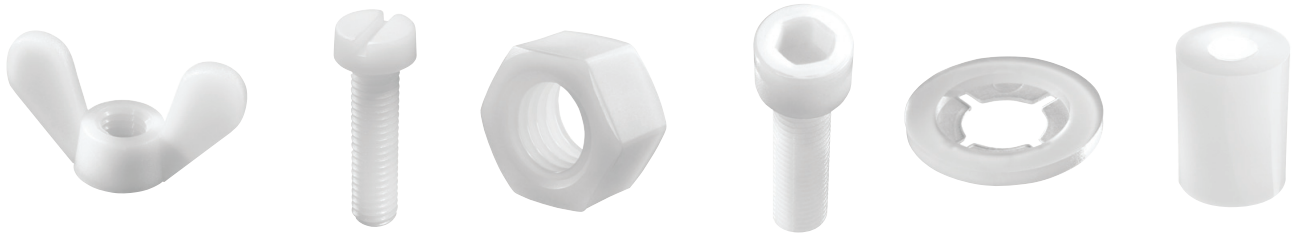
HobSpec Bulletin

Nylon Fasteners



Scope: This article will briefly outline the most common polymers used in fasteners and then go into more depth on Nylon 66, which is the most common polymer used in fasteners. It offers the best compromise between cost and mechanical properties and is readily available in Hobson stock.

Glass Reinforced Nylon (GFR PA6.6): Same properties as PA6.6 with enhanced mechanical properties of tensile strength, fatigue strength, impact strength, friction and abrasion resistance.

Polypropylene (PP): Most commercial polypropylene has an intermediate crystallinity between low density polyethylene (LDPE) and high density polyethylene (HDPE). Polypropylene is very resistant to fatigue and complies with food standards. One application is the hinged lid of a tic tac container. Another major use is in piping systems where rigidity and resistance to corrosion and chemical leaching are required. Many items used in medical and laboratory situations are manufactured from polypropylene as it has a high heat resistance and hence can be sterilised in autoclaves.

Polyethylene (PE): Is the most widely used plastic in the world with annual production of approximately 80 million tonnes and is used extensively in packaging applications such as foam, shrink wrapping and plastic bags. It is classified into different categories based upon density such as UHMWPE, HDPE, MDPE, LLDPE, LDPE, VLDPE.

Polycarbonate (PC): Widely known under a trademark of “Lexan” and is easily moulded and thermoformed. It is a very durable transparent material with high impact reistance but low scratch resistance. It displays electrical insulation properties and retains dimensional stability at high temperature, and is self-extinguishing.

Polyvinylidene fluoride (PVDF): Is a highly non-reactive thermoplastic fluoropolymer. It has excellent resistance to solvents and acids. It displays good mechanical properties, including wide temperate service range and is self-extinguishing with very low smoke generation. PVDF is commonly used in insulation on electrical wires due to its flexibility, low thermal conductivity, high chemical resistance and heat resistance.

Acetal (POM): Acetal resins are odourless, tasteless and non-toxic. Key properties include high strength and rigidity, excellent dimensional stability, fatigue endurance, relatively low moisture absorption and low dynamic and static coefficient of friction. Perhaps the most outstanding feature is Acetal’s ability to retain these properties over a wide range of adverse conditions including extreme humidity, exposure to solvents and other chemicals and high loading and prolonged cyclic stressing. Acetal is widely used in the automotive, electrical, machinery, equipment and watch making industries.

NYLON (PA, PA6.6, 66): Is the standard polymer used in the Hobson range of fasteners and is recognised worldwide for being the most suitable material for fasteners. It offers excellent filling qualities and hence is easily moulded even into very difficult long shapes such as threaded rod.

It provides good toughness, tensile strength and resistance to creep, particularly in the high temperature range. Nylon has excellent wear properties, low coefficient of friction and exceptional chemical resistance to aromatic hydrocarbons, greases and oils. Nylon is a hygroscopic material which has a tendency to absorb water or moisture from the surrounding environment. The amount of absorption will depend on the environmental conditions. When water or moisture is absorbed by Nylon, it behaves like a plasticizer in plastics reducing the tensile strength, stiffness; and increasing elongation, impact strength and energy absorbing characteristics. Outdoor weathering can be improved by the addition of carbon black.

Nylon will perform well in long range service in most applications. Nylon is a translucent to off white in colour. Depending on the raw material used, there will always be slight colour differences from bright white to a very dull off white to light grey.

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