No need of advance preparation work on the surface of metal for rust prevention
- ▶ Eco-friendly product as it does not contain heavy metals considered harmful to humans
- ▶ Easy to remove as the part rust preventive agent applied does not become hard

### (3) Features of LTOil-24, a long life rust preventive oil

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Items	Long life rust preventive oil (LTOil-24)	Competitive (Houghton TECTYL-506)
Viscosity40°C, cst (D445)	180	Very high(crosslinked)
Flash point (Start) (flash point)°C,	125°C	35°C
Flash point (Pick) (flash point)°C,	369°C	199°C
Smell	odorless	-
Toxic ingredients	Eco-friendly product	-

◆ Toxic ingredients analysis: Attach analyzed data of LTOil-24 conducted by KTR

### (4) Content of development of LTOil-24 Spray, a long life rust preventive oil power shield

#### ① Sales strategy of power shield products

- ▶ With its excellent quality, rust preventive oil of KS-Fine Chem has been sold mainly to large companies such as Hyundai Heavy Industries or Renault Samsung Motors, but now it can become popular of preventive agent for corrosion of metals with the development of power shield (LTOil-24 Spray Type) which deriving potential demand.
- ▶ Although there is a long life rust preventive oil among competitor's products, it is inconvenient and wasteful to re-use as it becomes hard after using once, but power shield can (spray) resolves this problem completely.

#### ② Sales targets of power shield products

- ▶ Expand sales target limit to National railroad administration, defense industry, aviation industry, shipbuilding industry, precise machining industry and distribution agents.

#### (4) Performance comparison result of LTOil-24

### Comparison test result of KS-Fine Chem (LTOil-24) and Houghton (TECTYL-506)

#### ► Test data of rust inhibiting ability after applying rust preventive oil on the surface of metallic materials

- Test Method: Applying 2 samples to metallic materials for the test (all-purpose knife, cold-rolled steel sheet), and onto the surfaces,
  - \* Water spray : Compare and evaluate rust inhibiting ability as spraying water in cycles.
  - \* Spray salty water : Compare and evaluate rust inhibiting ability as spraying salty water (salt concentration of 7%) in cycles at room temperature and high temperature (70°C).
- ※ Cold-rolled steel sheet used for the test was used after washing existing rust preventive oil off completely.
- Test result data (Salty water spray test )

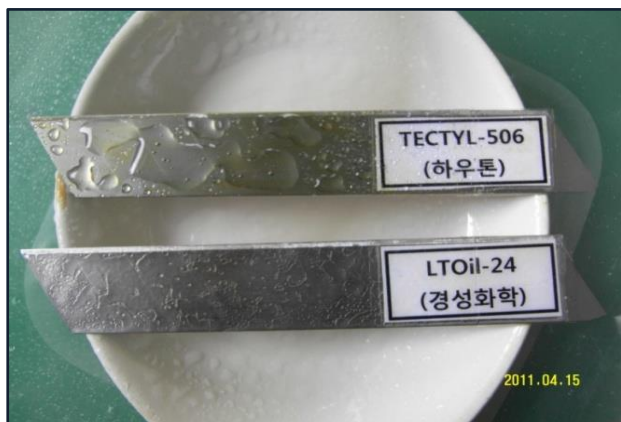
#### Test Result

Items	Room temperature (20°C)		High temperature (70°C)	
	KS-Fine Chem (LTOil-24)	Houghton (TECTYL-506)	KS-Fine Chem (LTOil-24)	Houghton (TECTYL-506)
<b>Rust occurrence time</b>	<b>468hrs</b> after spraying salty water <b>“Good”</b> (Rust occurrence 0%)	<b>468hrs</b> after spraying salty water <b>“Normal”</b> (Rust occurrence 5%)	<b>122hrs</b> after spraying salty water <b>“Good”</b> (Rust occurrence: under 2%)	Rust occurred when <b>12hrs</b> after spraying salty water <b>After 122hrs</b> (Rust occurrence: over 60%)

#### (4) Performance evaluation for long life rust preventive oil of competitor's Houghton (TECTYL-506) and LTOil-24

##### Salty water spray test (I) Data

Test condition : Compare and evaluate rust occurrence degree as spraying salinity 7% of salty water (salinity of sea water: 3.5%) once a day into Aging oven at **high temperature (70°C)**



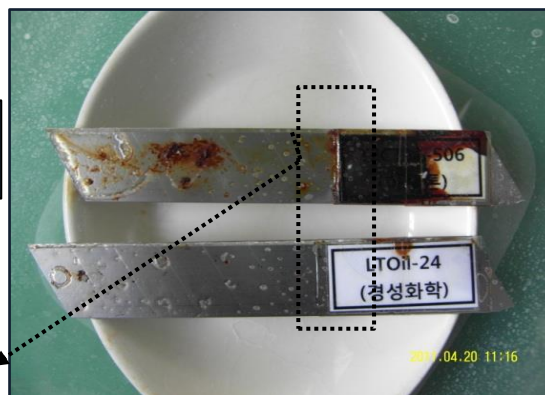
Apply each rust preventive oil on steel knife edges (early stage)



After 6hours



After 101 hours



After 122hours

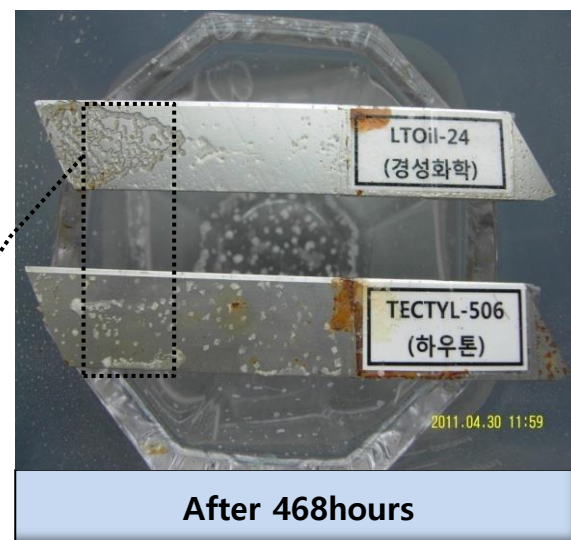
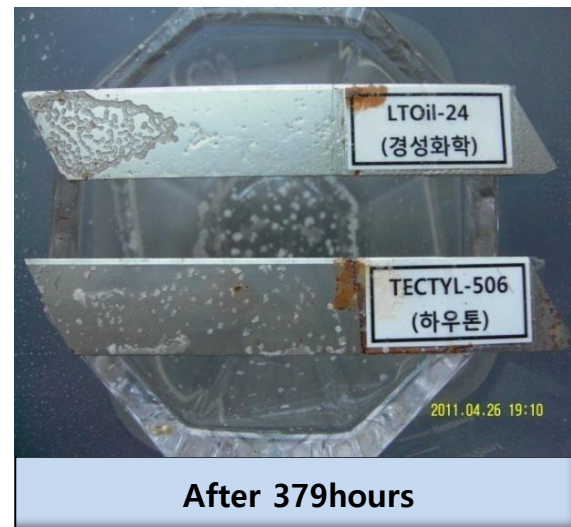
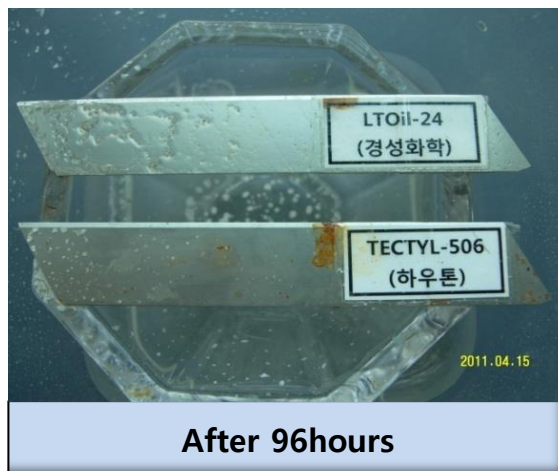
"Salinity"



#### (4) Performance evaluation for long life rust preventive oil of competitor's Houghton (TECTYL-506) and LTOil-24

##### Salty water spray test (I) Data

Test condition : Compare and evaluate rust occurrence degree as spraying salinity 7% of salty water once a day into Aging oven at **room temperature (20°C)**.



"Salinity"

## LTOil-24 Power shield Can



Power Shield-Spray 480 ml  
Power Shield-Spray 320 ml

## LTOil-24 Power shield Undiluted liquid





## Summary of VCI-R-3P product

- **Popularizing business of Volatile Corrosion Inhibitor Powder(VCI-R-3P) product developed by KS-Fine Chem.**

### **(1) The current situation about Mini Corrosion Inhibitor Powder bag product**

There is no competitor of volatile mini rust preventive bag products, and damp proof agents are used to moist area but it does not have rust inhibiting function. Damp proof agents only remove some moisture and alleviate corrosion of metals, and it needs to be changed frequently.

### **(2) Content of new product (Mini Corrosion Inhibitor Powder bag VCI-R-3P) developed by KS-Fine Chem**

#### **① Features of VCI-R-3P, volatile Corrosion Inhibitor Powder powder**

- ▶ Protect metal surfaces by forming film to prevent corrosion of metals as the inhibiting agent is vaporized by retired corners and narrow gaps where people can hardly approach.
- ▶ As inhibiting effect is consistently maintained long hours, it does not need to be refilled.
- ▶ It does not leave stain on the surface of metal and change metallic nature.
- ▶ No need of advance preparation work on the surface of metal for rust prevention.
- ▶ It does not contain harmful heavy metals such as nitrite or phosphate.

#### **② VCI-R-3P applied metals**

- ▶ It is variously applied to steel, cast iron, brass, bronze, copper, cadmium alloy, stainless, chromium alloy, magnesium, alloy, tin, tinplate, aluminum alloy, plated metals, and so on.

## (2) Contents of the development of VCI<sub>R</sub>-3P Power Shield Mini Corrosion Inhibitor Powder bag by KS-Fine Chem

### ③ Applications

- ▶ Rust inhibiting for metal products in various boxes (tool kit, equipment storage, transformer box, distribution board, traffic control box, exhibit box for metallic processed and manufactured goods, storage for electronics sensitive in moist, etc.

### ④ Features of product

- ▶ Form: Commercialized to maintain rust inhibiting property for long by filling white VCI powder contained in a non-woven fabric bag into a plastic mini container to attach inside of storage boxes for metallic goods.
  - **Packaging unit : Contents 10g, 20g, 40g, 50g      Purity ; 99.8%**
  - Ignition point ; 170°C**

### ⑤ Sales strategy for mini rust preventive bag

- ▶ With its excellent quality, VCI<sub>R</sub>-3P rust preventive agent has been sold mainly to large companies such as Hyundai Heavy Industries or Renault Samsung Motors, but now it can become popular of preventive agent for corrosion of metals with the development of VCI<sub>R</sub>-3P mini rust preventive bag which deriving potential demand.

### ⑥ Sales targets of mini Corrosion Inhibitor Powder bag

- ▶ Defense industry, KEPCO, large companies, small and medium-sized enterprises, transformer (electronic control boxes) manufacturers, tool kit manufacturers, export packing companies, marine store providers, retail chains (E mart, Lotte mart, Daiso, distribution complex for industrial materials, etc.)

# Comparison Analysis Data of VCI<sub>R</sub>-3P of KS-Fine Chem and competitor's product

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◆Test method : Prepare test piece as the pictures. Separate the test pieces away from rust preventive powder in the container, and then spray water in cycles. Then check the degree of rust occurrence.

## Test pieces and preparation at the early stage



VCI<sub>R</sub>-3P  
volatile Corrosion  
Inhibitor Powder  
of KS-Fine Chem

Volatile Corrosion  
Inhibitor Powder  
of Zerust



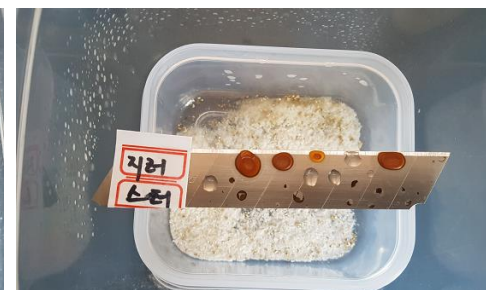
VCI<sub>R</sub>-3P volatile rust preventive  
powder of KS-Fine Chem (After 3hrs)



Volatile rust preventive powder of  
Zerust (After 3hrs)



VCI<sub>R</sub>-3P volatile rust preventive  
powder of KS-Fine Chem (After 48hrs)



Volatile rust preventive powder of  
Zerust (After 48hrs)



VCI<sub>R</sub>-3P volatile rust preventive  
powder of KS-Fine Chem (After  
900hrs)



Volatile rust preventive powder of  
Zerust (After 900hrs)

## Application factors of VCiR-3P Corrosion Inhibitor Powder

Packing environment and conditions		Application factors		
		Standard condition	High temperature and humidity	Poor condition
Hermetically sealed environment	Inside	1.0	1.3	1.5
	Outside	1.2	1.5	1.6
Moderately sealed environment	Inside	1.2	1.5	1.9
	Outside	1.5	1.7	2.4
Ventilative environment	Inside	1.4	1.7	2.3
	Outside	1.7	2.0	3.5

★ Calculation method for the usage of rust preventive powder :  
 Package volume (m<sup>3</sup>) X Standard amount (50g) X Application factors

### (3) VCI-R-3L volatile rust preventive oil of KS-Fine Chem

#### ① Features of VCI-R-3L volatile rust preventive oil

- ▶ Protect metal surfaces by forming film to prevent corrosion of metals as the inhibiting agent is vaporized by retired corners and narrow gaps where people can hardly approach.
- ▶ As preventive effect is consistently maintained long hours, it does not need to be refilled.
- ▶ It does not leave stain on the surface of metal and change metallic nature.
- ▶ No need of advance preparation work on the surface of metal for rust prevention.
- ▶ It does not contain harmful heavy metals such as nitrite or phosphate.

#### ② VCI-R-3L applied metals

- ▶ It is variously applied to steel, cast iron, brass, bronze, copper, cadmium alloy, stainless, chromium alloy, magnesium, alloy, tin, tinplate, aluminum alloy, plated metals, and so on.

#### ③ Applications

- ▶ To prevent rust occurrence in various oil tanks, pour VCI-R-3L onto the bottom. Then the rust preventive oil is vaporized to prevent rust occurrence.  
Currently it is applied to the test drive of engine oil tank of ship builders, the prevention of rust occurrence at free space of large oil storage tanks.

#### ④ Features of the product

- ▶ Form : Packed in the container of 20 liter, and it is possible to be packed and shipped by the demand of the customers.
- ▶ Volatile rust preventive oil (VCI-R-3L) is only developed and produced by KS-Fine Chem.

### ① Features of VCIr-3W volatile rust preventive water

- ▶ As highly concentrated rust preventive water, it prevents rust by diluting proper amount with water.
- ▶ Prevent the surfaces of metals by forming rust preventive film even in the water.
- ▶ It does not leave stain on the surface of metal and change metallic nature.
- ▶ No need of advance preparation work on the surface of metal for rust prevention.
- ▶ It does not contain harmful heavy metals such as nitrite or phosphate.

### ② VCIr-3W applied metals

VCIR

- ▶ It is variously applied to steel, cast iron, brass, bronze, copper, cadmium alloy, stainless, chromium alloy, magnesium, alloy, tin, tinplate, aluminum alloy, plated metals, and so on.

### ③ Applications

- ▶ Coolant of various internal-combustion engine, rust prevention in various drains, rust prevention work for rebar inside of construction structure concrete (use by diluting rust preventive powder in ready mixed concrete car)



Performance test for **VCiR-3P volatile Corrosion Inhibitor Powder** of KS-Fine Chem

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★ Comparison test by diluting VCiR-3P with water, after 7days

Water



Diluted  
solution of rust  
preventive  
agent  
(Diluted 0.5%  
with water)

★ Comparison test by diluting VCiR-3P with water, after 24days

Water



Diluted solution  
of rust  
preventive  
agent  
(Diluted 0.5%  
with water)

★ Comparison test by diluting VCiR-3P with water, after 24days

Water



Diluted solution  
of rust  
preventive  
agent  
(Diluted 0.5%  
with water)

Performance comparison with a competitor

★ Picture after 60days in the water (depositing knife edge after diluting rust preventive powder of 0.5% each)

CORTEC  
(US)



VCiR-3P  
(KS-Fine Chem)

**VCiR-3P**  
(Volatile Corrosion Inhibitor Powder)  
Power shield powder mini bag

Case types of 10g, 20g ,40g, 50g

Bag types of 100g, 200g



Case model of Volatile Corrosion  
Inhibitor Powder bag

**VCiR-3L**  
(Volatile rust preventive oil)  
Power shield oil



※The shape and materials of the  
container could be changed.

## Summary of packing film product

### ● Special rust preventive packing film developed by KS-Fine Chem

#### (1) Introduction of packing film product

- ▶ Various customized rust preventive packing product can be supplied by specifications of orderers.
- ▶ Composed of harmless products to humans and eco-friendly.

#### (2) Advantages of film products

- ▶ Easy to work.
- ▶ Protect products from the shock with its excellent impact strength and tearing strength.
- ▶ Easy to complete as its sealing property is good.

< Applied metals >

Applied to parts and products packages made with steel, cast iron, brass, bronze, copper, cadmium alloy, stainless, chromium alloy, magnesium, alloy, tin, tinplate, aluminum alloy, plated metals, etc.

# Special rust preventive packing film



Items		Method	UNIT	High shrinkage film (HS-70)	High barrier film (HB-80)
Thickness of FILM		-	$\mu\text{m}$	70	80
Tensile strength	MD	ASTM D882	Kg/cm <sup>2</sup>	Over 400	450
	TD	ASTM D882	Kg/cm <sup>2</sup>	Over 350	350
Elongation (at break)	MD	ASTM D882	%	Over 500	Under 100
	TD	ASTM D882	%	Over 500	Under 100
Impact strength		ASTM D1709	g	Over 240	100
Oxygen permeability coefficient	(23°C,75%RH)cm <sup>3</sup> /cm <sup>2</sup> day bar			High	High Barrier
Purpose				Large/medium size package	High-priced small package