

BASIC TYPE 66 NYLON

The following information is based on American Society for Testing and Materials (ASTM) test methods at optimum conditions of 73° F (23° C), 50% relative humidity, with the nylon at 2.5% moisture by weight. Further information on ASTM test methods and numbers, and other technical data can be obtained upon request, by calling All-States at 1-800-621-5837 or 1-773-728-0525.

Type 66 Nylon Material:

- Is strong and resilient.
- Fits most common product applications.
- Is resistant to a wide range of inorganic and organic substances, including automotive oils, detergents and alkalis.
- Has a specific gravity of 1.14, measured in relative units to water, which has a value of 1.
- Is derived from two amide-forming ingredients: hexamethylene diamine and adipic acid (each contain six atoms).

Facts on Type 66 Nylon's Strength and Density:

- Tensile yield strength (the load required for a material to lose its elasticity) is 9,000 psi. (Tensile strength and stiffness increase as temperature and/or moisture decrease.)
- Izod impact strength (the amount of energy needed to break a material at a notched point) is 2.1 ft. pounds per inch of notch depth.
- Flexural modulus of elasticity (an inverse linear measure of the relationship between flexibility and strength) is rated at 175,000 psi. (Lower values indicate greater flexibility and less strength.)
- Affected by solvents, strong acids and some salts. Alcohols tend to plasticize the nylon. Contact factory for complete list.

Facts on Type 66 Nylon's Temperature Requirements:

- -40° F (-40° C) to 185° F (85° C) working temperature range.
- 480° F (250° C) to 500° F (260° C) melting point.
- Deflection temperature (a measurement of the temperature at which a specific load will cause permanent deformation of the material) is 430° F (221° C) at 66 psi and 160° F (70° C) at 264 psi.

Facts on Type 66 Nylon's Flammability and Dielectric Strength

- Meets UL94V-2 flammability rating in tests for resistance to flame and electrical charge.
- Minimum oxygen needed to support combustion (the oxygen index) of Type 66 nylon in an oxygen/nitrogen atmosphere is 31%.
- Its dielectric strength (a measure of a material's electrical resistance) is 550 volts per mil.

Storage Requirements

- Because nylon is a hygroscopic material (affected by variations in moisture), all nylon materials optimally require storage at 73° F (±15° F) and 50% RH in sealed containers.
- Failure to keep product sealed, particularly in cold and/or dry environments, will result in moisture loss and a more brittle product.
- All-States packaging initially provides nylon products conditioned to 2.5% moisture added by weight in heavy-wall, polyethylene heat-sealed bags.

OTHER TYPE 66 NYLON MATERIALS

The following materials are Type 66 with additives to modify the nylon for specific applications and environments.

Facts on Outdoor, Weather-Resistant/UV-Stabilized Type 66 Nylon:

- Direct sunlight tests of this material showed virtually no deterioration of properties for at least five years, with minimum loss up to 15 years, due to a carbon black additive used to retard the degrading process of UV light.
- Available in black only, this outdoor, weather-resistant/UV-stabilized nylon is stronger but less ductile than basic Type 66.

Heat-Stabilized Nylon

- Has a higher temperature range than Type 66.
- Meets UL94V-2 flammability rating.

Fire-Retardant Nylon

- Recommended for most UL94V-0 environments.
- About half the tensile strength and slightly less impact strength of Type 66 nylon.

OTHER PLASTIC MATERIALS

Polypropylene

- All-States polypropylene products are more suitable than Type 66 nylon for use in drier environments.
- Since it is not a hygroscopic material, it is relatively unaffected by variations in moisture levels.
- Compared to Type 66 nylon, our polypropylene products:
 - Are resistant to many acids that affect nylon.
 - Are lighter in weight (specific gravity .9).
 - Have about half the tensile strength.
 - Have one-fourth the Izod impact strength.
 - Are less flexible in drier conditions.
 - Meet UL94V-HB flammability rating (horizontally burns).

Low-Density Polyethylene

- Similar to polypropylene in chemical and moisture resistance.
- Has less than half the tensile strength of polypropylene but is over six times more flexible.
- Suitable for use with delicate materials.
- Has no UL flammability rating.

Fluoropolymers (Tefzel¹, Halar²)

- Suitable for many severe environments, including high-energy radiation exposure, acidic areas and have been used in Plenum applications.
- Virtually inert to most solvents, chemicals and strong mineral acids.
- Weather-resistant and virtually unaffected by moisture.
- Meet UL94V-0 flammability rating.

¹Tefzel® is a registered trademark of E.I. DuPont de Nemours & Co.

²Halar® is a registered trademark of Ausimont, Inc.

CROSS-SECTION SERIES

The term “cross-section” (of a cable tie) occurs frequently throughout this catalog. The term, where applicable, is the same as the “Strap Identification Code” in Military Standards MS3367 and MS3368 under MIL-S-23190. This code nomenclature relates to certain specified maximum strap width and thickness dimensions and minimum tensile strengths.

Minimum loop tensile strengths required by the military for each cross-section series are in the following table. All-States cable ties meet or exceed these requirements.

Minimum Loop Tensile Strength

Cross-Section	lbs.	(Kg)
Miniature	18	(8)
Compact	30	(14)
Intermediate	40	(18)
Standard	50	(23)
Heavy	120	(54)
Very Heavy	175	(879)
Extra Heavy	250	(113)

Material	STRENGTH/DENSITY				TEMPERATURE				FLAMMABILITY		
	Ultimate Tensile Strength psi	Izod Impact Strength fp/i	Flexural Modulus psi	Specific Gravity	Continuous Usage Temperature Range	Melting Point	Deflection Temperature 66 psi 264 psi		UL Flammability Rating	Dielectric Strength Rating V/Mil	Oxygen Index
NYLON											
Basic Type 66	11,200	2.1	175,000	1.14	-40 F to 185 F (-40 C to 85 C)	485 F to 500 F (221 C to 260 C)	430 F (221 C)	160 F (71 C)	UL94V-2	550	31%
UV-Stabilized	9,000	2.0	191,000	1.15	-40 F to 185 F (-40 C to 85 C)	485 F to 500 F (252 C to 260 C)	446 F (230 C)	190 F (88 C)	UL94V-2	463	26% ³
Heat-Stabilized	11,100	2.7	195,000	1.14	-40 F to 221 F (-40 C to 105 C)	500 F (260 C)	430 F (221 C)	165 F (74 C)	UL94V-2	568	33%
Fire-Retardant	5,500	1.7	200,000	1.27	-40 F to 203 F (-40 C to 95 C)	480 F (249 C)	400 F (204 C)	160 F (71 C)	UL94V-0	620	31%
OTHER MATERIALS											
Polypropylene	5,100	.5	220,000	.90	40 F to 221 F (4 C to 105 C)	334 F (168 C)	220 F (104 C)	N/A	UL94V-HB	600	N/A
Polyethylene	1,925	No Break	34,000	.92	Up to 167 F (Up to 75 C)	375 F (191 C)	108 F (42 C)	N/A	No Rating	450	N/A
Tefzel ¹	6,500	No Break	200,000	1.70	-65 F to 302 F (-54 C to 150 C)	520 F (271 C)	220 F (104 C)	165 F (74 C)	UL94V-0	400	28-32%
Halar ²	7,000	No Break	242,000	1.68	-50 F to 284 F (-46 C to 140 C)	464 F (240 C)	197 F (92 C)	152 F (67 C)	UL94V-0	400	60%

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³ Dry as molded (.02% moisture). All other figures are measured at 2.5% moisture added.

These specifications are taken from the raw material manufacturers' data sheets and are intended only as a guide for selection. All-States Inc. reserves the right to change the raw material on any of its products without notice. Further information is available through the All-States corporate office.