

Cast Nylon (PA6G)

Technical Datasheet



Heavy Duty Engineering Plastic for many applications

Service. Quality. Value.

Typical Applications

Mechanical engineering, automotive and general machinery construction - e.g. plain bearings, coil bodies, guide & clutch parts, gears, cams, rollers, slide bearings, seal rings and guide rails, pulleys, conveyor parts.

Product Description

A high-quality general-purpose wear resistant engineering plastic material: the chemical name is polyamide. It is available in a range of grades and forms to suit many applications. The casting process allows the production of larger material sections virtually free from residual stress. It may also be cast into customer shapes that reduce material waste and machining time.

Technical Description

Smiths' range of Cast Nylon includes the following grade options -

Grade	Modification	Purpose
Nylon 6G - (PA6G)	None. Standard colour is natural (off-white). Black is also available. Others on request.	Base material for general mechanical engineering applications.
Nylon 6G+MoS ² (molybdenum disulphide) - (PA6GMO)	Addition of liquid lubricant. Colour: black	Improved wear resistance, good sliding properties & very good UV resistance.
Nylon 6G+Oil - (PA6G+Oil)	Addition of liquid lubricant. Colour: yellow is standard, others on request	Lower friction and less 'stick-slip.' For low-load, high speed applications
Sustaglide	With special solid lubricants. Colour: green is standard, others on request	Increased sliding loads and higher operating temperatures are possible.

Machinability

While not as fine as acetal, the machinability of unmodified nylon is very good. Glass-filled grades will require the use of tipped tooling. As with all plastic materials, experience has shown that extra care must be taken with larger diameters, especially in the colder months when plastic materials lose some of their toughness and so have less resistance to machining stresses. It's therefore important to ensure that these materials are not machined while in a chilled condition. Full machining instructions are available on request.

See also...

Extruded Nylon 66: Ideal for smaller components.
Nylon 12: Very high impact strength and low moisture absorption.

Product Attributes

Range of grades

Good mechanical properties
Good chemical resistance
Good impact strength

Natural product may be used in contact with foodstuffs (subject to appropriate limits)

Naturally good damping properties

Good sliding properties
High wear resistance
Good abrasion resistance

Product sourced from longstanding manufacturer with ISO accreditation

Customer Benefits

Correct grade selection for application is optimised

Very good all-round product for diverse engineering applications

Reduces machinery noise levels

Long life in many industrial bearing, wear and gear applications

Consistent quality ensures uniform characteristics in machining and performance

Product Availability *

Round bar	Natural colour made up to 2000mm dia, MoS ₂ , black to 450mm. Modified grades - please call for a quotation.
Sheet/plate	Natural colour made to 500mm thk. MoS ₂ , black to 200mm. A range of area formats is available. Modified grades - please call for a quotation.
Tube	Natural colour made up to 2000+mm outside dia. Other grades - please call for a quotation.

* Sizes not stocked are available on relatively short delivery time. 1, 2 or 3m lengths supplied or cut to customer requirements.

Chemical Resistance

Nylon 6G is highly resistant to: hydrocarbons, alkalis, fats, oils, fuels, ethers, esters and ketones. But it is not resistant to: halogens, mineral acids and certain organic acids, oxidising agents.

Dimensional Stability

Like most Nylons, 6G will slowly absorb / exude moisture depending on the humidity of the surrounding atmosphere. This has three significant affects; importantly, a component will change dimension so consideration must be given to this e.g. bearing clearances. Electrical insulation properties will change - consider Nylon 12 as an alternative. Usefully, high humidity will toughen Nylon 6G, with significantly higher impact strength being recorded.

Cast Nylon (PA6G)



Heavy Duty Engineering Plastic for many applications

Service. Quality. Value.

	Nylon 6G, natural or black	Nylon 6G+MoS ₂ , black	Nylon 6G+oil	Sustaglide	
Mechanical Properties					
Density at 20°C	1.15	1.15	1.14	1.14	g/cm ³
Tensile strength @ yield	75	82	70	75	MPa
Elongation @ break	45	35	50	>35	%
Tensile modulus of elasticity	3,400	3,500	3,300	3,400	MPa
Notched impact strength (Charpy)	>3.0	>2.5	>4.0	>3.5	kJ/m ²
Ball indentation hardness	180	185	165	170	N/mm ²
Hardness (Shore D)	83	83	82	81	Scale D
Electrical Properties					
Volume resistivity	10 ¹⁵	-	10 ¹⁵	10 ¹⁵	Ohm cm
Surface resistivity	10 ¹³	-	10 ¹³	10 ¹³	Ohm
Dielectric constant, 50 Hz	3.7	-	3.7	3.7	-
Dielectric dissipation factor, 50 Hz	0.02	-	18	18	-
Dielectric strength	20	-	18	18	Kv/mm
Comparative tracing index (CTI), Solution 'A'	600	-	600	600	-
Thermal Properties					
Melting temperature	216	216	213	215	°C
Heat deflection temperature – method A, 1.8 MPa	95	95	90	90	°C
Coefficient of thermal expansion (Ave. between 20 - 60 °C)	80	80	80	80	10 ⁻⁶ .K ⁻¹
Specific thermal capacity at 100°C	1.70	1.70	1.70	1.70	kJ/(kg - K)
Thermal conductivity at 20°C					
Service temperatures without high mechanical load – long term	-40 to +110	-40 to +110	-40 to +110	-40 to +110	°C
Service temperature – short term (max)	+170	+170	+170	+160	
Chemical resistance					
Acid resistance	-	-	-	-	
Alkali resistance	+	+	+	+	
Hydrocarbon resistance	+/0	+/0	+/0	+/0	
Chlorinated hydrocarbon resistance	-	-	-	-	
Aromatic resistance	+/0	+/0	+/0	+/0	
Ketone resistance	+	+	+	+	
Resistance to hot water	+/0	+/0	+/0	+/0	

Key: + = YES 0 = LIMITED - = NO

Other Physical Properties					
Moisture absorption	2.5	2.5	2.5	2.0	%
Saturation in air @ 23°C and 50% RH					
Flammability according to UL94 (3mm / 6mm thick)	HB/V2	HB/HB	HB/V2	HB/HB	-

UK Service Centres: **Quality & Testing:**

- | | | | |
|--------------------|---------------|-------------------|---------------|
| Smiths Belfast | 02895 908 897 | Smiths Leeds | 0113 307 5167 |
| Smiths Biggleswade | 01767 604 704 | Smiths Manchester | 0161 794 8650 |
| Smiths Birmingham | 0121 728 4940 | Smiths Norwich | 01603 789 878 |
| Smiths Bristol | 0117 971 2800 | Smiths Nottingham | 0115 925 4801 |
| Smiths Chelmsford | 01245 466 664 | Smiths Redruth | 01209 315 512 |
| Smiths Gateshead | 0191 469 5428 | Smiths Verwood | 01202 824 347 |
| Smiths Horsham | 01403 261 981 | Main Office | 0845 527 3331 |



www.smithmetal.com info@smithmetal.com

All information in our data sheet is based on approximate testing and is stated to the best of our knowledge and belief. It is presented apart from contractual obligations and does not constitute any guarantee of properties or of processing or application possibilities in individual cases. Our warranties and liabilities are stated exclusively in our terms of trading.