

Discover the Nycast® Advantage of Cast Nylons Limited



CAST NYLON STOCK SHAPES and CUSTOM CASTINGS



CAST NYLONS
LIMITED

Delivering your product advantage for more than 25 years.

Cast Nylons Limited (CNL) is the premier producer of cast nylon in North America. Our people, our processes and our products are recognized as being among the very best in the industry.

Innovation drives our engineers and casters to develop creative solutions for our customers. CNL offers 42 standard and custom product formulas to meet the needs of the most demanding applications.

The company's product offerings include cast nylon sheets, rods, tubular bars, rectangular bars, nylon sheaves, elevator buckets, discs, rings and custom cast components. With distributors strategically located throughout the United States and Canada, CNL is available to serve a wide variety of industries and applications.

Our company also offers a unique 24/7 melt storage facility, which allows CNL to run product anytime, so that orders placed during the day can be scheduled for the same evening.

CNL's single-product focus allows us to provide a depth of service unmatched by the competition. Every aspect of our operation is focused on providing excellence, from manufacturing quality to our product line, tool design, engineering support, delivery and every part of the customer experience - that's the **Nycast® advantage**.

Standard Type 6 Products



NYCAST® XHA BLUE & NYCAST® 6 PA NATURAL

Two of the most widely used cast nylons in the industry, **NYCAST XHA BLUE** and **NYCAST 6PA NATURAL** have delivered successful performance – with and without lubrication – in a variety of diverse applications, particularly as a bearing material. They are lightweight, offer extremely good wear resistance, high tensile strength and high modulus of elasticity.

Other significant properties include:

- High impact resistance
- Excellent vibration resistance
- Resistance to brittleness and deterioration
- Easy machinability and abrasion resistance
- High heat distortion temperature

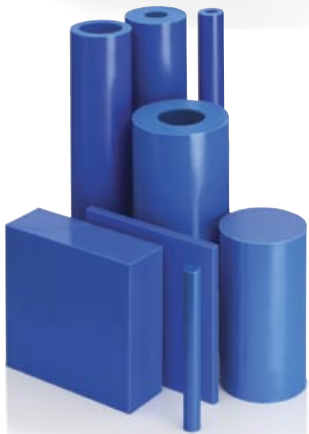
HEAT STABILIZATION PROPERTIES

NYCAST® XHA-BLUE has a heat stabilizer that retards the loss of physical properties as temperature increases. This allows the material to function at approximately 10% higher temperatures than standard grades; meaning NYCAST XHA operating at 200° F will have approximately the same physical properties as a standard grade operating at 185° F.

Maximum intermittent temperature for NYCAST XHA is 330° F and continuous operating temperature is 250° F (compared to 230° F for standard grades).

NYCAST® 6PA MoS₂

NYCAST 6PA-MoS₂ is a popular choice as a dry lubricant-filled bearing material. Manufactured to be a more crystalline product with improved wear resistance, **NYCAST 6PA-MoS₂** also offers improved compressive strength.



Premium Bearing Grades



NYCAST® NYLOIL® is the very first **oil-filled** cast nylon, introduced to North America 25 years ago. Often copied, never equaled, CNL's NYLOIL is carefully dispersed with an oil-based lubricant during the manufacturing process. The result is a highly crystalline, internally lubricated, high-strength polymer with enhanced wear and reduced friction properties.

NYLOIL is offered in grades tailored to specific applications:

NYLOIL (Green) - ideal for most anti-friction applications

NYLOIL FG (Natural) - specified for direct contact with food - FDA and USDA 3A compliant

NYLOIL MDX (Gray or Blue) - designed for slightly higher load capabilities



SOLID LUBRICANT-FILLED NYLONS

NYCAST® RX (Red) & NYCAST® GX (Gray) -

are **solid lubricant-filled** cast nylons designed to provide low coefficient of friction and superior wear resistance, making them an excellent choice in high-load, low-speed applications.



LIMITING PV

	Unlubricated*	Continuously Lubricated*
Nycast 6PA		
6 PA-Blue, 6 PA-MoS ₂	3,600	14,000
Nycast 612 CP	3,600	14,000
Nycast Nyloil, Nyloil-FG	16,000	16,000
Nyloil-MDX	16,000	16,000
Nycast GX/RX	16,000	16,000

* Measured on a Thrust Washer test machine, in accordance with ASTM D3702. The samples were run under normal test conditions, unlubricated @ 50ft/min and 40psi.

Impact Modified Materials



NYCAST® CP

Highly resilient, with higher tensile elongation and impact strength than standard grades, **NYCAST CP** has proven itself in many applications requiring an extra degree of toughness. A copolymer of caprolactam and laurilactam, NYCAST CP was originally developed specifically for use in ball valve seats in the oil and gas industry. This durable material provides an economical, high-performance bridge between NYCAST 6 and NYCAST 12 formulations.



NYCAST® 6MP

Designed to address the problems associated with impact loads, **NYCAST 6MP** formulations provide performance advantages in applications that require improved impact properties over standard grades. NYCAST 6MP cushion pads protect the hammer from metal-to-metal damage in pile drivers and provide many performance advantages in certain gear, die block, valve seat and other applications.

This formulation also provides superior performance in extreme cold temperature applications, where standard grades are prone to impact failure.



Specialty Products

NYCAST®12

With its extremely low moisture absorption, the mechanical properties of **NYCAST 12** remain virtually unaffected in a wide range of environments. NYCAST 12 offers superior performance design in applications, where dimensional stability, chemical resistance, dielectrics, abrasion resistance and impact strength are important factors. In wet or dry environments, indoor or outdoor, the low deformation and superior fatigue resistance properties of NYCAST 12 deliver unmatched performance in many high-speed wheel and roller applications.

This material is also well-suited to use for power transmission components in material handling and transportation environments, as well as in structural and enclosure elements in sensitive electronic and manufacturing equipment.



NYMETAL

Bonding metal to nylon in a proprietary process produces a strong metal interface which stands up to the toughest applications. **NYMETAL** billets are made exclusively with NYCAST grades (including food-grade materials) and a variety of metal cores for use as gears, rollers and sprockets. Combining the performance advantages of nylon and metal into one cohesive unit, NYMETAL offers advantages that are not obtained from either material alone.



NYCAST® GF

Offering improved tensile, compressive and flexural properties over conventional unfilled NYCAST grades, **NYCAST GF** (Glass Filled)-30% provides increased load bearing characteristics and is the choice in applications where added stiffness, rigidity and dimensional stability are required.

QUALITY CAST NYLON - AVAILABLE IN YOUR CHOICE OF COLOR

CNL produces over 12 colors of NYCAST type 6 cast nylon. Custom colors are available.



Molded Shapes/Custom Cast Shapes



NYCAST® NEAR NET SHAPE CASTINGS

Our process involves putting molten material directly into a tool to make a type 6 nylon shape, offering an overall more cost-effective process than machining or molding parts from other materials. NYCAST Near Net Shapes are offered in our full line of formulations.



SHEAVES

NYCAST® Custom Cast Sheaves offer equipment designers advantages in reduced component weight, improved wire rope life, and protection against corrosion.

Other benefits include:

- Low set-up costs
- Large cross-section geometry possible
- Simple or complex shapes

Materials Selector Guide

NYCAST® - NYLOIL® and NYMETAL

Standard Grades - for bearings, bushings, seals, die blocks, wear pads

Nycast 6PA Natural - tough, hard, resilient, high strength, for all around use. Use for direct food contact

Nycast XHA-Blue - extra heat resistance over 6PA-Natural

Nycast MoS₂ - improved wear resistance and higher crystallinity

Premium Bearing Grades - offering improved wear properties as much as five times longer life than unfilled grades

Nyloil - oil filled, low coefficient of friction, excellent bearing material

Nyloil FG - oil filled, low coefficient of friction, can be used in direct food contact

Nyloil MDX - oil filled + MoS₂, low coefficient of friction, higher crystallinity

Nycast GX/RX - solid lubricant filled, low coefficient of friction for high load, low speeds

Impact Modified Grades -manufactured to improve impact properties in cold temperatures or high impact areas

Nycast CP - solid impact modified copolymer, added toughness over standard cast 6

Nycast MP - liquid impact modified, tailored for high impact applications as in cushion pads

Specialty Products-

Nycast 12 - High impact, low moisture absorption, excellent dimensional stability, higher dielectric properties

Nycast Nymetal - nylon bonded to metal cores creates excellent nylon-metal interface for high torque loading

Nycast GF - glass impregnated nylon 6 for dramatic increase in flexural, tensile and comprehensive strength over unfilled nylon 6

Nycast Colors -13 colors of nylon 6 to choose from to allow color-coding of components

Product Specifications

PROPERTY	UNITS	ASTM TEST METHOD	NYCAST® 6PA Natural NYCAST® 6PA MoS ₂	NYCAST® XHA	NYLOIL® NYLOIL® FG NYLOIL® MDX	NYCAST® RX NYCAST® GX	NYCAST® CP	NYCAST® 6MP	NYCAST® 12	NYCAST® GF
Specific Gravity		D792	1.15 - 1.17	1.15 - 1.17	1.14 - 1.15	1.14 - 1.15	1.10 - 1.13	1.14 - 1.16	1.03	1.32
Tensile Strength	psi	D638	10,000 - 13,500	12,000 - 13,500	9,500 - 11,000	10,500 - 11,500	8,700 - 11,500	9,700 - 10,800	7,900	9,700 - 11,500
Tensile Elongation	%	D638	20 - 55	20 - 30	35 - 55	35 - 55	25 - 80	25 - 35	>50	2 - 5.5
Tensile Modulus	psi	D638	400,000 - 550,000	485,000 - 550,000	375,000 - 475,000	375,000 - 575,000	240,000 - 330,000	375,000 - 440,000	230,000	550,000 - 750,000
Compressive Strength	psi	D695	13,500 - 16,000	15,500 - 18,000	12,000 - 14,000	12,000 - 14,000	11,000 - 12,500	12,500 - 15,100	10,000	17,000 - 17,500
Compressive Modulus	psi	D695	325,000 - 400,000	300,000 - 350,000	275,000 - 375,000	275,000 - 375,000	200,000 - 300,000	280,000 - 345,000	224,000	410,000 - 445,000
Flexural Strength	psi	D790	15,500 - 17,500	15,000 - 17,500	14,000 - 16,000	14,000 - 16,000	15,000 - 20,000	12,000 - 13,000	9,000	17,500 - 18,500
Flexural Modulus	psi	D790	420,000 - 500,000	420,000 - 500,000	375,000 - 475,000	375,000 - 475,000	285,000 - 385,000	330,000 - 350,000	238,000	500,000 - 570,000
Shear Strength	psi	D732	10,000 - 11,000	10,000 - 11,000	8,000 - 9,000	8,000 - 9,000	7,600 - 9,000	10,000 - 11,000	6,100	-
Notched Izod Impact	ft.lbs./in.	D256	0.7 - 0.9	0.7 - 0.9	1.4 - 1.8	1.4 - 1.8	0.9 - 1.4	0.82 - 0.91	3.02	0.6 - 0.9
Hardness, Rockwell	R	D785	115 - 125	115 - 125	100 - 115	115 - 125	100 - 115	110 - 115	108	116 - 120
Hardness, Shore	D	D2240	78 - 83	78 - 83	74 - 80	78 - 83	75 - 81	76 - 78	76	84 - 85
Melting Point	° F	D789	450±10	450±10	450±10	450±10	410±10	450±10	351	500±1
Coefficient Of Linear Thermal Expansion	in./in./°F	D696 E831	5.0 x 10 ⁻⁵ (Nat only) 6.1 x 10 ⁻⁵	5.0 x 10 ⁻⁵	5.0 x 10 ⁻⁵	5.0 x 10 ⁻⁵	5.0 x 10 ⁻⁵	4 - 4.5 x 10 ⁻⁵	5.5 x 10 ⁻⁵	3.8 x 10 ⁻⁵
Deformation Under Load	%	D621	0.5 - 2.5	0.5 - 2.5	0.7 - 0.8	0.7 - 0.8	0.4 - 0.7	1.0 - 2.0		0.4
Deflection Temperature: 264 psi	° F	D648	200 - 400	200 - 400	200 - 400	175 - 185	200 - 400	200 - 400	122 - 126	245 - 255
66 psi	° F	D648	400 - 430	400 - 430	400 - 430	410 - 420	400 - 430	400 - 430	343 - 351	360 - 370
Continuous Service Temperature	° F		230	250	230	230	210	230	250	230
Intermittent Service Temperature	° F		330	330	330	330	300	330	300	330
Coefficient of Friction: Dynamic		D1894	0.22	0.22	0.12	.12	0.22	0.22	.2 - .3	
Water Absorption 24 Hours	%	D570	0.5 - 0.6	0.5 - 0.6	0.5 - 0.6	0.4 - 0.5	0.5 - 0.6	0.5 - 0.6	0.1	0.5 - 0.6
Saturation	%	D570	5.0 - 6.0	5.0 - 6.0	4.0 - 5.0	4.0 - 5.0	4.0 - 5.0	5.0 - 6.0	0.7	1.1 - 1.2
Dielectric Strength	v./mil.	D149	500 - 600	500 - 600	500 - 600	500 - 600	500 - 600	500 - 600	500 - 600	
Dielectric Constant 60 cycles		D150	3.7	3.7	3.7	3.7	3.7	3.7	3.7	
1000 cycles		D150	3.7	3.7	3.7	3.7	3.7	3.7	3.7	
100,000 cycles		D150	3.7	3.7	3.7	3.7	3.7	3.7	3.7	
Compliance		FDA	Nycast 6PA Natural Nycast 6PA FG Blue	—	Nyloil FG	—	—	—	—	—
		USDA 3A	Nycast 6PA Natural Nycast 6PA FG Blue	—	Nyloil FG	—	—	—	—	—
		UL 94 HB	Nycast 6PA Natural	—	—	—	—	—	—	—

Revised: May 12, 2005 (revised values)

NYCAST® cast nylons are used in a wide variety of industries including:

Metals Processing

Metal Forming

Pulp and Paper

Mining Equipment

Marine

Material Handling

Automotive Production

Printing Equipment

Construction Equipment

Bottling Equipment

Water Treatment

Canning Equipment

Packaging Equipment

Textile

Oil Field Equipment

Food Processing

Gas Industries

The facts stated and recommendations contained herein are based on experiments and information believed to be reliable. No guarantee is made of the accuracy, however, and the products are sold without warranty, expressed or implied, and upon the conditions that purchasers shall conduct tests to determine suitability for their intended use.

About Cast Nylons Limited

Cast Nylons Limited made its first casting in 1980 and has continued to grow and develop new cast nylon products for over 25 years.

Located in Willoughby, Ohio, Cast Nylons Limited is the premier producer of cast nylon in North America, offering over 20 standard NYCAST grades & 22 custom formulations, superior product quality, an extensive inventory and exceptional customer service.

Other Cast Nylons products include:

Elevator Buckets

CNL's elevator bucket line set the standard years ago as the lightweight bucket for heavy-duty industrial applications. These elevator buckets weigh only 1/5 as much as malleable iron, yet outwear the heavier bucket 2 to 1. The result is increased life on every component part of the system. Natural lubrication allows them to dump clean with no material build up, for no excess weight.

ProtoBlock

ProtoBlock by CNL serves applications needing less than full sheet quantities of high performance engineering plastics. Since 1985 ProtoBlock has served machinists, modelers, and companies requiring these materials for prototyping or short production runs.

Other Literature available from Cast Nylons - by mail or via our website:

- NYLOIL® Brochure - Describes the Nyloil family of oil-impregnated nylons.
- NYMETAL® Brochure - Nycast nylon on metal cores.
- NYCAST® Sheave Design Manual - The advantages of nylon sheaves. Includes load and bearing design information.
- Machining Guidelines - Guidelines for turning, milling, sawing, drilling and more.
- Bearing Design Guide - Bearing design information on clearances, tolerances and temperature.
- Chemical Resistance Guide - Data on how Nycast nylon reacts to various chemicals.
- MSDS - Material Safety Data Sheets



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