

## CHEMISTRY THAT MATTERS™

### LNPT™ COMPOUNDS

### WEAR AND FRICTION SOLUTIONS

### LUBRICATED COPOLYMERS FOR THIN-WALL HEALTHCARE APPLICATIONS

As designers miniaturize drug delivery devices (insulin pens, inhalers) for improved portability, they are often faced with a difficult dilemma. How do you design for smooth, repeatable, and quiet actuation in parts created with thin walls and maintain the tight dimensional tolerances required? Semi-crystalline resins will generally flow better and provide better wear and lower friction compared to amorphous resins, but they can't always hold the tolerances needed.

#### Dimensional accuracy and low friction

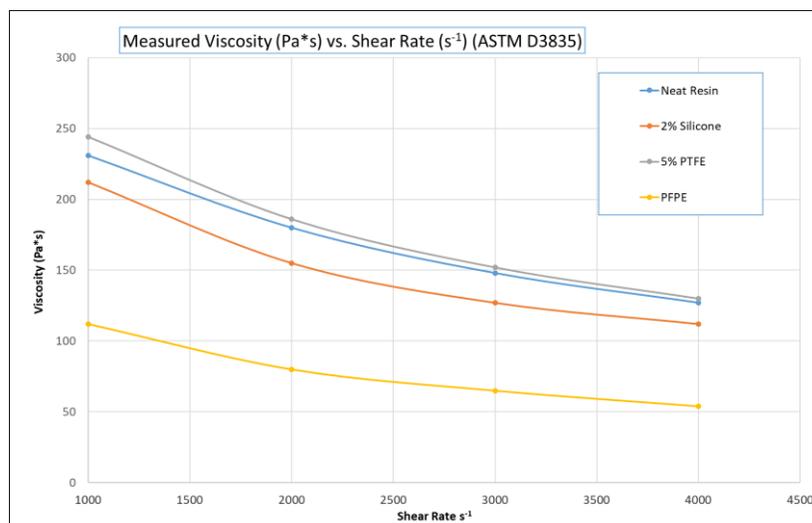
To get dimensional accuracy and good tribological performance, a common technic is to add an internal lubricant into an amorphous resin. But adding traditional lubrication packages like PTFE and silicone generally reduces the flow of a thermoplastic resin. One possible solution is compounding a high-flow PC Copolymer resin for use in healthcare applications, with PFPE, a fluorinated synthetic oil.



#### PFPE as internal lubricant and flow promoter

Perfluoropolyether (PFPE) is available as a USP Class VI material, and it can act as both an internal lubricant, reducing wear and friction, and as a flow aid to improve filling of thin wall parts. The chart below illustrates the effect of adding various lubrication packages on melt viscosity of a high flow PC Copolymer. The PFPE lubricated formulation showed significant improvement in flow and has been shown to reduce assembly and actuation forces in some applications. Based on these results, a new grade LUBRICOMP™ DX19519H compound was created.

#### Viscosity vs shear for a high flow PC copolymer resin with various internal lubrication types



# WEAR AND FRICTION SOLUTIONS

## LUBRILLOY ALLOY TECHNOLOGY

The recently introduced LUBRICOMP DX19519H compound exhibits good flow in thin-wall parts and reduces frictional forces associated with squeak generation during operation of buttons and sliders. It joins a family of PFPE lubricated grades embraced by drug delivery device and surgical tool manufacturers as a reliable way to get improved friction performance from tight tolerance parts.

SABIC LNP compounds based on ULTEM™, LEXAN™ and LEXAN Copolymer resins and managed under the LNP Healthcare Management of Change process have found use in a variety of applications.

Grade	Description	Features	Possible Applications
LUBRICOMP DX19519H compound	PC Copolymer, PFPE	Improved “slip-stick”, low friction, low squeak, thin wall molding	Thin wall medical drug delivery, lab equipment, injector pens/pump
Other PFPE lubricated grades			
LUBRICOMP DX07404H compound	PC, PFPE	Improved “slip-stick”, low squeak, lower COF than unmodified PC	Drug delivery, lab equipment, injector pens/pump, medical connectors
LUBRICOMP EX03599H compound	PEI, PFPE	HDT: 213C, Improved “slip-stick”, low squeak, lower COF than unmodified PEI	Surgical instruments, trocars
LUBRICOMP EX10405H compound	PEI, 30% carbon fiber, PFPE	FM: 17.3 GPa, improved “slip-stick”, low friction	Metal replacement, surgical tools

DISCLAIMER: THE MATERIALS, PRODUCTS AND SERVICES OF SAUDI BASIC INDUSTRIES CORPORATION (SABIC) OR ITS SUBSIDIARIES OR AFFILIATES (“SELLER”) ARE SOLD SUBJECT TO SELLER’S STANDARD CONDITIONS OF SALE, WHICH ARE AVAILABLE UPON REQUEST. INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS DOCUMENT ARE GIVEN IN GOOD FAITH. HOWEVER, SELLER MAKES NO EXPRESS OR IMPLIED REPRESENTATION, WARRANTY OR GUARANTEE (I) THAT ANY RESULTS DESCRIBED IN THIS DOCUMENT WILL BE OBTAINED UNDER END-USE CONDITIONS, OR (II) AS TO THE EFFECTIVENESS OR SAFETY OF ANY DESIGN OR APPLICATION INCORPORATING SELLER’S MATERIALS, PRODUCTS, SERVICES OR RECOMMENDATIONS. UNLESS OTHERWISE PROVIDED IN SELLER’S STANDARD CONDITIONS OF SALE, SELLER SHALL NOT BE RESPONSIBLE FOR ANY LOSS RESULTING FROM ANY USE OF ITS MATERIALS, PRODUCTS, SERVICES OR RECOMMENDATIONS DESCRIBED IN THIS DOCUMENT. Each user is responsible for making its own determination as to the suitability of Seller’s materials, products, services or recommendations for the user’s particular use through appropriate end-use and other testing and analysis. Nothing in any document or oral statement shall be deemed to alter or waive any provision of Seller’s Standard Conditions of Sale or this Disclaimer, unless it is specifically agreed to in a writing signed by Seller. Statements by Seller concerning a possible use of any material, product, service or design do not, are not intended to, and should not be construed to grant any license under any patent or other intellectual property right of Seller or as a recommendation for the use of any material, product, service or design in a manner that infringes any patent or other intellectual property right.

SABIC and brands marked with ™ are trademarks of SABIC or its subsidiaries or affiliates, unless otherwise noted.  
© 2020 Saudi Basic Industries Corporation (SABIC). All Rights Reserved.

Any brands, products or services of other companies referenced in this document are the trademarks, service marks and/or trade names of their respective holders.