

Two black handguns are shown on a camouflage fabric background. One handgun is in the foreground, angled towards the bottom left, with its magazine inserted. The other handgun is behind it, partially obscured. The background fabric has a mix of green, brown, and tan patterns.

POLYMERS FOR FIREARMS

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Engineering polymers and elastomers are the perfect solution for use in firearm components. They provide lightweight, high strength, high stiffness, dimensional stability and excellent chemical resistance to meet the most demanding requirements. There are a wide variety of different types of polymers that offer specific benefits, and these polymers can be easily modified to meet almost any performance requirement. Engineering polymers have been successfully used in firearm components for many years because of the many benefits they bring.

WHY POLYMERS FOR FIREARM COMPONENTS?

Polymers can offer multiple advantages in firearm components including:

- High Dimensional Stability
- Excellent Chemical & Stress Cracking Resistance
- Excellent Fatigue Resistance
- Lower Overall System Costs
- Reduced Weight
- Improved Performance
- Design Freedom
- Product Differentiation
- Reduced Recoil
- Resistance to Moisture / Corrosion

TYPICAL FIREARM COMPONENTS THAT CAN BE PRODUCED FROM POLYMERS ARE:

- | | |
|---------------|-------------------|
| ● Grips | ● Trigger Guards |
| ● Magazines | ● Pistol Frames |
| ● Butt Stocks | ● Lower Receivers |
| ● Recoil Pads | ● Optic Mounts |
| ● Handguards | ● Picatinny Rails |



Each of these applications have different requirements. Some need high strength or high stiffness; others may need vibration damping; others may need softness or a tactile feel, while others may need high dimensional stability or specific chemical resistance. Because of this, multiple polymer types are used depending on the specific needs of each component. Common polymer types used for firearm components are various types of nylons (nylon 6, nylon 66, nylon copolymers and specialty nylons), polyesters, acetals, polycarbonates, thermoplastic elastomers, thermoplastic polyurethane, and high-performance polymers like polysulfone, PPS and PPA. Many of these polymers will be reinforced with glass fiber or carbon fiber for high strength and stiffness.



FIREARM COMPONENT & POLYMER / ELASTOMER TYPES

FIREARM COMPONENT	ENGINEERING POLYMERS	THERMOPLASTIC ELASTOMERS (TPE)
Stocks, Frames, Receivers	Glass reinforced nylon, polyester, polypropylene, polycarbonate	
Handguards, Forearms, Picatinny Rails, Magazines	Glass reinforced nylon, polyester, polypropylene; may also contain special lubricants	Vibration damping thermoplastic elastomers, soft-touch thermoplastic elastomers
Recoil Pads		Vibration damping thermoplastic elastomers
Grips	Glass reinforced nylon, polyester, polypropylene	Vibration damping thermoplastic elastomers, soft-touch thermoplastic elastomers
Bullets	Lead replacement with nylon or other polymer types	Thermoplastic polyurethane
Shotgun Shells, Wads, Buffers	Non-reinforced polyethylene	

COMMON FIREARM COMPONENTS & REQUIREMENTS

COMPONENT	DESCRIPTION	REQUIREMENTS
1	Pistol Grip	Stiffness, Strength, Chemical Resistance
2	Magazine	Dimensional Stability, Stiffness, Impact Resistance
3	Butt Stock	Energy Absorption, Lightweight
4	Handguard	Stiffness, Strength, Chemical Resistance
5	Trigger Guard	Stiffness, Strength
6	Frame	Extreme Strength, Stiffness, Dimensional Stability
7	Lower Receiver	Extreme Strength, Stiffness, Heat Resistance, Dimensional Stability
8	Optic Mount	Stiffness, Strength, Creep Resistance



POLYMER TYPE, SUPPLIER & TRADENAME

POLYMER TYPE	SUPPLIER / TRADENAME
Glass Reinforced Nylon 6	RMA HYLON®, BASF ULTRAMID® B
Glass Reinforced Nylon 66	RMA HYLON®, BASF ULTRAMID® A, ASCEND VYDYNE® R
Glass Reinforced Nylon Copolymers	ASCEND HIDURA™
Glass Reinforced Polypropylene	RMA SCOLEFIN®, ASAHI THERMYLENE®, ENTEC ECHO®
Glass Reinforced PBT Polyester	CELANESE CELANEX®, BASF ULTRADUR®
Glass Reinforced Polycarbonate	RMA HYLEX®, SAMYANG TIREX®, TRINSEO CALIBRE™
Thermoplastic Elastomers	CELANESE SANTOPRENE® TPV, ENPLAST S & ENPLAST EA
Thermoplastic Polyurethane	LUBRIZOL ESTANE®
Acetal	CELANESE CELCON® & HOSTAFORM®
Polysulfone	BASF ULTRASON®
High Performance Polymers	CELANESE FORTRON® & CELSTRAN® LONG GLASS FIBER REINFORCED PLASTIC
Thermoplastic Polyurethane	LUBRIZOL ESTANE® TPU



Let Entec Polymers help you with your engineering polymer and elastomer needs for firearm components. With our broad portfolio of products and our experience in firearm components, we can help you select the best polymer for your specific needs and application requirements. In addition, we can develop custom polymer compounds for your application if standard off-the-shelf products don't meet your requirements. Let us bring our knowledge and experience in polymers and firearms to help you manufacture the best firearms components possible.