

1.0 Scope

This glossary presents preferred nomenclature and definitions of terms relating to plastic fasteners, their product classifications, materials, physical characteristics, manufacturing characteristics, testing and inspection.

2.0 General

2.1 Plastics. Plastics are a class of materials which contain a high polymer as an essential ingredient, and which at some stage in fastener production, flow due to application of heat and/or pressure. (In a broad sense, the term resin is used to designate any polymer that is a basic material for plastics.) Nylons, acetals, polycarbonates, polypropylenes, polyvinyl chlorides and cellulose are widely used in plastic fastener production.

2.2 Plastic Fastener. A plastic fastener is a mechanical device such as a bolt, nut, screw, rivet or engineered part made from a plastic and designed to hold, join, couple, assemble or maintain equilibrium of single or multiple components. Plastic fasteners may be externally threaded, internally threaded or nonthreaded.

3.0 Classification of Plastic Fastener Products

3.1 Externally Threaded Plastic Fasteners. Plastic fasteners having external threads are normally classed as bolts, screws, rods or studs.

A bolt is designed for insertion through holes in assembled parts to mate with a nut and is normally intended to be tightened or released by turning that nut.

A screw possesses capabilities which permit it to be inserted into holes in assembled parts, of mating with a pre-formed internal thread, and of being tightened or released by torquing its head.

A rod or stud can be inserted into holes for mating with preformed internal threads or can be inserted through holes in assembled parts to mate with a nut.

3.2 Internally Threaded Plastic Fasteners. Plastic fasteners having internal threads are normally classed as nuts and are intended for use on an external, or male, screw thread such as a bolt, rod or stud.

3.3 Nonthreaded Plastic Fasteners. Non-threaded plastic fasteners represent a broad class of fasteners generally recognized as rivets, washers, pin fasteners, quick-operating fasteners, grommets, ties, cable retainers, push-on nuts, retaining rings, inserts, spacers, clips and harnesses.

3.4 Assemblies of Metal and Plastic for Fasteners. A broad category of miscellaneous fasteners are based on the combination of metal and plastic (or two dissimilar plastics) to utilize favorable qualities from each. Some examples of this category are locking fasteners, sealing fasteners and slide seals.

4.0 Plastic Fastener Materials and Additives

4.1 Materials

4.1.1 Acetal Plastics. Acetal plastics are based on resins having a predominance of acetal linkages in the main chain.

4.1.2 Acrylic Plastics. Acrylic plastics are based on resins made by the polymerization of acrylic monomers, such as ethyl acrylate and methyl methacrylate.

4.1.3 Cellulosic Plastics. Cellulosic plastics are based on cellulose compounds, such as esters (cellulose acetate) and ethers (ethyl cellulose).

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4.1.4 Epoxy Plastics. Epoxy plastics are thermoplastic or thermosetting plastics containing ether or hydroxy alkyl repeating units, or both, resulting from the ring-opening reactions of lower molecular weight polyfunctional oxirane resins, or compounds, with catalysts or with various polyfunctional acidic or basic coreactants.

4.1.5 Fluorocarbon Plastics. Fluorocarbon plastics are based on resins made by the polymerization of monomers composed of fluorine and carbon only.

4.1.6 Nylon Plastics. Nylon plastics are based on resins composed principally of a long-chain synthetic polymeric amide which has recurring amide groups as an integral part of the main polymer chain.

4.1.7 Polycarbonate Plastics. Polycarbonate plastics are based on polymers in which the repeating structural units in the chains are essentially all of the carbonate type.

4.1.8 Polyolefin Plastics. Polyolefin plastics are based on polymers made with ethylene as essentially the sole monomer.

4.1.9 Polyvinyl Chloride (PVC). Polyvinyl chloride is based on a resin prepared by the polymerization of vinyl chloride alone.

4.2 Additives.

4.2.1 Antioxidant. An antioxidant is a substance which prevents or retards oxidation of a polymeric material which is exposed to air.

4.2.2 Catalyst. A catalyst is a substance which may facilitate a reaction when added in minor quantity as compared to the amounts of the primary reactants.

4.2.3 Dye. A dye is a coloring agent mixed with a plastic material after processing to provide a uniform color.

4.2.4 Filler. A filler is an inert substance added to a plastic to modify its physical properties such as hardness, stiffness and impact strength. Filler particles are usually small, relative to those of the plastic.

4.2.5 Pigment. A pigment is a coloring agent mixed with plastic material prior to processing to provide a uniform color.

4.2.6 Reinforcement. A reinforcement is a strong inert material added to a plastic to improve its strength and stiffness.

5.0 Related Material Terminology

5.1 Bleed. Bleed (also commonly referred to as discoloration or migration) indicates loss of color when in contact with water or solvent; undesired movement of certain materials in a plastic (e.g., plasticizers in vinyl) to the surface of a finished part.

5.2 Blister. A blister is a raised area on the surface of a molded plastic caused by the pressure of gases inside acting on the incompletely hardened surface.

5.3 Blocking. Blocking (also known as sticking or caking) is an undesired adhesion between contacting layers of a material, such as occurs from moderate pressure during storage or use.

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- 5.4 Bloom.** A bloom (also known as a blush or blemish) is a visible exudation or efflorescence on the surface of a plastic.
- 5.5 Crazing.** Crazing represents fine cracks which may extend in a network on or under the surface or through a layer of plastic material.
- 5.6 Cut-Off.** Cut-off is the line where two halves of a compression mold come together. It is also referred to as flash groove or pinch off.
- 5.7 Ejection Mark.** A surface mark on the part caused by the ejector pin as it pushes the part out of the mold cavity is called an ejection mark.
- 5.8 Fin.** A fin is the web of material remaining in holes or openings in a molded part.
- 5.9 Flash.** Flash is extra plastic attached to a part along the parting line.
- 5.10 Flow Line.** A flow line (also known as a weld line) is a mark on the part caused by the meeting of two material flow fronts during molding.
- 5.11 Gate Mark.** A gate mark is a surface discontinuity on the part caused by the presence of the mold orifice through which material enters the cavity.
- 5.12 Haze.** Haze is the degree of cloudiness in a translucent plastic material.
- 5.13 Parting Line.** A parting line is a surface discontinuity on a part where the parts of a mold meet in closing.
- 5.14 Porosity.** Porosity is the existence in a plastic material of very small voids.
- 5.15 Sink Mark.** A sink mark is a shallow depression or dimple on the surface of an injection-molded part due to collapsing of the surface following local internal shrinkage after the gate seals.
- 5.16 Void.** A void is an internal or external material discontinuity representing poor fill or the absence of material.
- 6.0 Physical Properties**
- 6.1 Mechanical Properties**
- 6.1.1 Compressive Modulus, p.s.i.** Compressive modulus is the ratio of stress to strain for a given material within its proportional limit under compressive loading conditions. (ASTM Test Method D695)
- 6.1.2 Compressive Strength, p.s.i.** Compressive strength represents compressive load at failure of a shaped specimen divided by cross-sectional area of the specimen. (ASTM Test Method D695)
- 6.1.3 Creep.** Creep is dimensional change with time of a material under load.
- 6.1.4 Ductility, %.** Ductility represents the extent to which a solid material can be drawn into a thinner cross-section.

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