



Material Selection Guide: Nylon and Teflon™ PTFE



12655 N. First Street | P.O. Box 2009 | Greenwood, DE 19950 USA | Toll Free: 800-497-4520 | Fax: 302-349-5730

Material Highlight: Nylon vs. Teflon™ PTFE

The smallest components can often make the biggest impact in a project. Choosing the right material for washers, gaskets, spacers, and other essential small components is a critical part of engineering, no matter your industry. Metallic components crafted from specialized alloys, amorphous and semicrystalline thermoplastics, and imidized materials all offer unique strengths and weaknesses in their performance.

As you evaluate the critical factors of your project, be sure to consider aspects such as:

- Temperature: will the parts be exposed to frequent fluctuation or extremes in temperature?
- Mechanics: is tensile strength important for this part? Will it be exposed to competing forces?
- Flexibility: does this component need to be extremely stiff or flexible for any reason?
- Impact Resistance: will toughness be a factor for this component?
- Dielectric Strength: will this part need to insulate from or effectively conduct electricity?
- Chemical Resistance: what chemicals or other substances will these components need to resist?
- Industry Demands: what specifications must your project meet? Is FDA or ITAR compliance important?
- Cost: what material offers the best performance for your budget?

Nonmetallic Stamped Parts: Innovation and Performance

As the available materials for stamped parts have become increasingly sophisticated, plastics have emerged as a high-performance, low-cost alternative to traditional metallic components. With specialized formulas, quick production options, and versatility for both large and small-run projects, new and innovative plastic materials are more popular now than ever.

Lightweight and easily formulated for high durability, chemical, and temperature resistance, it's no surprise that thermoplastic formulas such as Nylon and Teflon™ PTFE can be found in a wide variety of both home and industrial applications, including:

- Power tools, consumer, and kitchen appliances
- Home and garden, including outdoor hose and sprinkler systems
- Plumbing and electrical fixtures
- Furniture assembly
- Aerospace and military components
- Automotive assembly, including gears, bearings, and wheels
- Construction and industrial applications
- Marine components
- Food processing equipment
- Outdoor equipment and apparel
- And more



Teflon™ PTFE: Superior Chemical Resistance

Invented just three years after Nylon, Teflon™ PTFE was discovered by Dr. Roy J. Plunkett in 1938. This waxy, solid polymer, is possibly the world's most slippery material. It is inert to essentially all chemicals, making it tremendously versatile and useful for today's aerospace, communications, industrial, and electronics industries. It also offers nonstick surfaces on everyday cookware and works as a stain repellent for textiles.

Nylon: The First Synthetic Fiber

First invented in 1935 by Wallace Carothers, Ph.D., Nylon was the world's very first truly synthetic fiber. Today, it has become best known as a common material for high performance fabrics and clothing.

Nylon, however, offers strength and versatility for a variety of demanding industry applications. Medical instruments, plumbing seals, and fire safety sprinkler systems all rely on the durability of Nylon material.

Sample Application Comparison: Teflon™ PTFE, Nylon 6, Nylon 6/6, and Nylon MDS Washers

With high performance options from both Nylon and Teflon™ PTFE products, the best material fit for a project depends not only on the industry, but the specific demands of the application in question. For example, washer performance alone can vary vastly in elasticity, chemical resistance, and more.

Teflon™ PTFE

Best known for its low coefficient of friction and extreme resistance to water, oil, and chemicals, Teflon™ PTFE performs particularly well in appliances, outdoor equipment, and plumbing fixtures and systems.

- An outstanding thermal insulator, maintaining dimensional stability in up to 600 degrees Fahrenheit
- Consistent, durable, and long-lasting
- The most chemically resistant plastic; impervious to any kind of corrosive fluid
- The lowest coefficient of friction of any solid, even at high speed
- Dielectric strength: 400 - 500 v/mil
- Tensile strength: 1,500 - 3,000 psi
- Flexural modulus (bending stiffness/flexibility): 72,000 psi
- Izod impact (toughness): 3.5 ft-lbs/in



Nylon 6

This form of Nylon, also found in fabrics and textiles, can be used as a replacement for many metallic industrial applications — it's an excellent substitute for steel, aluminum, brass, and other high strength metals. It performs well in mechanical environments and plumbing applications. Abrasion resistant and highly machinable, it can also be found in electronics, household appliances, and outdoor apparel. Nylon 6 is:

- One of the lightest non-metallic materials available
- Resistant to alkalis, dilute acids, and oxidizing agents
- A cost-effective metal alternative in both economics and performance
- Dielectric strength: 500 - 600 v/mil
- Tensile strength: 10,000 - 13,500 psi
- Flexural modulus (bending stiffness/flexibility): 420,000 - 500,000 psi
- Izod impact (toughness): 0.7 - 0.9 ft-lbs/in

Nylon 6/6

This high-viscosity Nylon is ideal for chemical and electrical applications due to its high strength and temperature resistance. It's very similar to Nylon 6, but is made up of a higher order molecular structure. The balance and versatility of Nylon 6/6 make it easy to machine, with a high processing window. Machinery components, food processing, electronics, and appliances all utilize Nylon 6/6. Nylon 6/6 is:

- Similar to Nylon 6 in terms of both properties and applications
- Resistant to hydrocarbons, making it ideal for combustion engines and hydrocarbon-based lubricant applications
- Exceptional balance of strength, ductility, and heat resistance
- Well-suited metal replacement
- Can be engineered for increased strength and stiffness
- Cost-effective balance of dimensional stability, chemical/temperature resistance, and strength
- One of the most versatile materials available in engineering thermoplastics

Nylon MDS

The hardest, strongest type of Nylon, Nylon MDS was designed specifically for food grade applications. An extruded version of Nylon 6/6, Nylon MDS is enhanced with MDS particles for increased load-bearing capacity and improved lubricity.

Its strength and toughness make it ideal for any application that utilizes moving components, and as an exceptional alternative



to metals in most machining applications that apply high mechanical stresses. Pharmaceuticals, electronics, food processing, and all types of machinery rely on Nylon MDS. It is:

- Highly thermally and chemically resistance
- Durable and resistant to wear
- Self lubricating, with the closest coefficient of friction to Teflon™ PTFE for a Nylon fiber.
- Dielectric strength: 300 - 400 v/mil
- Tensile strength: 12,400 psi
- Flexular modulus (bending stiffness/flexibility): 410,000 psi
- Izod impact (toughness): 1.2 ft-lbs/in

With careful evaluation of your project requirements and expectations, thermoplastic components can offer high performance in extremely demanding settings — all while remaining affordable, lightweight, and easy to design and manufacture with precision.

New Process Fibre and Your Next Project

New Process Fibre was founded in 1927 in the hopes of improving a manufacturing process and its products. Over time, the products, materials, and even the processes have changed, but our focus on constant improvement has never varied.

Our founder, F. Carl Porter, developed a new process for creating vulcanized fibre, which has been expanded to include improvements of all kinds in the creation of non-metallic stampings. Today, we offer fabrication services and custom stamping work to produce parts from all kinds of vulcanized fibre, thermoplastic, NEMA Grade laminate, and specialized stamping materials.

Porter's descendants still run — and improve — New Process every day. They embrace the same dedication to innovative materials, top quality and cost effectiveness that founded the company, and have built an inventory of equipment and materials including over 8,000 washer dies to accommodate virtually any job.

[Contact us for additional material expertise or more information on our vast inventory today!](#)

