

Hi-WAX™ EXCEREX®

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Hi-WAX™ EXCEREX®

We respond to needs in all fields
with a broad range of brands.



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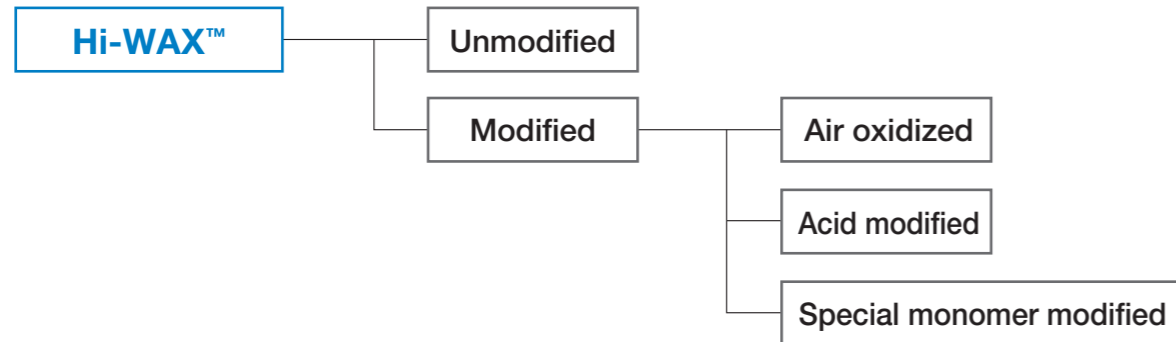
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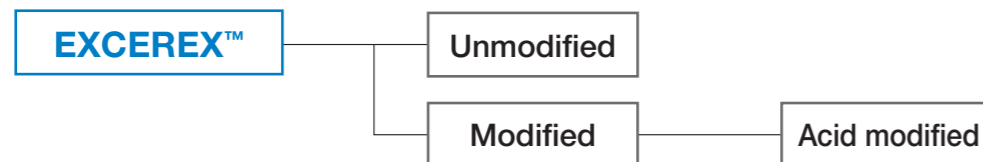
<https://mitsuichemicals.com/jp/>

Features of Hi-WAX™ and EXCEREX™

Hi-WAX™ is a brand of polyethylene wax made by direct polymerization of ethylene, developed by Mitsui Chemicals based on its unique Ziegler catalyst polymerization technology. It is used in a broad range of applications, including pigment dispersants, slip agents and mold release agents for molding resins, modifiers for ink and paints, and aids for textile treatment.



EXCEREX™ is a metallocene catalyst based polyethylene wax, marketed for the first time in the world in 2004. Precise molecular design technology has enabled melting point reduction, lower molecular weight, greater hardness, and provision of reactive groups. This wax achieves results that are impossible with conventional catalysts—cutting low softening point components which cause stickiness in resin molding applications, and low molecular weight components which bleed out onto the molded product surface and affect appearance and adhesion. Thus the product can be used worry-free.



Shape of our company's products

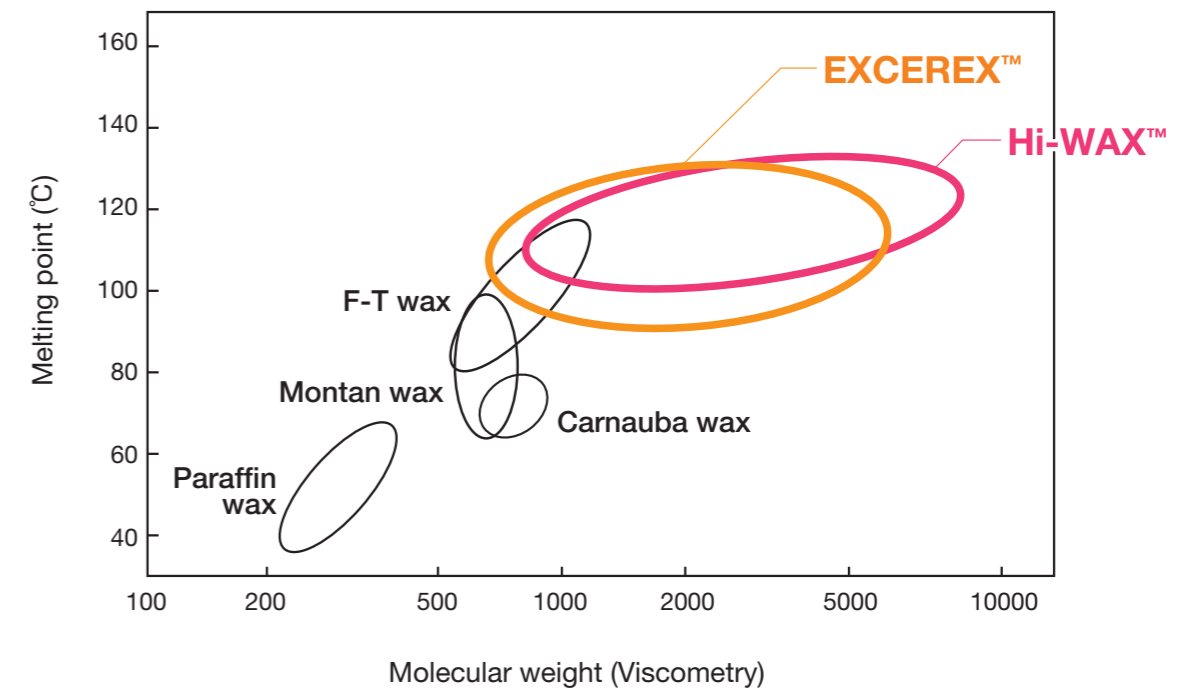
Particle size varies depending on the grades



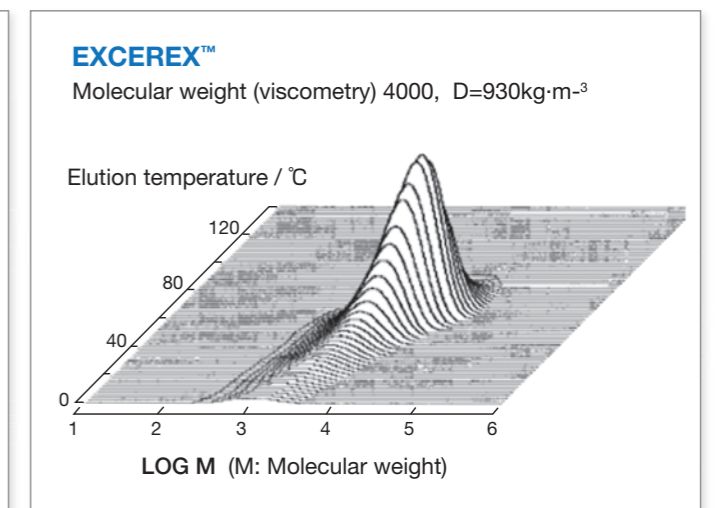
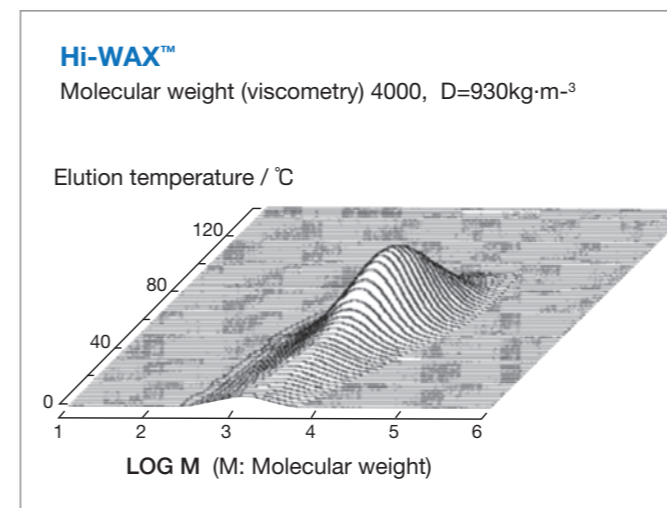
Our product categories

They cover a wide range from the polymerization method to thermal cracking and various modifications

Range of wax properties (Molecular weight – Melting point)



Correlation between composition distribution and molecular weight distribution



※Cross-fractionation chromatograph measurement results
 ※O-dichlorobenzene is used as the catalyst
 ※The horizontal axis indicates the molecular weight distribution, and the vertical axis indicates the composition distribution

EXCEREX™ is a product using metallocene catalyst. It is designed with a narrow molecular weight distribution and composition distribution, and little stickiness or bleed out.

Table of brands and correspondences with applications

Hi-WAX™ EXCEREX™

| Classification | | | General polymeric type | | | | | | | | | | | | | | | | |
|---------------------------------|---------------------|--|--|----------------------------|----------------------------|----------------------------|-------|-------|-------|-------|---|------|------|------|------|------|------|--------|--------|
| | | | High-density type | | | | | | | | Low-density type | | | | | | | | |
| Property | Units | | 100P [*] HP10A | 200P [*] 200PF | 400P [*] 400PF | 800P [*] 800PF | 07500 | 10500 | 20700 | 40800 | 110P | 210P | 220P | 320P | 410P | 420P | 720P | 30200B | 30050B |
| Molecular weight | - | | 900 | 2000 | 4000 | 8000 | 700 | 1000 | 2000 | 4000 | 1000 | 2000 | 2000 | 3000 | 4000 | 4000 | 7200 | 2900 | 2700 |
| Density | kg/m ³ | | 950 | 970 | 980 | 970 | 950 | 960 | 970 | 980 | 920 | 940 | 920 | 930 | 950 | 930 | 920 | 915 | 905 |
| Acid value | mgKOH/g | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Crystallinity | % | | 90 | 87 | 85 | 84 | 91 | 91 | 92 | 87 | 80 | 75 | 70 | 65 | 80 | 70 | 60 | 57 | 48 |
| Melting point | °C | | 116 | 122 | 126 | 127 | 115 | 119 | 124 | 128 | 109 | 114 | 110 | 109 | 118 | 113 | 113 | 102 | 91 |
| Softening point | °C | | 121 | 130 | 136 | 140 | 120 | 124 | 129 | 135 | 113 | 120 | 113 | 114 | 122 | 118 | 118 | 105 | 99 |
| Hardness (Penetration) | 10 ⁻¹ mm | | 2 | 1 | <1 | <1 | 1 | <1 | <1 | <1 | 25 | 4 | 13 | 7 | 2 | 3 | 3 | 6 | 7 |
| Melt viscosity (140°C) | mPa·s | | 15 | 80 | 600 | 8000 | 10 | 20 | 80 | 750 | 20 | 80 | 80 | 250 | 650 | 650 | 6000 | 270 | 260 |
| Features | | | Has high crystallinity and high density, and thus hardness and the softening point are high. | | | | | | | | Has low crystallinity and density, and thus hardness and the softening point are low. | | | | | | | | |
| Resin additive | | | ○ | ○ | ○ | ○ | | | | | ○ | | ○ | ○ | ○ | ○ | ○ | | |
| Mold auxiliary | | | | | | | | | | | | | | | | | | ○ | ○ |
| Pigment dispersant | | | | ○ | | ○ | | | ○ | | ○ | ○ | | | | ○ | ○ | ○ | ○ |
| Chlorinated vinyl lubricant | | | | ○ | ○ | ○ | | | | | | ○ | | | | ○ | | | |
| Ink abrasion resistance agent | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | ○ | ○ | ○ | ○ | ○ | ○ | | |
| Textile processing auxiliary | | | | | | | | | | | | | | | | | | | |
| Paint additive | | | | ○ | ○ | ○ | | ○ | ○ | | ○ | | ○ | | ○ | ○ | | | |
| Release agent | | | | ○ | ○ | ○ | | | | | | | | | | | ○ | | |
| Rubber processing auxiliary | | | | | | | | | | | ○ | ○ | ○ | ○ | | | | | |
| Paper quality improvement agent | | | | | | | | | | | | | | | | | | | |
| Hot melt | | | | ○ | ○ | | ○ | | | | ○ | | ○ | | | | | | |

* HP10A and Brands with a F suffix have a small grain size.

Hi-WAX™ EXCEREX™

Note) Numeric values in the table are typical values not standard values.

| Classification | | | Modified type | | | | | | | | | | | | | | |
|---------------------------------|---------------------|--|---|-------|-------|-------|------------------------------|---------------------------------|-------|-------|-------|--------------------|-------|---------|-------------------------------|---|--|
| | | | Oxidized type (Low acid value) | | | | | Oxidized type (High acid value) | | | | Acid modified type | | | Special monomer modified type | | |
| Property | Units | | 210MP | 220MP | 310MP | 320MP | 405MP [*] 405MPF | 4051E | 4052E | 4202E | 4252E | 1105A | 2203A | 15341PA | 1120H | 1160H | |
| Molecular weight | - | | 2000 | 2000 | 3000 | 3000 | 4000 | 3200 | 3000 | 2600 | 2900 | 1500 | 2700 | 1700 | 1200 | 1500 | |
| Density | kg/m ³ | | 940 | 920 | 950 | 930 | 960 | 970 | 970 | 950 | 940 | 940 | 930 | 930 | 940 | 1000 | |
| Acid value | mgKOH/g | | 1 | 1 | 1 | 1 | 1 | 12 | 20 | 17 | 17 | 60 | 30 | 14 | - | - | |
| Crystallinity | % | | 75 | 65 | 80 | 70 | 80 | 74 | 75 | 62 | 47 | 60 | 65 | 72 | 58 | 30 | |
| Melting point | °C | | 112 | 107 | 114 | 107 | 121 | 115 | 110 | 100 | 94 | 104 | 107 | 89 | 107 | 104 | |
| Softening point | °C | | 118 | 113 | 122 | 114 | 128 | 120 | 115 | 107 | 98 | 108 | 111 | 109 | 108 | 105 | |
| Hardness (Penetration) | 10 ⁻¹ mm | | 3 | 14 | 3 | 7 | 1 | 1 | 4 | 5 | 5 | 6 | 3 | 3 | 7 | 1 | |
| Melt viscosity (140°C) | mPa·s | | 80 | 80 | 250 | 250 | 650 | 500 | 440 | 300 | 480 | 150 | 300 | 70 | 40 | 1100 | |
| Features | | | Has affinity with polar polymers, inorganic compounds and metals etc. Products with high acid value can be emulsified. Acid modified products have reactivity with oligomers having alcohol, amine, isocyanate, and epoxy groups. | | | | | | | | | | | | | Has good compatibility with aromatic resins such as PS, ABS, and PES. | |
| Resin additive | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | ○ | ○ | | ○ | ○ | | |
| Mold auxiliary | | | | | | | | | | | | | | | | | |
| Pigment dispersant | | | | | ○ | ○ | | ○ | | ○ | | ○ | ○ | | ○ | ○ | |
| Chlorinated vinyl lubricant | | | ○ | ○ | | | ○ | | ○ | ○ | | ○ | ○ | | | | |
| Ink abrasion resistance agent | | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | ○ | ○ | | ○ | | |
| Textile processing auxiliary | | | | | | | | | | | | ○ | ○ | | | | |
| Paint additive | | | | ○ | ○ | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | ○ | | |
| Release agent | | | | | | | | | | | | | | ○ | ○ | | |
| Rubber processing auxiliary | | | ○ | ○ | | | | | | | | | | | | | |
| Paper quality improvement agent | | | | | | | | | | | | | ○ | | | | |
| Hot melt | | | | | | | | | | | | | | | | | |

The compliance of our company's products with laws, regulations and standards varies depending on the brand, so please inquire before use.

Data (solubility, compatibility, heat resistance)

Solubility

S: Soluble PS: Partially soluble I: Insoluble
Blend: Wax/Solvent = 1/4
Measurement temperature: 120°C

| | General type | | | High acid value type |
|-----------------------|-------------------|------|------------------|----------------------|
| | High-density type | | Low-density type | |
| | 100P | 400P | | |
| (Hydrocarbons) | | | | |
| Hexane | PS | I | PS | S |
| Heptane | PS | PS | S | S |
| Benzene | S | PS | S | S |
| Toluene | S | S | S | S |
| Xylene | S | S | S | S |
| Kerosene | S | S | S | S |
| Liquid paraffin | S | S | S | S |
| (Alcohols) | | | | |
| Methanol | I | I | I | I |
| Ethanol | I | I | I | I |
| 1-propanol | I | I | I | PS |
| 1-butanol | I | I | I | PS |
| Diethylene glycol | I | I | I | I |
| Glycerine | I | I | I | I |

| | General type | | | High acid value type |
|-----------------------------------|-------------------|------|------------------|----------------------|
| | High-density type | | Low-density type | |
| | 100P | 400P | | |
| (Ketones) | | | | |
| Methyl ethyl ketone | I | I | PS | PS |
| Diethyl ketone | PS | PS | S | S |
| MIBK | PS | PS | PS | S |
| (Chlorinated hydrocarbons) | | | | |
| Dichloroethane | PS | PS | S | S |
| Trichloroethylene | S | PS | S | S |
| Carbon tetrachloride | PS | PS | S | S |
| Chlorobenzene | S | S | S | S |
| (Other) | | | | |
| Ethyl acetate | I | I | I | I |
| Anisole | S | S | S | S |
| Oleic acid | S | S | S | S |
| Flaxseed oil | S | S | S | S |

Hi-WAX™ dissolves completely when heated in aromatic hydrocarbon solvents such as toluene and xylene. The general low-density type dissolves more easily than the high-density type, and it dissolves in heptane, diethyl ketone, dichloroethane, trichloroethane, and carbon tetrachloride, but the high-density type only dissolves in some of these solvents. The high acid value type dissolves easily in polar solvents such as MIBK.

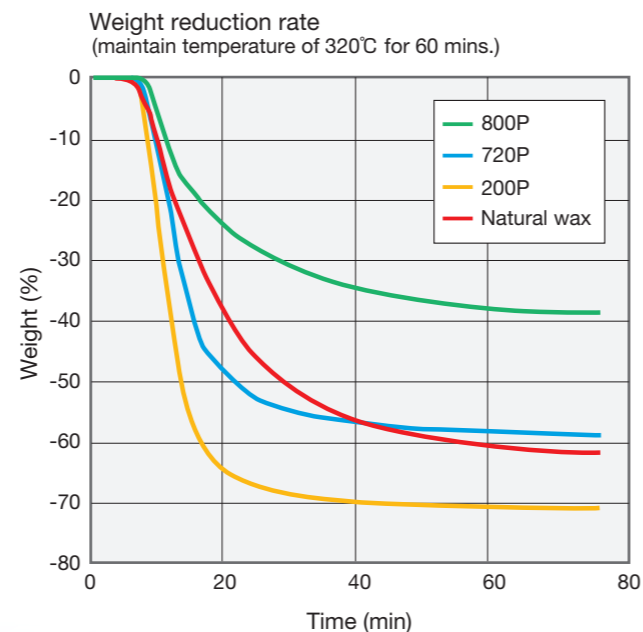
Compatibility

C: Compatible I: Incompatible
Blend: Wax/Material = 1/2
Measurement temperature: 160°C
Heating time: 1 hour

| | General type | | | High acid value type |
|-----------------------------|-------------------|------|------------------|----------------------|
| | High-density type | | Low-density type | |
| | 100P | 400P | | |
| High-density polyethylene | C | C | C | C |
| Low-density polyethylene | C | C | C | C |
| Ethylene vinyl acetate | C | C | C | C |
| Polybutene | C | C | C | C |
| Carnauba wax | C | C | C | C |
| Paraffin wax | C | C | C | C |
| Micro wax | C | C | C | C |
| Aliphatic hydrocarbon resin | C | C | C | C |
| Diocetyl phthalate | C | C | C | C |
| Flaxseed oil | C | C | C | C |
| Mineral oil | C | C | C | C |
| Oleic acid | C | C | C | C |
| Stearic acid | C | C | C | C |

Olefin-based, natural wax and fatty acids all exhibit outstanding miscibility.

Heat-resistance

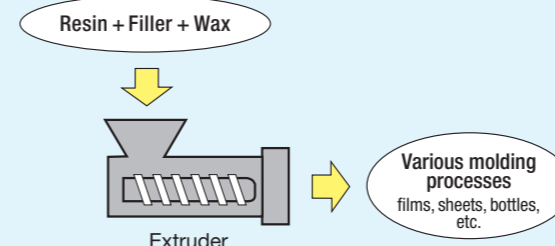


The high molecular weight brand has outstanding heat resistance.

Examples of product use (mold auxiliary, release agent, chlorinated vinyl lubricant, pigment dispersant)

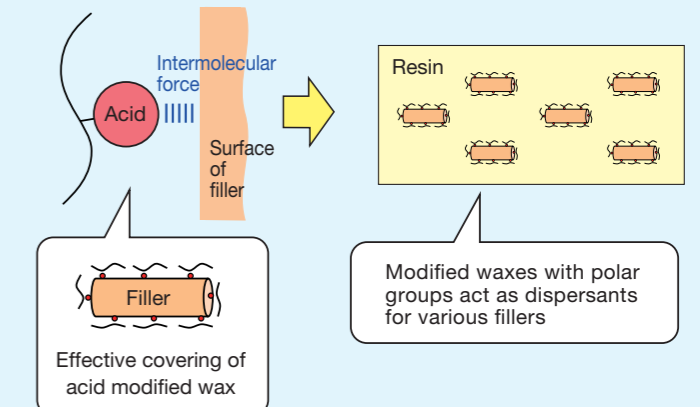
[Filler dispersant (inorganic fibers, natural fibers, nanofillers, etc.)]

Example of use



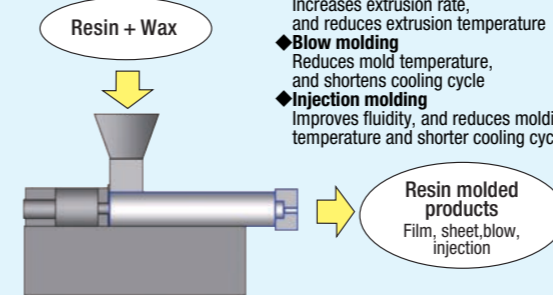
Effects Improves the dispersibility of various fillers

Filler dispersion mechanism by our modified wax



[Mold auxiliary]

Example of use

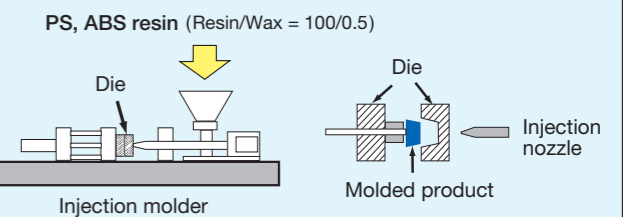


Effects

- ◆ **Extrusion molding (film, sheet)**
Reduces resin pressure and torque, and reduces extrusion temperature, and increases extrusion rate.
- ◆ **Blow molding**
Reduces mold temperature, and shortens cooling cycle
- ◆ **Injection molding**
Improves fluidity, and reduces molding temperature and shorter cooling cycle

[Application as a mold release agent for injection molding]

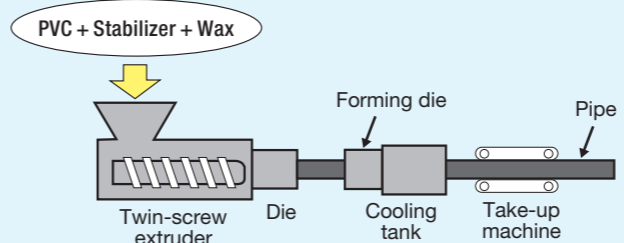
Example of use



Effects Enables shortening of molding cycle

[PVC lubricant]

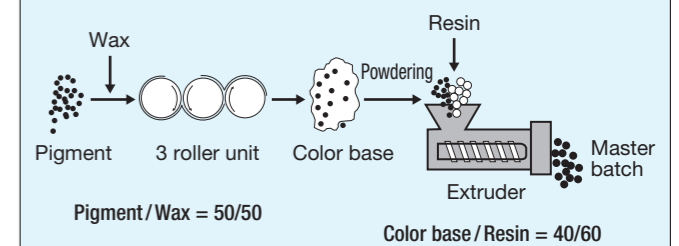
Example of use



Effects Enables superior appearance of molded products

[Pigment dispersant]

Example of use



Effects Enables increased concentration of master batch