

THERMOPLASTIC

SEMI-CRYSTALLINE GROUP

Definition:

It is the long chained molecules that define the character of this group. When moulded, this highly ordered molecular structure is anisotropic: shrinking less in the direction of flow vs. transverse to flow. Other features of this aligned structure include a high degree of component flexibility, good chemical & ESC (Environmental Stress Cracking) resistance.

Semi-crystalline materials have a distinctive (known) melting temperature, they do not gradually soften when exposed to increases in temperature, instead they remain solid until a given quantity of heat is absorbed then rapidly change into a low viscous (watery) melt.

Typical Features:

- Chemical & ESC resistant.
- Fatigue resistant & flexible
- Good for bearing & wear.
- Resistant to bonding with solvents & adhesives.
- Distinctive (known) melting temperature.

Reinforcements & fillers:

Benefits, if available:-

Glass fibre **reinforcement** by weight (eg: 30%) alters Mechanical Properties:-

- Increases stiffness
- Becomes more brittle.
- Reduces moulding shrinkage.
- Improvements to Heat Distortion Temp (HDT).

Additional **fillers** can improve:-

- Flame-retardance.
- Electrical properties:-

Carbon increases conductivity

Stainless steel improves dissipative behaviour.

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DSM 4.1.25

NYLON 6 (PA6)_Unfilled _ Black

General:

Polyamide (PA): is one of the most widely used engineering thermoplastics.

Benefits:

- High fatigue and abrasion resistance
- They are tough, rigid and have chemical resistance to hydrocarbons.
- Heat stabilized versions allow sustained exposure up to 185°C.
- Possess very good dielectric properties. Surface Resistivity (ohms/sq.) 10^3
- All nylons can be **reinforced** with glass fibres, glass beads, and **carbon black** to alter their mechanical (x10) and thermal performance.
- Nylons containing PTFE and molybdenum disulphide **fillers** are available for bearing materials with appropriately lower friction and improved wear.

PA6 has higher impact strength and slightly better low temperature properties than PA66. It also has a better resistance to solvents, grease and detergents but a lower resistance to dilute mineral acids. Easier to mould.

Limitations: (unmodified)

- All absorb moisture (hygroscopic).
- PA6 absorbs more moisture than PA66 after moulding which causes swelling & could affect dimensional tolerances.
- Low flame-retardant standards (UL94: HB).
- Poor chemical resistance to strong acids
- Colouring is limited due to the high processing temperatures.

ASM (DEK) Applications:

- Vector Guard Spring Carriers
- Vector Guard Tube Plugs

These values are representative. For critical applications, refer to data-sheet.

MECHANICAL PROPERTIES					
	HARDNESS Shore A	TENSILE STRENGTH:	YOUNGS MODULUS:	POISSONS RATIO:	DENSITY:
PA6	---	78 MPa	3 GPa	0.39	1140 Kg/m³

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GRADE	SUPPLIER	UL No.	RECYCLE CODE
4MID 9B20000 + (BLACK MASTERBATCH PE 94110)	4PLAS	-----	>PA6<

GRADE	SUPPLIER	UL No.	RECYCLE CODE
DOMAMID 6 + (BLACK MASTERBATCH PE 94110)	DOMO CHEMICALS (UNITED POLYMERS)	-----	>PA6<

Alternatives:

Alternative polymers are allowed only with the express written permission of ASMPT. Please email details of your request to engineering_enquiries@asmpt.com

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