

Innovation News

Greaseless Solutions for Unique DURACON® POM Applications

Polycetal (POM) is a well-known, crystalline-structured engineering plastic that has excellent friction and wear resistance. The greaseless POM concept began when suppliers for applications such as food-grade conveyor chains, mechanical cassette deck systems and printer components demanded a new formulation to eliminate lubricant migration. As a result, cleaner application operation was developed, which dramatically reduced labor and supply costs for the manual greasing stage of the manufacturing process.

As time progressed, several formulations of POM were developed for various sliding purposes, resulting in a number of unique advantages.

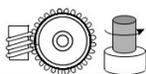
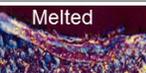
However, it was difficult to apply the second-generation POM to several common automotive applications, such as window lifting systems, actuator gears and HVAC components, due to the severe load and sliding conditions. Automotive contaminants, including dust, road salt, chemicals and others, are more abrasive. Therefore, a new generation of greaseless, high-sliding POM was

developed to accommodate harsher demands.

Table 1 illustrates common types of POM damage for sliding applications, including pitting, adhesion and abrasion.

- Pitting fatigue is caused by cyclic compression, which is observed on roller surfaces and lubricated POM gears.
- Adhesion is usually found on bearings, gearing structures and cam systems that have high-speed or high-load conditions, leading to surface separation during operation. The heat generated by the friction negatively affects the performance of the part directly. Generally, a low-friction alternative is a good counter measure to enhance the sliding performance.
- Abrasion is a shaving or filed damage caused by hard edges and rough surfaces. Because frictional heat might not affect the material as severely as adhesion, enhancing toughness and durability is one of the most important factors in counteracting frictional damage.

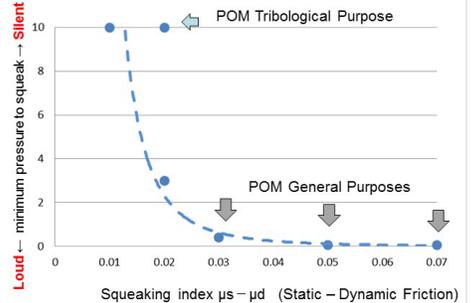
Table 1: Typical Damage of POM

Mode	Application Example	Damage
Abrasion		
		
Adhesion		
Pitting		

To ensure proper resistance to abrasion and noise, it is critical to consider formulations developed specifically for high-sliding POM materials that are also exposed to outside elements. The squeaking noise is generated when the two material surfaces rub together during operation, which cause micro-vibrations. To avoid this, the friction coefficient should be increased as

frictional speed increases.

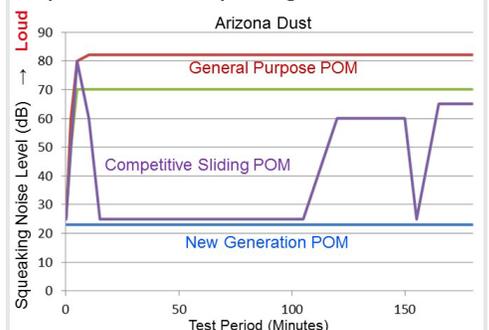
Graph 1: Squeaking Index



Illustrated in Graph 1, the difference between the static friction coefficient (μ_s) and the dynamic coefficient (μ_d) can be seen using a squeaking index. Overall, materials that have a lower squeaking index can reduce the risk of noise.

Both abrasion and the noise associated with it are connected to the mating surface type and dust conditions. "Arizona dust" is a well-known type of dust used for POM abrasion testing in the United States, while "China dust" is very common for abrasion testing in China. As shown in Graph 2, the latest in high-sliding POM technology provides the lowest abrasion and noise for applications that are exposed to outside elements.

Graph 2: Abrasion & Squeaking Resistance of POMs



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Polyplastics Increases Technical Support Capabilities in US

In effort to further increase our footprint here in the United States, Polyplastics recognizes that having strong technical support capabilities are the foundation for generating new, and growing current business. In December 2016, Polyplastics USA purchased a JSW 110AD 180H injection molding machine, as well as a Digital Imaging Correlation Machine from Correlated Solutions. By acquiring these two pieces of equipment allows Polyplastics USA to technically support our customer base like never before!

Our molding tools were designed with customer support and training in mind. We now have the ability to mold our own ISO Tensile and HDT bars, as well as perform customer training seminars with our various appearance part cavities. The DICM allows use to visualize stress, strain, and deformation with actual parts in the field. Being able to produce results as accurately as an FEA model, this method saves valuable time in the troubleshooting process.

DURACON® POM

POM (Acetal Copolymer)

DURANEX® PBT

PBT (Polybutylene Terephthalate)

DURAFIDE® PBT

PPS (Polyphenylene Sulfide)

TOPAS® COC

COC (Cyclic Olefin Copolymer)

About Polyplastics

Polyplastics is a global leader in the development and production of engineering plastics solutions. With more than 50 years of experience, its technical experts enhance manufacturing and product performance with a proficiency that has become second nature. Backed by a strong global network of R&D, production and sales resources, the team is able to create advanced solutions for an ever-evolving market.

For more information, visit our website, www.polyplastics.com/en/.

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