UHMW-PE

Alternatives to PTFE from Mitsui Chemicals Group

High friction and abrasion wear are commonly encountered problems in the use of moving machine elements made from plastics. Polytetrafluoroethylene (PTFE) is widely used as an additive for reducing the friction coefficient and decreasing abrasion loss. However, it has its weaknesses in abrasion resistance. Additionally, PFOA and PFAS which are contained in PTFE, is becoming restricted as an environmentally hazardous substance globally. Our UHMW-PE (Ultra-high molecular weight polyethylene) products - MIPELON™ and LUBMER™ - present a viable alternative to PTFE.

Benefits of UHMW-PE:

Abrasion resistance

It exhibits superior abrasion resistance to polyacetal (POM), fluoropolymers and PA66 nylon.

Low friction

It has excellent self-lubrication and sliding properties.

Low specific gravity

The low specific gravity enables reduced product weight.

Chemical resistance

UHMW-PE has a good chemical resistance, and is stable against most acids, alkalis and organic chemicals.

Impact resistance

It possesses a higher impact resistance than polycarbonate (PC) and improves product durability.

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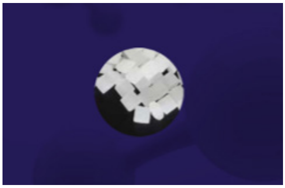
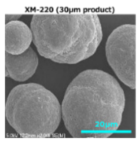
Introduction to LUBMER™ and MIPELON™:

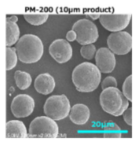


MIPELON™	LUBMER™
UHMW-PE (Fine-particle)	Specialty PE
Fine-Particle Powder (10-60 µm)	Pellet
MW: 2 million g/mol	MW: < 1 million g/mol
Modifier/Additives (Rubber, Resin, Grease, Coatings) Sintering Molding	Injection Molding Extrusion Molding
Abrasion Resistance, Impact Strength, Self-Lubrication, Spherical shape, Narrow Particle size distribution	Superb Lubrication, Abrasion Resistance, Noiseless Properties, Chemical Resistance

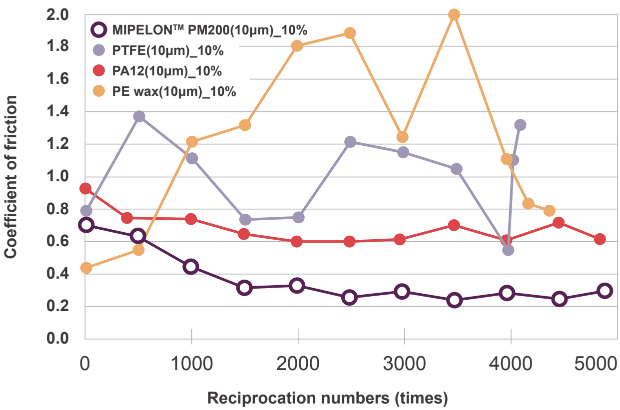
MIPELON™

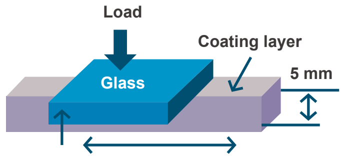
MIPELON™ features excellent distribution due to the spherical shape and narrow particle size distribution, and is able to improve the sliding properties, abrasion resistance, durability and quietness of a substrate when added to rubbers, coatings, greases and films. It can be used as powder coating, or also as filter by sintering the MIPELON™ itself.





Friction of coefficient measurements on rubber coatings with glass





W 30xL 30xT 6 (mm)

Load: 0.2 kg
Stroke: 100 mm
Speed: 150 mm/sec
Reciprocation: 5000 times

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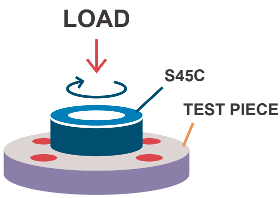
LUBMER™

LUBMER™ is a special polyethylene developed by Mitsui Chemicals using proprietary polymerization technology. It's the perfect solution for injection molding or extrusion molding with high sliding properties. LUBMER™ grades can be used as a neat resin, or - the basic grades and LUBMER™ LY1040 - as an additive, to improve the sliding properties and abrasion resistance of engineering plastics and rubbers.

Suzuki Method Ring Abrasion Test (JIS K 7218)

Testing Temperature: 23°C
Opposite Material: S45C
Load: 0.75MPa
Speed: 30m/min.
Distance: 3km



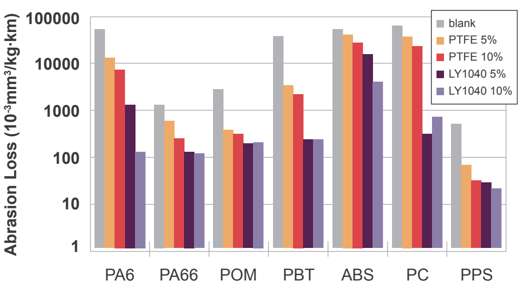
Abrasion resistance of different materials
(Ring test)

LUBMER™	PA6	POM	PBT
			
Abrasion Amount **85** ($\times 10^{-3}$mm³/kg·km)	Abrasion Amount **55000** ($\times 10^{-3}$mm³/kg·km)	Abrasion Amount **2300** ($\times 10^{-3}$mm³/kg·km)	Abrasion Amount **37800** ($\times 10^{-3}$mm³/kg·km)
Resistant to abrasion	Prone to abrasion		

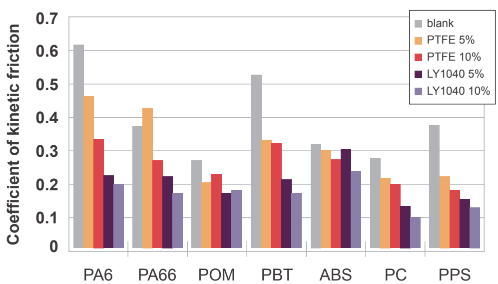
Introduction of LUBMER™ LY1040

LUBMER™ LY1040 can be used as an additive in engineering plastics. Figures below show the decrease in the coefficient of friction (COF) and abrasion loss by addition of 5wt% and 10wt% LY1040 to various materials.

Abrasion Loss of LUBMER™ LY1040 compounds



COF of LUBMER™ LY1040 compounds



**These data are just representative values, but not specification values.*

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