WS Hampshire Inc.
Over 100 Years of Non-Metallic Material Fabrication

IAPD MEMBER

# NYLON

Nylon is one of the most widely used plastics in the world, especially as a bearing and wear material. Nylons are frequently used as replacements for bronze, brass, aluminum, steel and other metals, as well as other plastics, wood, and rubber. Nylons offer extremely good wear resistance, coupled with high tensile strength and modulus of elasticity. They also have high impact resistance, a high heat distortion temperature, and resist wear, abrasion, and vibration. In addition, nylons can withstand sustained contact with a wide variety of chemicals, alkalies, dilute acids or oxidizing agents. Another important factor, both economically and mechanically, is the relative light weight of nylon -- approximately 1/8 the weight of bronze, 1/7 the weight of cast iron, and 1/2 the weight of aluminum -- which reduces both the inertial and static loads and eases the handling of large components during maintenance or replacement procedures.

**MC®907, MC®901** - Cast Unfilled Nylon 6

Unmodified cast type 6 nylon offers the highest strength and hardness of the nylon 6 grades. MC907, the natural grade (off-white in color), is FDA, USDA and 3A-Dairy compliant and is primarily used for food contact parts. A heat-stabilized grade, MC901, ( **Blue** in color) offers thermal stability to 260°F, and is used in bearing and structural applications, such as wheels, gears, and custom parts.

**Nylatron® GSM** - Cast Moly-Filled Nylon 6

Finely divided particles of "Moly" (molybdenum disulfide -- $MoS_2$) are dispersed evenly throughout the nylon material during polymerization. The Moly particles act as a dry lubricant to enhance nylon's load bearing and wear capabilities while maintaining impact strength and toughness. It is most commonly used for gears, sheaves, sprockets and custom parts. It is **Dark Grey** in color.

**Nyloil®** - Cast Oil-Filled Nylon 6

Simply put, this is a cast nylon with built-in oil lubrication. During the manufacturing process, oil lubrication is completely and evenly dispersed throughout the cast nylon, making it an integral part of the material's structure that cannot spin out, dry out, or drain out, even under the harshest working conditions. This oil-filler reduces friction by as much as 25% at the bearing interface, and can result in longer wear life than unfilled or moly-filled cast nylons. The standard grade is **Green** in color, but a natural (off-white) colored FDA & USDA approved grade is also available.

**Nylatron® GSM Blue** - Cast Moly- & Oil-Filled Nylon 6

This grade combines both molybdenum disulfide ($MoS_2$) and oil for the load capability of Nylatron GSM nylon, plus improved frictional characteristics. It excels in higher pressures and at low speeds. It is **Dark Blue-Gray** in color.

**Nylatron® NSM** - Cast Solid-Lubricant-Filled Nylon 6

This grade offers the best bearing and wear properties available. Solid lubricant additives, evenly dispersed throughout the nylon material, imparts self-lubricating, high PV, and superior wear characteristics. This **Gray** colored nylon grade is ideal for larger size parts, bearings, gears, and wear pads.

## TYPICAL PROPERTIES of CAST NYLONS

| ASTM or UL test | Property | Nylon 6 MC907,901 Unfilled | Nyloil Oil-Filled | Nylatron GSM Moly-Filled | Nylatron GSM Blue Moly & Oil | Nylatron NSM Solid-Lube |
|---|---|---|---|---|---|---|
| | ***PHYSICAL*** | | | | | |
| | Density (lb/in³) | 0.042 | 0.042 | 0.042 | 0.042 | 0.042 |
| D792 | (g/cm³) | 1.15 | 1.16 | 1.16 | 1.15 | 1.15 |
| | Water Absorption, 24 hrs (%) | 0.3 | 0.5 | 0.3 | 0.22 | 0.25 |
| D570 | Saturation (%) | 7 | 2.5 | 7 | - | 7 |
| | ***MECHANICAL*** | | | | | |
| D638 | Tensile Strength (psi) | 12,000 | 10,000 | 10,500 | 10,000 | 11,000 |
| D638 | Tensile Modulus (psi) | 400,000 | 425,000 | 400,000 | 500,000 | 410,000 |
| D638 | Tensile Elongation at Break (%) | 20 | 50 | 30 | 35 | 20 |
| D790 | Flexural Strength (psi) | 16,000 | 15,000 | 16,000 | 15,000 | 16,000 |
| D790 | Flexural Modulus (psi) | 500,000 | 425,000 | 400,000 | 425,000 | 400,000 |
| D695 | Compressive Strength (psi) | 15,000 | 13,000 | 14,000 | 13,000 | 14,000 |
| D695 | Compressive Modulus (psi) | 400,000 | 325,000 | 400,000 | 425,000 | 400,000 |
| D785 | Hardness, Rockwell R | R115 | R110 | R110 | R117 | R110 |
| D256 | IZOD Notched Impact (ft-lb/in) | 0.4 | 1.6 | 0.5 | 0.9 | 0.5 |
| | ***THERMAL*** | | | | | |
| D696 | Coefficient of Linear Thermal Expansion (x $10^{-5}$ in./in./°F) | 3.5 | 3.5 | 3.5 | 5.9 | 5 |
| D648 | Heat Deflection Temp (°F / °C) at 264 psi | 200 / 93 | 350 / 177 | 200 / 93 | - | 200 / 93 |
| D3418 | Melting Temperature (°F / °C) | 420 / 215 | 450 / 232 | 420 / 215 | 420 / 215 | 420 / 215 |
| - | Max Operating Temp (°F / °C) | 200 / 93 | 230 / 110 | 200 / 93 | 200 / 93 | 200 / 93 |
| C177 | Thermal Conductivity (BTU-in/ft²-hr-°F) (x 10-4 cal/cm-sec-°C) | - | - | - | - | - |
| UL94 | Flammability Rating | HB | - | HB | - | HB |
| | ***ELECTRICAL*** | | | | | |
| D149 | Dielectric Strength (V/mil) short time, 1/8" thick | 500 | 550 | 400 | - | 400 |
| D150 | Dielectric Constant at 60 Hz | 3.7 | 3.7 | 3.7 | - | - |
| D150 | Dissipation Factor at 60 Hz | - | - | - | - | - |
| D257 | Volume Resistivity (ohm-cm) at 73°F, 50% RH | > $10^{13}$ | - | > $10^{13}$ | > $10^{13}$ | > $10^{13}$ |

NOTE: The information contained herein are typical values intended for reference and comparison purposes only. They should NOT be used as a basis for design specifications or quality control. Contact us for manufacturers' complete material property datasheets. All values at 73°F (23°C) unless otherwise noted.