DATASHEET

NYLON 66 & 6 (PA66 & PA6 extruded)

HARD WEARING ENGINEERING PLASTICS

THAMES STOCKHOLDERS

The characteristics of Nylon 66 and Nylon 6 are, with a few exceptions, broadly similar to each other. While Nylon 66 is the preferred general-purpose nylon in the UK, and is therefore the principal stocked nylon at Thames, Nylon 6 is used for the same applications throughout much of mainland Europe. Both types are covered in this datasheet but any significant differences are highlighted.

PRODUCT DESCRIPTION

High-quality general-purpose wear resistant engineering nylons; the chemical name is polyamide, and is available in a range of grades and forms to suit many applications. Nylon 66 is harder and stronger than nylon 6 whereas Nylon 6 absorbs slightly more moisture.

TECHNICAL DESCRIPTION

Thames offers extruded Nylon including the following grade options:

Grade	Modification	Purpose
Nylon 66 Natural (off-white) & black. PA66	None	Component Identification
Nylon 66 + 30% glass fibre - black PA66GF	Reinforced with 30% glass fibre	Increased strength & stiffness
Nylon66 + MoS_2 (Molybdenum Disulphide) - black. PA66MO	Additive to increase tensile strength & surface hardness. Crystalline structure is also finer.	Improved bearing & wear performance. Improved UV resistance.

ATTRIBUTES

- Range of grades available
- Good mechanical properties
  Good chemical resistance
  Good impact strength
  Natural product may be used in contact with foodstuffs, subject to appropriate limits
- Good damping qualities
- Good sliding properties
  High wear resistance
  Good abrasion resistance
- Product sourced from long-standing manufacturer with ISO accreditation

BENEFITS

- Correct grade selection for each application is optimised
- Very good all-round product for a broad range of engineering applications
- Reduces machinery noise
- Ideal for use in industrial bearing, gear and wear applications
- Consistent quality ensures uniform machining and performance characteristics

MACHINABILITY

While not as fine as acetal, the machinability of un-modified nylon is 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 may be supplied on request.

CHEMICAL RESISTANCE

Nylon 66 and 6 are highly resistant to: hydrocarbons, alkalis, fats, oils, fuels, ethers, esters and ketones. But are not resistant to: halogens, mineral acids and certain organic acids, oxidising agents.

DIMENSIONAL STABILITY

Like all polyamides, nylon 66 will slowly absorb / exude moisture from 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 Nylons, with significantly higher impact strength being recorded, although the cost is a lower tensile strength.

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.

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MECHANICAL PROPERTIES	Nylon 66, un-modified (Nylon 6 un-mod)	Nylon 66 + 30% glass (Nylon 6+30% glass)	Nylon 66+MoS_2 (Nylon 6+MoS_2)	
Density at 20°C	1.15 (1.14)	1.35 (1.35)	1.15 (1.14)	g/cm^3
Tensile strength @ yield	85 (80)	100 (100)	90 (80)	MPa
Elongation @ break	50 (>50)	5 (5)	20 (>50)	%
Tensile modulus of elasticity	3,300 (3,200)	5,000 (5,000)	3,400 (3,200)	MPa
Notched impact strength (Charpy)	>3 (>3)	6 (6)	>2 (>3)	kJ/m^2
Ball indentation hardness	180 (170)	210 (210)	180 (170)	N/mm^2
Shore – hardness	83 (82)	86 (86)	83 (82)	Scale D

ELECTRICAL PROPERTIES				
Volume resistivity	10^{15} (10^{15})	- (-)	- (-)	Ohm cm
Surface resistivity	10^{13} (10^{13})	- (-)	- (-)	Ohm
Dielectric constant, 50 Hz	3.8 (3.9)	- (-)	- (-)	-
Dielectric dissipation factor, 50 Hz	0.015 (0.02)	- (-)	- (-)	-
Dielectric strength	25 (20)	- (-)	- (-)	Kv/mm
Comparative tracing index (CTI), Solution 'A'	600 (600)	- (-)	- (-)	-

THERMAL PROPERTIES				
Melting temperature	260 (200)	260 (200)	260 (200)	°C
Heat deflection temperature – method A, 1.8 MPa	100 (75)	150 (140)	100 (75)	°C
Coefficient of thermal expansion (Ave. between 20 - 60 °C)	80 (90)	50 (60)	80 (90)	$10^{-6}.K^{-1}$
Specific thermal capacity at 100°C	1.70 (1.70)	1.50 (1.50)	1.70	kJ/(kg · K)
Thermal conductivity at 20°C	0.23 (0.23)	0.24 (0.28)	0.23	W/(m· K)
Service temperatures without high mechanical load – long term	-30 to +95 (-40 to +85)	-20 to +120 (-30 to +110)	-30 to +95	°C
Service temperature – short term (max)	+170 (+160)	+200 (+180)	+170 (160)	°C

CHEMICAL RESISTANCE				
Acid resistance	- (-)	- (-)	- (-)	
Alkali resistance	+ (+)	+ (+)	+ (+)	
Hydrocarbon resistance	0 (0)	0 (0)	0 (0)	
Chlorinated hydrocarbon resistance	- (-)	- (-)	- (-)	
Aromatic resistance	0 (0)	0 (0)	0 (0)	
Ketone resistance	+ (+)	+ (+)	+ (+)	
Resistance to hot water	0 (0)	0 (0)	0 (0)	

OTHER PHYSICAL PROPERTIES				
Moisture absorption Saturation in air @ 23°C and 50% RH	2.8 (3.0)	1.7 (2.0)	2.8 (3.0)	%
Flammability according to UL94 (3mm / 6mm thick)	HB/V2 (HB/V2)	HB/V2 (HB/V2)	HB/V2 (HB/V2)	-

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