PLASTICIZER

Plasticizers are added to PVC and other plastics to increase their flexibility and other physical properties. They are used in wallpaper, flooring, electrical wires, and synthetic leather.

• No odor	Odorless
• Non-toxic	Pass toxicology test
• Non-benzene	Environmental-friendly plasticizer
• Low VOCs	Reduce the amount of viscosity reducer Reduce VOCs emissions

NON TOXIC

Clean toxicological profile	Safe alternative to phthalates	Regulatory clearances

PAMIR

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PAMIR

Eco-friendly plasticizer
Eco-friendly anti-bacterial plasticizer

99.9% antibacterial, antifungal, antiviral function

Global leading Eco-friendly material company

GREETING

'Pamir' is a market leader in the eco-friendly materials industry, owing to its corporate philosophy of respect for life and naturalism.

We developed Korea's first eco-friendly plasticizer, with ZERO environmental hormones. Our products have made a significant contribution to the global market for eco-friendly materials. Pamir was founded in 2015, that specializes in the development of new cutting-edge materials and environmentally friendly medical devices. Since our inception, we have focused on developing eco-friendly products for infants and toddlers, as well as products that benefit patient health. In 2017, Pamir collaborated with Sungkyunkwan University, to develop an eco-friendly plasticizer with ZERO environmental hormones for the first time in Korea. We distribute eco-friendly plasticizers to both domestic and international customers. Additionally, we manufacture eco-friendly blister films (for pharmaceutical and food use) based on eco-friendly plasticizers and supply them to both pharmaceutical and food companies. We also develop and supply hospitals with disposable medical supplies. Pamir's ultimate goal is to be a global leader for environmentally friendly disposable medical supplies. Eco-friendly medical devices that do not emit environmental hormones, are now the trend in the medical device market. This market has grown rapidly to a size of 500 trillion won (418.4 Billion USD). Medical devices that are directly linked to human life, only eco-friendly ones will survive. Pamir is expanding its business to include not only eco-friendly medical devices, but also baby products, general household goods, and industrial goods. Through continuous R&D, investment, cutting-edge manufacturing facilities, and overseas subsidiaries, we are becoming the world leader in providing eco-friendly plasticizer. We request your undivided attention and heartfelt encouragement for Pamir, which aspires to take a second leap forward.

CEO **Yoon Ju-il**

VISION

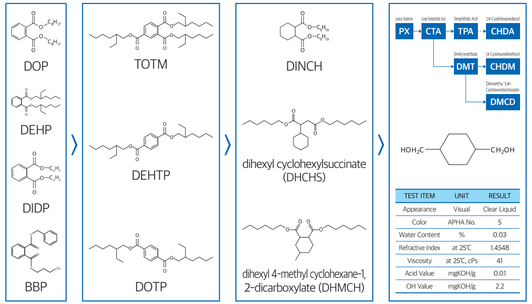
R&D
Research and development of eco-friendly high-tech materials on a continuous basis

Customer
Suggestion of user-friendly purchasing conditions

Produce
Establishment of a manufacturing environment conducive to the production of superior products

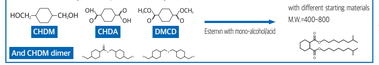
Ownership
Thorough quality control combined with a sense of product ownership

CHDM Plasticizer



Stable structure, universal use, first commercialization

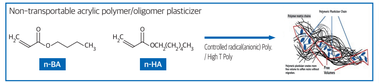
CHDM-based non-phthalate/non-aromatic plasticizer



Hexamol DINCH like plasticizer with different starting materials M.W.=400~800

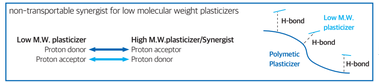
Use of encapsulation material for oral medicine as FDA-approved material

Non-transportable acrylic polymer/oligomer plasticizer



Low-transportability synergist

non-transportable synergist for low molecular weight plasticizers



Cyclohexane unit

- Non-aromatic plasticizer with no Benzene ring (complete exclusion of environmental hormone risk)
- Stable structure even in various processing (heat, pressure) methods

It can be used in all plastic products that use plasticizers.

HB-01(ECO-FRIENDLY PLASTICIZER)

molecular formula / material name	C26H48O4 (1,2-cyclohexane dicarboxylic acid diisononyl ester)
molecular weight	424.7 g/mol
CAS No.	166412-78-8

- HB-01 is a non-phthalate premium eco-friendly plasticizer.
- As a non-phthalate-based eco-friendly plasticizer, it can be used in various products that come into contact with people.
- As a colorless, odorless and transparent plasticizer, it can be applied to soft products such as those for medical use, wallpaper, flooring, toys, food wrap, and sheets.
- It also has good compatibility with other general plasticizers and additives used in PVC.

	HB-01	DINCH	DOP	DOTP	Method
Hardness Shore A(10 sec)	83.0	82.0	78.5	82.1	ASTM D 2240
Plasticization efficiency	1.01	1.04	1.00	1.05	ASTM D 2240
Initial coloration	8.8	8.8	8.8	10.1	ASTM E 313
Permeability/Haze(%/%)	90.1/11.3	89.5/11.3	89.6/3.0	88.3/4.7	ASTM D 1003
Tensile strength(KG/CM)	182	180	181	193	ASTM D 638
Migration(wt%)	0.07	0.20	0.04	0.71	ISO 177
Low brittle transition temperature(℃)	-33.4	-33.4	-31.4	-32.2	ASTM D-746
UV weather resistance	Excellent	Excellent	Good	Poor	ASTM G-154

* Blending(phr): PVC 100, Heat Stabilizer 2.0, ESO 2.0, Lubricant 0.5, Plasticizer 50

SPECIFICATIONS

(1) Typical Physical Properties

Items	unit	data
Pour point	℃	-60
Flash point(COC)	℃	224
Dynamic viscosity (at 20℃)	mPas	45-60
Boiling point	℃	394

(2) Specifications

Items	Specification Value	Test method
1.Color (APHA)	30 max.	ASTM D1209
2.Moisture (wt%)	0.10 max.	ASTM E203
3.Acid value (mg KOH/g)	0.08 max.	ASTM D1045
4.Specific gravity (20/20℃)	0.944 ~ 1.06	ASTM D1298
5.Refractive index (20℃)	1.460 ~ 1.466	ASTM D1045
6.Ester content (GC%)	99.6 min.	GC-MS
7.Heating loss (wt%)(125±3℃ ×3hrs)	0.2 max.	JIS K6751
8.Volume resistance (Ω-cm at 30℃)	1.2 ×1011 min.	ASTM D1169
Molecular Weight: 424.7g/mol		

TEST REPORT

Physical and chemical property test report

HB-02(ECO-FRIENDLY ANTIBACTERIAL PLASTICIZER)

molecular formula / material name	C26H48O4 (1,2-cyclohexane dicarboxylic acid diisononyl ester)
molecular weight	424.7 g/mol
CAS No.	166412-78-8

- HB-02 is a non-phthalate premium eco-friendly antibacterial plasticizer equipped with an antibacterial function (AFCP (Anti Bacterial/Fungal Coating Polymer)) that uses physical surface tension rather than chemical substances (zinc, copper, silver nano, etc.) so that it is harmless to the human body.
- As a non-phthalate-based eco-friendly antibacterial plasticizer, it can be used in various products that come into contact with people.
- As a colorless, odorless and transparent antibacterial plasticizer, it can be applied to soft products such as those for medical use, wallpaper, flooring, toys, food wrap, and sheets.
- It also has good compatibility with other general plasticizers and additives used in PVC.
- In particular, 99.99% of antibacterial, anti-fungal, and antiviral functions are excellent when producing finished products.

	HB-02	DINCH	DOP	DOTP	Method
Hardness Shore A(10 sec)	83.0	82.0	78.5	82.1	ASTM D 2240
Plasticization efficiency	1.01	1.04	1.00	1.05	ASTM D 2240
Initial coloration	8.8	8.8	8.8	10.1	ASTM E 313
Permeability/Haze(%/%)	90.1/11.3	89.5/11.3	89.6/3.0	88.3/4.7	ASTM D 1003
Tensile strength(KG/CM)	182	180	181	193	ASTM D 638
Migration(wt%)	0.07	0.20	0.04	0.71	ISO 177
Low brittle transition temperature(℃)	-33.4	-33.4	-31.4	-32.2	ASTM D-746
UV weather resistance	Excellent	Excellent	Good	Poor	ASTM G-154
Antibacterial and antifungal	99.99%	0%	0%	0%	Standard Test Research Institute

* Blending(phr): PVC 100, Heat Stabilizer 2.0, ESO 2.0, Lubricant 0.5, Plasticizer 50

Anti-bacterial result against coliform bacillus (E-coli) and Staphylococcus aureus: **99.9%**

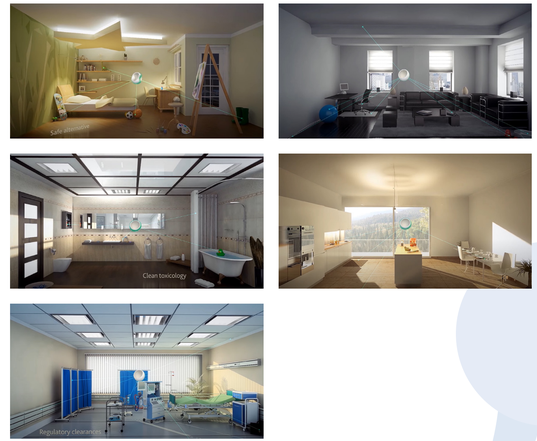
Anti-fungal result against aero-tropic white fungus: **99.9%**

99.9% antibacterial, antifungal, antiviral function

It is an antibacterial plasticizer that is harmless to the human body by using physical surface tension that bacteria do not like without using chemical substances that are pesticide ingredients. It has 99.9% antibacterial, antifungal and antiviral properties.

Physical and chemical property test report

APPLICABLE AREAS



TEST REPORT

Human toxicity and environmental hazard test report

PAMIR