

*Additives for coatings & Specialty chemicals*

## THIXOTROPIC ADDITIVES



# ***MONORAL***<sup>®</sup>

As a result of our considerable experience and our co-operation with specialist suppliers of other raw materials and machinery, we offer extensive guidance. Please contact us and we will assist you.



**POLY ETHYLENE WAX**  
(Anti-settling and Anti-hard caking agent)



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## COMPANY HISTORY

HSChem is a leading supplier of rheological additives for coatings industry in the world.

Our extensive experience in the field of coating technology and commitment to exceptional quality and customer service has rewarded us with the ISO 9001 certification since 2004.

Our products include anti-sagging agent, anti-settling agent, Defoamer, surface control agent, Metallic orientation agent, matting & slip agents for UV coating and Mar&Abrasion resistance agents for inks and plastic coatings.

HSChem's honest and reliable way of managing good business relationship with our clients has helped us to become a leading rheological producer in the world.

Today, MONORAL is the synonymous with quality additives that dominate the Asian market beyond Korea.

MONORAL additives are being stocked and distributed in more than 68 countries.



*Additives for coatings & Specialty chemicals*

1978	Apr	Company founded by Mr. Hae-Gil, Yang Poly-Olefin wax products started Defoamer for waterbased system started
1989	Dec	Poly-Amide wax product's technical development started
1990	Apr	Poly-Amide wax product's business started
1992	Sep	Overseas marketing started
1997	Jul	Company becomes incorporated
2000	Jul	Received quality certification from International Paint (Akzo Nobel-UK)
2001	Jun	Opened new factory and R&D center Restructured as HS Chem Co.,Ltd
2004	Mar	Acquired ISO 9001 Certification
	Mar	Constructed 2nd Plant and started its operation
	Nov	Received an Award for "The Prize of Export Tower" from KITA (1 million USD)
2005	Nov	Received an Award for "The Prize of Export Tower" from KITA (3 million USD)
2007	Nov	Received an Award for "The Prize of Export Tower" from KITA (5 million USD)
2008	Nov	Pre-registration EU-REACH, participated in 'China Coat 2008' (Guangzhou)
2009	Nov	Participated in 'China Coat 2009' (Shanghai)
2010	Nov	Participated in 'China Coat 2010' (Guangzhou)
2011	Nov	Participated in 'China Coat 2011' (Shanghai)
2012	Nov	GRAND PRIZE From GIMPO CITY (Oversea Market Development part)
2013	Nov	The Prize of Export Tower from KITA (10 Million USD)
2014	Mar	Expend Main plant and new Technical Development Center setting up
2016	Aug	3rd Factory plant open
2017	Apr	1st Factory site equipment overhaul & new product develop
2017	May	Acquired PSM (Process Safety Management) Certificate
2020	Jun	Network of logistic hub in Europe (Amsterdam)
2020	Oct	4th Logistic center open
2021	Dec	Received an Award from Ministry of Trade, Industry and Energy



## WHAT'S POLY ETHYLENE WAX?

### Poly Ethylene Wax Form

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Polyethylene wax dispersed in xylene designed to provide anti-settling and anti-hard caking with stability of pigment suspension in non-aqueous coatings and applicable to a wide range of solvents to insure compatibility for most of coatings systems.

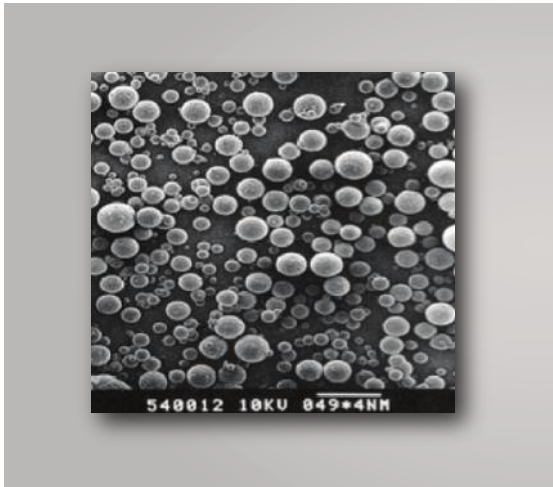
### Poly Ethylene Wax Characters

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PE WAX	Anti-settling
Low viscosity	
Anti settling	
Anti-hard caking	
Scratch resistance	
PO-Structure : bubble	
Incorporation : Grand mill base	

## Polyethylene Wax Structure

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### Polyethylene Wax Structure

Electrostatic repulsion

정전기 반발로 침강방지 부여

## Theory Of Anti-settling

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- This type of flow behaviour is typical of paints that experience a reduction in viscosity when shaken, stirred, or otherwise Mechanically disturbed (ex. Brushing or rolling) but that recover their original rheology in time , eventually reaching their original viscosity. It allows the paint to remain stable (anti-settling action) in a gel state in the container without compromising ease of application.
- EQUATION (Thixotropic Control) :  $Q = \eta / r * \zeta$   
 $\eta$ : viscosity     $r$ : shear rate     $\zeta$ : shear stress
- Conception Of Settling : thixotropy  $\approx$  Viscosity
- Factor : resin , solvent, pigment

## POLY ETHYLENE WAX : Anti-settling and Anti-hard caking agent

MONORAL is special poly ethylene wax systematically dispersed in xylene uniquely designed to provide anti-settling and anti-hard caking with an excellent stability of pigment suspension for non-aqueous coatings

### • Poly Ethylene Wax Paste

PRODUCT	SOLID	COMPOSITION	VOLATILE	LEVEL	APPLICATION	CONDITION	REGULATION
MONORAL 60X	24% PASTE	PE	Xylene	1-5%	Heavy duty coating All type enamels	Grind with Mill base	REACH KECL
MONORAL 6025X	25% PASTE	PE	Xylene	1-5%	Heavy duty coating All type enamels	Grind with Mill base	REACH KECL
MONORAL 420-20	20% PASTE	PE	Xylene	1-5%	Heavy duty coating All type enamels	Grind with Mill base	REACH KECL
MONORAL 420XP	20% GEL	PE	Xylene	1-5%	Industrial coating All type enamels	Grind with Mill base	REACH KECL
MONORAL 4000X	40% PASTE	PE	Xylene	1-3%	For stabilizing dispersion & Uniform color All type enamels	Grind with Mill base	REACH KECL

### • Poly Ethylene Wax Gel

PRODUCT	SOLID	COMPOSITION	VOLATILE	LEVEL	APPLICATION	CONDITION	REGULATION
MONORAL 2000X	20% GEL	PE	Xylene	1-5%	For stabilizing dispersion & Uniform color All type enamels	Let down Post addition	REACH KECL
MONORAL 2000XP	20% GEL	PE	Xylene	1-5%		Let down Post addition	REACH KECL

#### Packing Style



17kg/pail can / 170kg/drum

#### Product image



#### Transport Information



- Dangerous Goods
- Class 4.1 (Flammable solids)
- UN No : 1325

- 위험물 안전관리법 : 제2류 인화성고체

## POLY ETHYLENE WAX : Anti-settling and Anti-hard caking agent

MONORAL is a liquid of multi-purpose rheological Additive consists of fine particles dispersed in xylene to impart excellent anti-settling properties for metallic and plastic coatings system.

### • Poly Ethylene Wax Liquid

PRODUCT	SOLID	COMPOSITION	VOLATILE	LEVEL	APPLICATION	CONDITION	REGULATION
MONORAL 410	10% LIQUID	PE	Xylene	2-8%	Auto mobile & Metallic All type enamels	Let down Post addition	REACH KECL
MONORAL 410S	10% LIQUID	PE	Xylene	2-8%	Metallic coating Industrial coating	Let down Post addition	REACH KECL
MONORAL 410NX	10% LIQUID	PE	Xylene	2-8%	Plastic coating	Let down Post addition	REACH KECL
MONORAL 410XP	10% LIQUID	PE	Xylene IPA	2-8%	Industrial coating Plastic coating	Let down Post addition	REACH KECL
MONORAL 510	10% LIQUID	EAA	Xylene	2-8%	Metallic coating	Let down Post addition	REACH KECL
MONORAL 510XP	10% LIQUID	EAA	Xylene IPA	2-8%	Metallic coating Industrial coating	Let down Post addition	REACH KECL

### • Poly Ethylene Wax Matting Agent (UV Coating)

PRODUCT	SOLID	COMPOSITION	VOLATILE	LEVEL	APPLICATION	CONDITION	REGULATION
MONORAL 10P-X	10% LIQUID	PE	Xylene	10-50%	Matting&Anti-scratch	Let down Post addition	KECL
MONORAL 10P-XF	10% LIQUID	PE	Xylene	10-50%	Matting&Anti-scratch	Let down Post addition	KECL
MONORAL 10P-XB	10% LIQUID	PE	Xylene	10-50%	Matting&Anti-scratch	Let down Post addition	KECL
MONORAL 10P-BA	10% LIQUID	PE	N-Butyl Acetate	10-50%	Matting&Anti-scratch	Let down Post addition	KECL
MONORAL 20P-X	20% LIQUID	PE	Xylene	5-30%	Matting&Anti-scratch	Let down Post addition	KECL
MONORAL 20P-BA	20% LIQUID	PE	N-Butyl Acetate	5-30%	Matting&Anti-scratch	Let down Post addition	KECL

#### Packing Style



15kg/tin can

#### Product image



#### Transport Information



- Dangerous Goods
- Class 3 (Flammable liquids)
- UN Number 1263

- 위험물 안전관리법 :  
제4류 제2석유류, 인화성 액체

## ECO-FRIENDLY POLY ETHYLENE WAX : Anti-settling Agent for Eco-friendly coating system

This product is an ecofriendly version of polyethylene wax systematically dispersed in Low toxic Solvent uniquely designed to provide anti-settling and anti-hard caking with an excellent stability of pigment suspension for solvent base coatings.

### • Eco-friendly Polyethylene Wax Paste

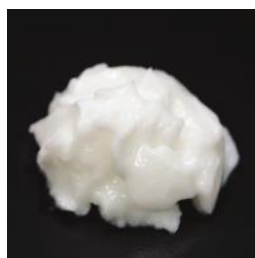
PRODUCT	SOLID	COMPOSITION	VOLATILE	LEVEL	APPLICATION	CONDITION	REGULATION
MONORAL 2000NT	20% GEL	PE	Light Aromatic	1-5%	For stabilizing dispersion & Uniform color All type enamels	Let down Post addition	REACH KECL
MONORAL 4000NT	40% PASTE	PE		1-3%		Let down Post addition	REACH KECL
MONORAL 420NT	20% PASTE	PE		1-5%		Let down Post addition	REACH KECL
MONORAL 420-20BA	20% PASTE	PE	N-Butyl Acetate	1-5%	Wood coating Industrial coating	Let down Post addition	REACH KECL
MONORAL 420-40BA	40% PASTE	PE		1-3%	Industrial coating Heavy duty coating	Let down Post addition	REACH KECL
MONORAL 60BA	24% PASTE	PE		1-5%	Industrial coating Heavy duty coating	Let down Post addition	REACH KECL
MONORAL 60MS	24% PASTE	PE	Aliphatic Solvent	1-5%	Wood coating Industrial coating	Let down Post addition	REACH KECL

#### Packing Style



17kg/pail can

#### Product image



#### Transport Information



- Dangerous Goods
- Class 4.1 (Flammable solids)
- UN No : 1325

- 위험물 안전관리법 : 제2류 인화성고체

## ECO-FRIENDLY POLY ETHYLENE WAX : Anti-settling Agent for Eco-friendly coating system

This product is an ecofriendly version of polyethylene wax systematically dispersed in Low toxic Solvent uniquely designed to provide anti-settling and anti-hard caking with an excellent stability of pigment suspension for solvent base coatings.

### ● Eco-friendly Polyethylene Wax Liquid

PRODUCT	SOLID	COMPOSITION	VOLATILE	LEVEL	APPLICATION	CONDITION	REGULATION
MONORAL 410NT	10% LIQUID	PE	Light Aromatic	2-8%	Plastic coating Metallic coating	Let down Post addition	REACH KECL
MONORAL 410BA	10% LIQUID	PE	N-Butyl Acetate	2-8%	Industrial coating Wood coating	Let down Post addition	REACH KECL
MONORAL 411NB	10% LIQUID	PE	Light Aromatic N-Butyl Acetate	2-8%	Plastic coating Metallic coating	Let down Post addition	REACH KECL
MONORAL 412DB	10% LIQUID	PE	Aliphatic Solvent N-Butyl Acetate	2-8%	Plastic coating Metallic coating	Let down Post addition	REACH KECL
MONORAL 512NB	10% LIQUID	EAA	Light Aromatic N-Butyl Acetate	2-8%	Plastic coating Metallic coating	Let down Post addition	REACH KECL
MONORAL 710BA	10% LIQUID	PE	N-Butyl Acetate	1-5%	Gravure Ink (Solvent type)	Let down Post addition	REACH KECL

#### Packing Style



15kg/tin can

#### Product image



#### Transport Information



- Dangerous Goods
- Class 3 (Flammable liquids)
- UN Number 1263

- 위험물 안전관리법 :  
제4류 제2석유류, 인화성 액체

## HYBRID WAX : Anti-sagging, Anti-settling and Thickening Agent

MONORAL is a new revolutionized rheological hybrid gel consists of both amide and poly ethylene wax designed to impart excellent anti-settling properties for no-aqueous coatings system. Hybrid wax is a new high concentrated gel type designed for highly efficient control of pigment settling in industrial coatings

### • Hybrid Wax

PRODUCT	SOLID	COMPOSITION	VOLATILE	LEVEL	APPLICATION	CONDITION	REGULATION
MONORAL 5405	5% Gel	Hybrid System	Xylene Ethanol, IPA	4-8%	Metallic coating All type enamels	Let down Post addition	REACH KECL
MONORAL 5407S	7% Gel		Xylene Ethanol, IPA	4-8%			
MONORAL 5407N	7% Gel		Xylene Ethanol, IPA	4-8%	Car coating Wood coating	Let down Post addition	REACH KECL
MONORAL 5410	10% Gel		Xylene Ethanol, IPA	3-6%			
MONORAL 5410S	10% Gel		Xylene Ethanol, IPA	3-6%			
MONORAL 5720	20% Gel		Xylene	1-5%	Urethane base Floor coating	Let down Post addition	REACH KECL

#### Packing Style



17kg/pail can

#### Product image



#### Transport Information



- Dangerous Goods
- Class 3 (Flammable liquids)
- UN Number 1263

• 위험물 안전관리법 :  
제4류 제2석유류, 인화성 액체

## HYBRID WAX : Anti-sagging, Anti-settling and Thickening Agent

This product is a new revolutionized rheological hybrid wax gel consists of both amide and polyethylene designed to impart excellent Anti-settling & improved metallic spots and a metallic orientation property

### • Eco-friendly Hybrid Wax

PRODUCT	SOLID	COMPOSITION	VOLATILE	LEVEL	APPLICATION	CONDITION	REGULATION
MONORAL 5307	7% Gel	Hybrid System	Aliphatic Solvent N-Butyl Acetate Ethanol	3-8%	Aromatic free	Let down Post addition	REACH KECL
MONORAL 5505	5% Gel		Light Aromatic Ethanol, IPA	4-8%	Metallic coating All type enamels	Let down Post addition	REACH KECL
MONORAL 5507S	7% Gel		Light Aromatic Ethanol, IPA	4-8%		Let down Post addition	REACH KECL
MONORAL 5507N	7% Gel		Light Aromatic Ethanol, IPA	4-8%	Car coating Wood coating	Let down Post addition	REACH KECL
MONORAL 5507R	7% Gel		Light Aromatic IPA	4-8%		Let down Post addition	REACH KECL
MONORAL 5510	10% Gel		Light Aromatic Ethanol, IPA	3-6%	Metallic coating All type enamels	Let down Post addition	REACH KECL
MONORAL 5510S	10% Gel		Light Aromatic Ethanol, IPA	3-6%	Car coating Wood coating	Let down Post addition	REACH KECL
MONORAL 5610	10% Gel		Light Aromatic Ethanol	4-8%		Let down Post addition	REACH KECL
MONORAL 5820	20% Gel		Light Aromatic	1-5%	Urethane base Floor coating	Let down Post addition	REACH KECL

#### Packing Style



17kg/pail can

#### Product image



#### Transport Information



- Dangerous Goods
- Class 3 (Flammable liquids)
- UN Number 1263

- 위험물 안전관리법 :  
제4류 제2석유류, 인화성 액체

## PRODUCT APPLICATION RANGE

### Industrial Coatings

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#### **60X, 420-20, 4000X**

- Heavy duty Coating, All type Enamels

#### **2000X, 420-20BA**

- General Industrial Coating, floor coating

#### **2000XP**

- PCM coating

#### **5720, 5820**

- Urethane base floor coating

#### **EDW-707, EDW-808**

- Water based Defoamer

#### **DS-106H**

- Solvent based Defoamer

### Automobile & Car Refinish Coatings

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#### **5407N (Hybrid wax)**

- UV, Metallic and Plastic
- All type enamels

#### **5507N (None toxic type)**

- UV, Metallic and Plastic
- All type enamels

## Metallic, UV & Plastic Coatings



**410, 510, 410BA (Liquid type)**

- Metallic coatings

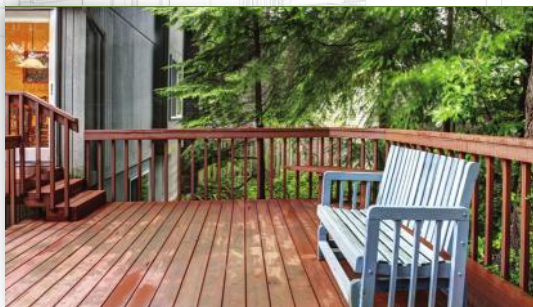
**5407S, 5507S, (Hybrid Wax)**

- UV, Metallic and Plastic
- All type enamels

**10-X, 10P-XF, 10P-XB, 10P-BA**

- Matting Agent (UV Coating)

## Wood stain Coatings



**2000X**

- EPO, UR, ALK and All type enamels

**2000NT**

- Eco-friendly All type enamels

**20P-X, 20P-BA**

- Matting & Slip

# Technical Info. No. 1

# Polyethylene Wax Paste

## • Polyethylene Wax Paste Anti-Settling Test

### Test Conditions

#### ▪ Test Formulation

Urethane Base Paint	Content
Urethane Resin	36.8%
Pigment	62.0%
Additive	1.2%

- Urethane Base Paint 36.8% + Additive (MONORAL 60X) 1.2%+ Pigment 62% (Total weight 300g)
- Mixing speed and time : 1,800rpm / 1hour
- Storage in 1 week at 60 °C

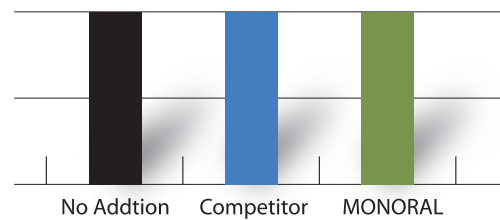
#### ▪ Test Equipment

- Brookfield KU-2 Viscometer
- Disk impeller φ4cm dissolver

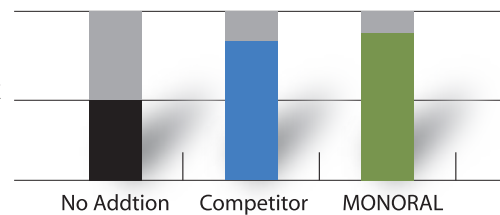
## • Anti-settling performance Test Result (우레탄 도료 침전테스트)



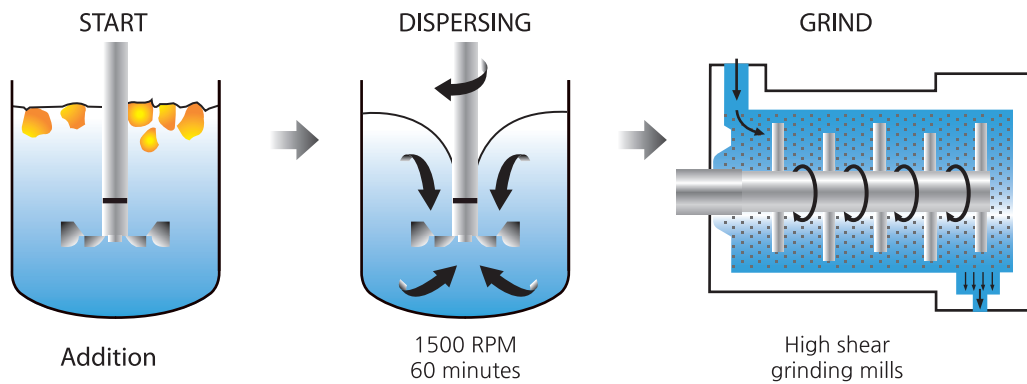
Initial stage (초기)



After 1 week (1주일후)



## Polyethylene Wax Paste Incorporation



- Generally, it cannot be dispersed with standard mixing equipment
- Use high shear grinding mills such as triple-roll mill, ball mill and sand mill bases for dispersing.

- 양호한 입도가 필요시 샌드밀, 볼밀, 3롤밀과 같은 분산설비로 분산과정을 해야 합니다.
- 교반/분산 시 안료와 함께 분산하는 것이 양호한 입도를 얻을 수 있습니다

## Caution

- Generally, PE hard paste type must be ground with mill base
- For optimum use, it should be dispersed at a temperature exceeding over 45°C (113°F)
- If large portion of talc pigments are required (for heavy duty system), then use high speed dissolver; preferably Cowles type of dissolver instead of using conventional impeller.

- 샌드밀과 같은 분산설비로 반드시 분산과정을 해야 합니다
- 분산시의 온도는 넓은 온도범위(20~70°C)에서 사용 할 수 있으며, 최적분산 온도는 45도 입니다
- 예외로 중방식 도료 또는 체질 안료가 많이 들어가는 도료시스템 에서는 고속 교반으로도 가능하나 꼭 입도 테스트 후 사용하시기 바랍니다.  
하지만 상도용 도료와 같이 양호한 입도 요구 시에는 고속교반은 적합하지 않음

## • Hybrid Wax Anti-Settling Test

### Test Conditions

#### ▪ Test Formulation

Acrylic Resin	Content
Acrylic Resin Beads (BR-116)*1	54%
Xylene	46%

Acrylic metallic base paint	Content
Aluminum Paste*2	10%
Acrylic resin	50%
Xylene	40%

1. Acrylic Resin Beads (BR-116)-Mitsubish Rayon
2. Aluminum Paste (Dh100, 44 $\mu$ m, NV : 65%)-Daihan Eunpakgy
  - Acrylic metallic base Paint 92% + Additive (MONORAL 5505) 8% (Total weight 200g)
  - Mixing speed and time : 800rpm / 10min
  - Storage in 1 week at 60 $^{\circ}$ C

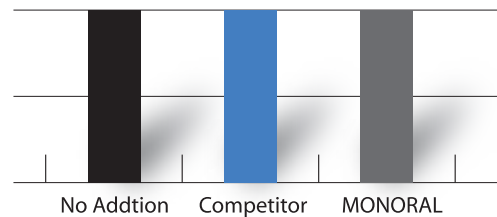
#### ▪ Test Equipment

- Brookfield DV-II + Pro (62) (25 $^{\circ}$ C)
- Propeller Impellers No 2 (size 50mm)
- Thixotropic Factor : 6rpm / 60rpm

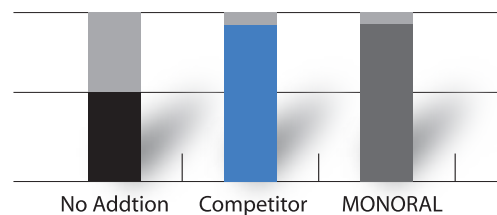
## • Anti-settling performance Test Result (아크릴 메탈릭 도료 침전테스트)



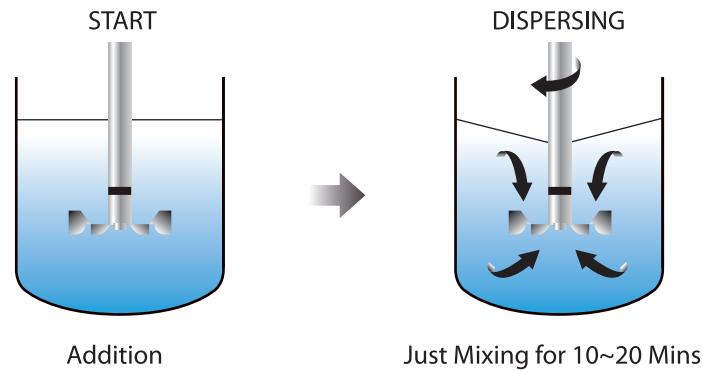
Initial stage  
(초기)



After 1 week  
(1주일후)



## Hybrid Wax Incorporation



- Just mixing with dissolver  
(It does not need grinding with sand mill)
- Incorporation temperature : 10℃ ~ 70℃
- Recommend Speed : 500 rpm/10~20 min

- 전 첨가와 후 첨가 가능
- 분산시 넓은 온도범위 : 10~70℃  
(참고로 최적분산 온도는 45도 입니다.)
- 추천 고속 교반속도 : 500 rpm/10~20분

## Caution

- Post-addition is ideal for metallic enamels and flat Enamels,  
especially when it's not processed with high shear grinding machines
- Basically apply post addition method for incorporation using standard type of dissolver.

- 공정 중 저속 교반/ 믹싱 만으로 왁스를 분산하는 것이 부족할 수 있습니다.
- 상도용 도료와 같은 매우 좋은 입도를 요구 시에는 반드시 고속 교반 하여야, 좋은 입도를 얻을수 있습니다.
- 도료배합이나 분산조건/온도에 따라 달라질 수 있으니, 반드시 테스트 후 사용 하십시오
- 기재된 정보는 사용시 권장사항으로 추천하지만, 보증하는 것은 아니므로 충분히 실험한 후 사용하십시오.

# Shipment Info.



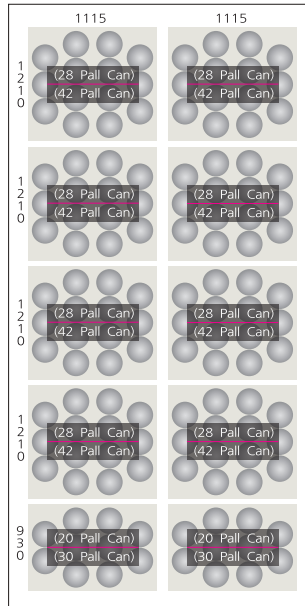
## Product : Polyethylene Wax (Paste) / Hybrid Wax Series

### Packing Style



17kg/pail can

### Packing on 20" full container



### Description

20" FCL	Total 660 cans
8 Pallet X 42 cans =	336 cans
8 Pallet X 28 cans =	224 cans
2 Pallet X 30 cans =	60 cans
2 Pallet X 20 cans =	40 cans
20" HCL	Total 396 cans
8 Pallet X 42 cans =	336 cans
2 Pallet X 30 cans =	60 cans

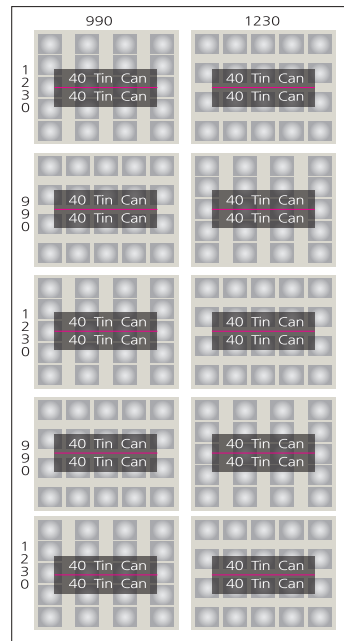
**Product : Polyethylene Wax (Liquid) Series**

**Packing Style**



15kg/Tin can

**Packing on 20" full container**



**Description**

**20" FCL**      **Total 800 cans**

20 Pallet X 40 cans = 800 cans

**20" FCL**      **Total 400 cans**

10 Pallet X 40 cans = 400 cans

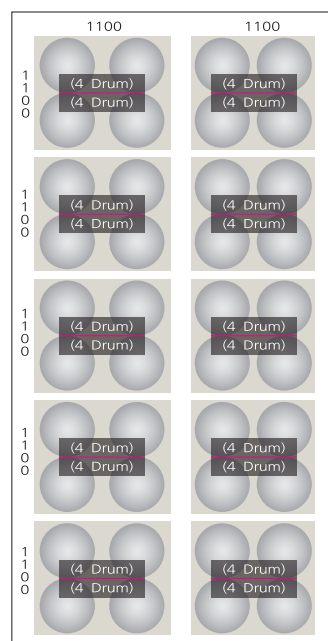
**Product : Polyethylene Wax (Paste) Series**

**Packing Style**



170kg/drum

**Packing on 20" full container**



**Description**

**20" FCL**      **Total 80 drums**

20 Pallet X 4 drums = 80 drums

**20" FCL**      **Total 40 drums**

10 Pallet X 4 drums = 40 drums



additives for coatings @ specialty chemicals





Since 1978

Ver. 2023

# **MONORAL<sup>®</sup>**

Please visit us at

[www.hschem.co.kr](http://www.hschem.co.kr)



**HS CHEM CO.,LTD.**

**Head Office / R&D Center**

50, Hagungondan-ro, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea

Tel: +82-31-982-3263 / Fax: +82-31-982-5580 / Email: [monoral@hschem.co.kr](mailto:monoral@hschem.co.kr)

**Factory 1** 41, Hagungondan-ro, Yangchon-eup, Gimpo

**Factory 2** 50, Hagungondan-ro, Yangchon-eup, Gimpo

**Factory 3** 47, Hagungondan-ro, Yangchon-eup, Gimpo