

NYLATRON®

Material Notes: Nylatron GS Nylon is a nylon and molybdenum disulphide (MoS₂) composition designed to improve the mechanical, thermal and bearing properties of type 6/6 nylon while maintaining its basic electrical and chemical characteristics. Through compounding, finely divided particles impart extra lubricity to this nylon, permitting Nylatron GS parts to operate with little or no lubrication. The added lubricity also contributes dramatically to component service life, making Nylatron GS a very cost-efficient choice. Nylatron GS nylon offers greater wear resistance, lower surface friction, higher strength and greater rigidity than unfilled 6/6 with improved dimensional stability.

| MECHANICAL PROPERTIES | ENGLISH VALUES | COMMENTS | METRIC VALUES |
|---|----------------|----------------------------|---|
| Specific Gravity | 1.16 | ASTM D792 | 1.16 |
| Tensile Strength, psi | 12500 | ASTM D638 | 86 MPa |
| Tensile Modulus, psi | 480000 | ASTM D638 | 3,310 MPa |
| Elongation, % | 25 | ASTM D638 | 25 % |
| Flexural Strength, psi | 17000 | ASTM D790 | 117 MPa |
| Flexural Modulus, psi | 460000 | ASTM D790 | 3,172 MPa |
| Shear Strength, psi | 10500 | ASTM D732 | 72 MPa |
| Compressive Strength, psi | 16000 | ASTM D695, 10% Def. | 110 MPa |
| Compressive Modulus, psi | 420000 | ASTM D695 | 2,896 MPa |
| Hardness, Rockwell M | 85 | ASTM D785 | 85 |
| Hardness, Rockwell R | 115 | ASTM D785 | 115 |
| Hardness, Durometer, Shore D Scale | 85 | ASTM D2240 | 85 |
| Izod Impact (Notched), ft-lb/in | 0.5 | ASTM D256 Type A | 27 J/m |
| Coefficient of Friction, Dynamic | 0.2 | Dry vs. Steel, PTM55007 | 0.2 |
| Limiting PV, psi-fpm | 3000 | PTM55007 | 0.11 MPa-m/sec |
| k (wear) factor, 10^{-10} in ³ -min/lb-ft-hr | 90 | PTM55007 | $90 \cdot 10^{-10}$ in ³ -min/lb-ft-hr |

| THERMAL PROPERTIES | ENGLISH VALUES | COMMENTS | METRIC VALUES |
|---|----------------|-----------------|------------------------|
| Coefficient of Thermal Expansion, 10E-4/°F | 0.4 | ASTM E831 (TMA) | $0.72 \cdot 10^{-4}/K$ |
| Deflection Temperature 264 psi, °F | 200 | ASTM D648 | 93 °C |
| Melting Point (Crystalline) Peak, °F | 500 | ASTM D3418 | 260 °C |
| Continuous Service in Air (Max), °F | 220 | Without Load | 104 °C |
| Thermal Conductivity, BTU-in/hr-ft ² -°F | 1.7 | | 0.24 W/m-K |

| ELECTRICAL PROPERTIES | VALUES | COMMENTS | METRIC VALUES |
|--|--------|--------------|---------------|
| Dielectric Strength, Short Term, Volts/mil | 350 | ASTM D149(2) | 14 kV/mm |

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|--------------------------------|-------|----------------|----------------------|
| Surface Resistance, Ohm/Square | 1E+13 | EOS/ESD S11.11 | 1E+13 Ohm/ Square |
|--------------------------------|-------|----------------|----------------------|

| CHEMICAL PROPERTIES | ENGLISH VALUES | COMMENTS | METRIC VALUES |
|---|----------------|--------------------|---------------|
| Water Absorption Immersion, 24 hr., % | 0.3 | ASTM D570 | 0.3 % |
| Water Absorption Immersion Sat, % | 7 | ASTM D570 | 7 % |
| Acids, Weak (acetic, dilute HCl) | 2 | Limited Service | 2 |
| Acids, Strong (conc. HCl or sulfuric) | 1 | Unacceptable | 1 |
| Alkalies, Weak (dilute NaOH) | 2 | Limited Service | 2 |
| Alkalies, Strong (conc. NaOH) | 1 | Unacceptable | 1 |
| Hydrocarbons, Aromatic (toluene) | 3 | Acceptable Service | 3 |
| Hydrocarbons, Aliphatic (gasoline) | 3 | Acceptable Service | 3 |
| Ketones, Esters (acetone) | 3 | Acceptable Service | 3 |
| Ethers (diethyl ether, THF) | 3 | Acceptable Service | 3 |
| Chlorinated Solvents (methylene chloride) | 2 | Limited Service | 2 |
| Alcohols (methanol, anti-freeze) | 2 | Limited Service | 2 |
| Inorganic Salt Solutions (NaCl, KCl) | 3 | Acceptable Service | 3 |
| Continuous Sunlight | 2 | Limited Service | 2 |
| Steam | 1 | Unacceptable | 1 |

| COMPLIANCE | ENGLISH VALUES | COMMENTS | METRIC VALUES |
|--|----------------|---------------|---------------|
| Flammability, UL94 (5=V-0; 4=V-1; 3=V-2; 1=HB) | 3 (V-2) | UL94 | 3 |
| FDA (1=Yes) | 0 | Not Compliant | 0 |
| USDA (1=Yes) | 0 | Not Compliant | 0 |
| NSF (1=Yes) | 0 | Not Compliant | 0 |
| 3A-Dairy (1=Yes) | 0 | Not Compliant | 0 |
| Canada AG (1=Yes) | 0 | Not Compliant | 0 |
| USP Class VI (1=Yes) | 0 | Not Compliant | 0 |

Material Notes: Nylatron GSM Blue nylon is the first cast nylon to combine both molybdenum disulfide and oil for the load capability of Nylatron GSM nylon, plus improved frictional characteristics. It excels in higher pressures, and at low speeds-up to 40 fpm. It offer 20% lower coefficient of friction, 50% greater limiting PV, and a lower "k" factor than Nylatron GSM, and the lowest "slip-stick" of any nylon product. It is ideal for slide pads, thrust washers and trunion bearings. Nylatron GSM blue should be considered for any oil-filled nylon application. It is dark blue in color.

| MECHANICAL PROPERTIES | ENGLISH VALUES | COMMENTS | METRIC VALUES |
|---|----------------|-------------------------|---|
| Specific Gravity | 1.15 | ASTM D792 | 1.15 |
| Tensile Strength, psi | 10000 | ASTM D638 | 69 MPa |
| Tensile Modulus, psi | 500000 | ASTM D638 | 3,448 MPa |
| Elongation, % | 30 | ASTM D638 | 30 % |
| Flexural Strength, psi | 15000 | ASTM D790 | 103 MPa |
| Flexural Modulus, psi | 500000 | ASTM D790 | 3,448 MPa |
| Compressive Strength, psi | 13000 | ASTM D695, 10% Def. | 90 MPa |
| Compressive Modulus, psi | 425000 | ASTM D695 | 2,930 MPa |
| Hardness, Rockwell M | 80 | ASTM D785 | 80 |
| Hardness, Rockwell R | 117 | ASTM D785 | 117 |
| Izod Impact (Notched), ft-lb/in | 0.9 | ASTM D256 Type A | 48 J/m |
| Coefficient of Friction, Dynamic | 0.18 | Dry vs. Steel, PTM55007 | 0.18 |
| Limiting PV, psi-fpm | 5500 | PTM55007 | 0.19 MPa-m/sec |
| k (wear) factor, 10^{-10} in ³ -min/lb-ft-hr | 65 | PTM55007 | $65 \cdot 10^{-10}$ in ³ -min/lb-ft-hr |
| THERMAL PROPERTIES | ENGLISH VALUES | COMMENTS | METRIC VALUES |
| Coefficient of Thermal Expansion, 10E-4/°F | 0.45 | ASTM E831 (TMA) | $0.81 \cdot 10^{-4}$ /K |
| Deflection Temperature 264 psi, °F | 200 | ASTM D648 | 93 °C |
| Melting Point (Crystalline) Peak, °F | 420 | ASTM D3418 | 216 °C |
| Continuous Service in Air (Max), °F | 200 | Without Load | 93 °C |
| ELECTRICAL PROPERTIES | VALUES | COMMENTS | METRIC VALUES |
| Surface Resistance, Ohm/Square | 1E+13 | EOS/ESD S11.11 | 1E+13 Ohm/Square |
| CHEMICAL PROPERTIES | ENGLISH VALUES | COMMENTS | METRIC VALUES |
| Water Absorption Immersion, 24 hr., % | 0.22 | ASTM D570 | 0.22 % |
| Water Absorption Immersion Sat, % | 6 | ASTM D570 | 6 % |

| | | | |
|---|---|--------------------|---|
| Acids, Weak (acetic, dilute HCl) | 2 | Limited Service | 2 |
| Acids, Strong (conc. HCl or sulfuric) | 1 | Unacceptable | 1 |
| Alkalies, Weak (dilute NaOH) | 2 | Limited Service | 2 |
| Alkalies, Strong (conc. NaOH) | 1 | Unacceptable | 1 |
| Hydrocarbons, Aromatic (toluene) | 3 | Acceptable Service | 3 |
| Hydrocarbons, Aliphatic (gasoline) | 3 | Acceptable Service | 3 |
| Ketones, Esters (acetone) | 3 | Acceptable Service | 3 |
| Ethers (diethyl ether, THF) | 3 | Acceptable Service | 3 |
| Chlorinated Solvents (methylene chloride) | 2 | Limited Service | 2 |
| Alcohols (methanol, anti-freeze) | 2 | Limited Service | 2 |
| Inorganic Salt Solutions (NaCl, KCl) | 3 | Acceptable Service | 3 |
| Continuous Sunlight | 2 | Limited Service | 2 |
| Steam | 1 | Unacceptable | 1 |

| COMPLIANCE | ENGLISH VALUES | COMMENTS | METRIC VALUES |
|--|----------------|---------------|---------------|
| Flammability, UL94 (5=V-0; 4=V-1; 3=V-2; 1=HB) | 1 (HB) | UL94 | 1 |
| FDA (1=Yes) | 0 | Not Compliant | 0 |
| USDA (1=Yes) | 0 | Not Compliant | 0 |
| NSF (1=Yes) | 0 | Not Compliant | 0 |
| 3A-Dairy (1=Yes) | 0 | Not Compliant | 0 |
| Canada AG (1=Yes) | 0 | Not Compliant | 0 |
| USP Class VI (1=Yes) | 0 | Not Compliant | 0 |

Material Notes: Nylatron GSM cast nylon contains finely divided particles of molybdenum disulfide to enhance its load bearing capabilities while maintaining the impact resistance inherent to nylon. It is the most commonly used grade for gears, sheaves, sprockets and custom parts. It is gray-black in color.

| MECHANICAL PROPERTIES | ENGLISH VALUES | COMMENTS | METRIC VALUES |
|---|----------------|----------------------------|---|
| Specific Gravity | 1.16 | ASTM D792 | 1.16 |
| Tensile Strength, psi | 11000 | ASTM D638 | 76 MPa |
| Tensile Modulus, psi | 400000 | ASTM D638 | 2,758 MPa |
| Elongation, % | 30 | ASTM D638 | 30 % |
| Flexural Strength, psi | 16000 | ASTM D790 | 110 MPa |
| Flexural Modulus, psi | 500000 | ASTM D790 | 3,448 MPa |
| Shear Strength, psi | 10500 | ASTM D732 | 72 MPa |
| Compressive Strength, psi | 14000 | ASTM D695, 10% Def. | 97 MPa |
| Compressive Modulus, psi | 400000 | ASTM D695 | 2,758 MPa |
| Hardness, Rockwell M | 80 | ASTM D785 | 80 |
| Hardness, Rockwell R | 110 | ASTM D785 | 110 |
| Hardness, Durometer, Shore D Scale | 85 | ASTM D2240 | 85 |
| Izod Impact (Notched), ft-lb/in | 0.5 | ASTM D256 Type A | 27 J/m |
| Coefficient of Friction, Dynamic | 0.2 | Dry vs. Steel, PTM55007 | 0.2 |
| Limiting PV, psi-fpm | 3000 | PTM55007 | 0.11 MPa-m/sec |
| k (wear) factor, 10^{-10} in ³ -min/lb-ft-hr | 90 | PTM55007 | $90 \cdot 10^{-10}$ in ³ -min/lb-ft-hr |
| THERMAL PROPERTIES | ENGLISH VALUES | COMMENTS | METRIC VALUES |
| Coefficient of Thermal Expansion, $10E-4/^\circ F$ | 0.45 | ASTM E831 (TMA) | $0.81 \cdot 10^{-4}/K$ |
| Deflection Temperature 264 psi, $^\circ F$ | 200 | ASTM D648 | $93^\circ C$ |
| Melting Point (Crystalline) Peak, $^\circ F$ | 420 | ASTM D3418 | $216^\circ C$ |
| Continuous Service in Air (Max), $^\circ F$ | 200 | Without Load | $93^\circ C$ |
| ELECTRICAL PROPERTIES | VALUES | COMMENTS | METRIC VALUES |
| Dielectric Strength, Short Term, Volts/mil | 400 | ASTM D149(2) | 16 kV/mm |
| Surface Resistance, Ohm/Square | $1E+13$ | EOS/ESD S11.11 | $1E+13$ Ohm/Square |
| Dielectric Constant, 1 MHz | 3.7 | ASTM D150(2) | 3.7 |
| CHEMICAL PROPERTIES | ENGLISH VALUES | COMMENTS | METRIC VALUES |

| | | | |
|---|-----|--------------------|-------|
| Water Absorption Immersion, 24 hr., % | 0.3 | ASTM D570 | 0.3 % |
| Water Absorption Immersion Sat, % | 7 | ASTM D570 | 7 % |
| Acids, Weak (acetic, dilute HCl) | 2 | Limited Service | 2 |
| Acids, Strong (conc. HCl or sulfuric) | 1 | Unacceptable | 1 |
| Alkalies, Weak (dilute NaOH) | 2 | Limited Service | 2 |
| Alkalies, Strong (conc. NaOH) | 1 | Unacceptable | 1 |
| Hydrocarbons, Aromatic (toluene) | 3 | Acceptable Service | 3 |
| Hydrocarbons, Aliphatic (gasoline) | 3 | Acceptable Service | 3 |
| Ketones, Esters (acetone) | 3 | Acceptable Service | 3 |
| Ethers (diethyl ether, THF) | 3 | Acceptable Service | 3 |
| Chlorinated Solvents (methylene chloride) | 2 | Limited Service | 2 |
| Alcohols (methanol, anti-freeze) | 2 | Limited Service | 2 |
| Inorganic Salt Solutions (NaCl, KCl) | 3 | Acceptable Service | 3 |
| Continuous Sunlight | 2 | Limited Service | 2 |
| Steam | 1 | Unacceptable | 1 |

| COMPLIANCE | ENGLISH VALUES | COMMENTS | METRIC VALUES |
|--|----------------|---------------|---------------|
| Flammability, UL94 (5=V-0; 4=V-1; 3=V-2; 1=HB) | 1 (HB) | UL94 | 1 |
| FDA (1=Yes) | 0 | Not Compliant | 0 |
| USDA (1=Yes) | 0 | Not Compliant | 0 |
| NSF (1=Yes) | 0 | Not Compliant | 0 |
| 3A-Dairy (1=Yes) | 0 | Not Compliant | 0 |
| Canada AG (1=Yes) | 0 | Not Compliant | 0 |
| USP Class VI (1=Yes) | 0 | Not Compliant | 0 |

Material Notes: Nylatron NSM is the premium bearing and wear nylon product available today. Solid lubricant additives impart self-lubricating, high pressure/velocity and superior wear resistance characteristics. This wear resistance is delivered without either start-up or running lubrication making it ideal for bearings, gears and wear pads. It is a proprietary type 6 nylon formulation produced using Quadrant EPP's Monocast process. Nylatron NSM was developed specifically for demanding applications where larger size parts are required. In wear applications, Nylatron NSM lasts up to 10 times longer than standard Type 6 nylon.

| MECHANICAL PROPERTIES | ENGLISH VALUES | COMMENTS | METRIC VALUES |
|---|----------------|-------------------------|--|
| Specific Gravity | 1.15 | ASTM D792 | 1.15 |
| Tensile Strength, psi | 11000 | ASTM D638 | 76 MPa |
| Tensile Modulus, psi | 410000 | ASTM D638 | 2,827 MPa |
| Elongation, % | 20 | ASTM D638 | 20 % |
| Flexural Strength, psi | 16000 | ASTM D790 | 110 MPa |
| Flexural Modulus, psi | 475000 | ASTM D790 | 3,275 MPa |
| Shear Strength, psi | 10000 | ASTM D732 | 69 MPa |
| Compressive Strength, psi | 14000 | ASTM D695, 10% Def. | 97 MPa |
| Compressive Modulus, psi | 400000 | ASTM D695 | 2,758 MPa |
| Hardness, Rockwell M | 80 | ASTM D785 | 80 |
| Hardness, Rockwell R | 110 | ASTM D785 | 110 |
| Hardness, Durometer, Shore D Scale | 85 | ASTM D2240 | 85 |
| Izod Impact (Notched), ft-lb/in | 0.5 | ASTM D256 Type A | 27 J/m |
| Coefficient of Friction, Dynamic | 0.18 | Dry vs. Steel, PTM55007 | 0.18 |
| Limiting PV, psi-fpm | 15000 | PTM55007 | 0.53 MPa-m/sec |
| k (wear) factor, 10^{-10} in ³ -min/lb-ft-hr | 9 | PTM55007 | $9 \cdot 10^{-10}$ in ³ -min/lb-ft-hr |

| THERMAL PROPERTIES | ENGLISH VALUES | COMMENTS | METRIC VALUES |
|--|----------------|-----------------|------------------------|
| Coefficient of Thermal Expansion, 10E-4/°F | 0.45 | ASTM E831 (TMA) | $0.81 \cdot 10^{-4}/K$ |
| Deflection Temperature 264 psi, °F | 200 | ASTM D648 | 93 °C |
| Melting Point (Crystalline) Peak, °F | 420 | ASTM D3418 | 216 °C |
| Continuous Service in Air (Max), °F | 200 | Without Load | 93 °C |

| ELECTRICAL PROPERTIES | VALUES | COMMENTS | METRIC VALUES |
|--|--------|----------------|------------------|
| Dielectric Strength, Short Term, Volts/mil | 400 | ASTM D149(2) | 16 kV/mm |
| Surface Resistance, Ohm/Square | 1E+13 | EOS/ESD S11.11 | 1E+13 Ohm/Square |

| CHEMICAL PROPERTIES | ENGLISH VALUES | COMMENTS | METRIC VALUES |
|---|----------------|--------------------|---------------|
| Water Absorption Immersion, 24 hr., % | 0.25 | ASTM D570 | 0.25 % |
| Water Absorption Immersion Sat, % | 7 | ASTM D570 | 7 % |
| Acids, Weak (acetic, dilute HCl) | 2 | Limited Service | 2 |
| Acids, Strong (conc. HCl or sulfuric) | 1 | Unacceptable | 1 |
| Alkalies, Weak (dilute NaOH) | 2 | Limited Service | 2 |
| Alkalies, Strong (conc. NaOH) | 1 | Unacceptable | 1 |
| Hydrocarbons, Aromatic (toluene) | 3 | Acceptable Service | 3 |
| Hydrocarbons, Aliphatic (gasoline) | 3 | Acceptable Service | 3 |
| Ketones, Esters (acetone) | 3 | Acceptable Service | 3 |
| Ethers (diethyl ether, THF) | 3 | Acceptable Service | 3 |
| Chlorinated Solvents (methylene chloride) | 2 | Limited Service | 2 |
| Alcohols (methanol, anti-freeze) | 2 | Limited Service | 2 |
| Inorganic Salt Solutions (NaCl, KCl) | 3 | Acceptable Service | 3 |
| Continuous Sunlight | 2 | Limited Service | 2 |
| Steam | 1 | Unacceptable | 1 |

| COMPLIANCE | ENGLISH VALUES | COMMENTS | METRIC VALUES |
|--|----------------|---------------|---------------|
| Flammability, UL94 (5=V-0; 4=V-1; 3=V-2; 1=HB) | 1 (HB) | UL94 | 1 |
| FDA (1=Yes) | 0 | Not Compliant | 0 |
| USDA (1=Yes) | 0 | Not Compliant | 0 |
| NSF (1=Yes) | 0 | Not Compliant | 0 |
| 3A-Dairy (1=Yes) | 0 | Not Compliant | 0 |
| Canada AG (1=Yes) | 0 | Not Compliant | 0 |
| USP Class VI (1=Yes) | 0 | Not Compliant | 0 |