

Medalist®

Medical Grade TPEs for Syringe Plunger Stoppers

Plunger stoppers serve as a key component of syringes or syringe-style dosage systems, functioning to preserve the integrity of the drug or chemical by providing an exceptional seal. Choosing the right material is crucial to the plunger stopper's performance. The stopper material needs to be chemically inert to minimize the risk of interaction with the syringe contents. A low coefficient of friction is required for optimal gliding performance against the glass or plastic barrel. Teknor Apex offers an entire portfolio of Medalist® medical-grade thermoplastic elastomers (TPEs) suitable for a variety of stopper designs and requirements.



Medalist® TPEs are the Premier Choice for Syringe Plunger Stoppers

Plunger stoppers made from Medalist TPEs perform well in both glass and plastic syringe barrels. Medalist stoppers achieve a consistent piston release and travel force due to a low coefficient of friction. Medalist TPEs offer several benefits over current stopper material technologies, including thermoplastic vulcanizates (TPVs), natural and isoprene rubber.¹ Medalist TPEs are composed of clean, inert ingredients, and do not require curing like rubber, eliminating concerns of extractables and leachables. Compared to thermoset rubber, Medalist TPE molding cycle times are reduced significantly, and scrap can be recycled. Also, the precision of injection molding allows for intricate designs with very tight dimensional tolerances. With Medalist TPEs, stoppers can be injection molded or overmolded onto syringe plungers, eliminating an assembly step. Specialty grades have been formulated for improved adhesion to engineering resins, which is an advantage over standard TPVs. Also, unlike standard TPVs, Medalist TPEs do not require pre-drying.

Why Medalist® TPEs for Syringe Plunger Stoppers?

- » Diverse portfolio of products to suit wide range of syringe systems
- » Sterilizable
- » Better compression set versus competitive TPEs for improved sealability
- » Good gliding performance as the plunger moves through the shaft
- » Suitable for high-cavitation precision molding
- » Available in natural or black

Regulatory Compliance

- » Made with FDA compliant ingredients
- » Biocompatible, ISO 10993-5 compliant
- » REACH SVHC Compliant
- » Free of DEHP, phthalates, BPA and latex
- » Free of Animal Derived Materials (ADM)
- » Manufactured in an ISO-13485 certified facility

Footnotes:

¹ Medalist TPEs are not recommended for applications requiring high oxygen barrier properties, and therefore are not suitable alternatives to butyl rubber or halo butyl rubber.

Table 1: Typical Properties of Medalist Medical-grade TPEs for Syringe Plunger Stoppers

Typical Properties	ASTM Test Method	Units	MD-24160	MD-16155HH	MD-34950
Color	---	---	Natural or Black	Natural or Black	Natural or Black
Specific Gravity	D792	---	0.90	1.04	0.94
Hardness (5 sec delay)	D2240	Shore A	57	55	50
Melt Flow Rate	D1238	g/10 min	12 (200°C, 5kg)	1.2 (230°C/2.16kg)	13 (230°C, 5kg)
100% Modulus	D412	psi (MPa)	290 (2.00)	350 (2.41)	220 (1.52)
Tensile Strength	D412	psi (MPa)	650 (4.48)	890 (6.14)	1000 (6.89)
Elongation	D412	%	450	610	590
Tear Strength (Die C, 20 in/min)	D624	lbf/in (N/mm)	140 (24.50)	157 (27.49)	150 (26.27)
Compression Set	D395				
73°F (23°C), 22 hr		%	19	13	11
158°F (70°C), 22 hr		%	38	25	46
212°F (100°C), 22 hr		%	---	36	---
Sterilization Method	---	---	Ethylene Oxide and Gamma	Steam	Ethylene Oxide and Gamma
For Overmolding, Adhesion to	---	---	PP	PP	PC, ABS, PC/ABS, COPE, PET, PBT, PMMA, ASA, SAN, POM

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