General Guide to Plastics

ABS - Excellent impact strength and impact resistance. Used extensively in appliances, automotive and computer components. Ma be painted and plated.

Acetal (Delrin®, Celcon®) - Acetals display good impact resistance, dimensional stability and outstanding surface hardness due to their high degree of crystalinity. They have high dielectric strength and are resistance to many solvents. They also exhibit negligible water absorption. Typical applications include roller bearings, gears, reels, counters, control cams, valves and pump parts.

CPVC - Chlorinating PVC results in a polymer that has all of PVC's good qualities, plus improved fire retardance, weatherability, a higher maximum working temperature and light-fastness.

Ertalyte® (PET) - Polyethylene terephthalate is a clear, crystalline plastic possessing high strength and low vapor permeability. Because it is also sterilizable and radiation resistant, it is used extensively as a container for carbonated beverages, liquor and other food products. It is also generally approved for use in the processing and packaging of pharmaceuticals.

FEP® - Fluorinated ethylene propylene has a low friction coefficient, is resistant to weathering and is useful from cryogenic temperatures to about 390F. It has a low dielectric constant and is flame and ignition resistant. Although its mechanical properties are not equal to some other engineering fluroplastics, it is commonly used for electrical insulation, cable sheathing, and as chemically resistant coatings and films.

Halar® (ECTFE) - Ethlene-chlorotrifluorethylene copolymer exhibits better mechanical properties than many other fluoroplastics. But like other fluoroplastics, its flame retardance, chemical resistance and low dielectric constant remain constant over a wide temperature range. These qualities make it suitable for use in such products as electrical insulation, monofilament, tank linings, housings, and electrical components. It may be usefully employed at temperatures from the cryogenic range to about 330F.

Isoplast® - Isoplast urethane resins are high tensile strength, chemically resistant resins originally developed for medical use. They are available in long glass fibre-filled grades. Isoplast® combines the toughness and dimensional stability of amorphous resins with the chemical resistance of crystalline materials. The long fibre reinforced grades are strong enough to replace some metals in load bearing applications.

Kel-F® (PCTFE) - Polychlorotrifluoroethylene is highly transparent. It also exhibits good electrical properties, and is resistant to most common solvents at room temperature. PCTFE is less permeable to gasses and water vapor than any other transparent film.

Kynar® (PVDF) - Polyvinylidene fluorides has a useful temperature range of -148F to 302F. It has good strength, creep resistance and weatherability. Lime some other chlorinated engineering plastics, it will not support combustion in air.

Lexan® (PC) - Polycarbonate exhibits the highest impact strength over a range of temperatures from -60F to 270F. It is fine for all precision parts, or where transparency is desired. Its water-clear transmittance (89%) makes it excellent for visors or guards. It shows good creep resistance and has a temperature-independent dielectric constant, as well as good insulating properties.

Noryl® (PPE) - Modified polyphenylene ether is one of the more widely known engineering plastics and has gained UL and FDA approval for a broad spectrum of moldable and foamable grades. It has good impact strength at low temperatures and is resistant to many agents, including steam. It may be furnished in either unreinforced grades and remains stable when processed. Yield strength or reinforced grades is comparable to aluminum. Typical end uses include computer and electric housings, automotive body parts, and piping.

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Nylon - All grades possess toughness and resiliency and have a high fatigue strength. Resistance to oils and hydrocarbon solvents is also good. Almost all formulations are also self-extinguishing and retain stable mechanical properties at temperatures from -75F to above 225F. They are widely used for latches, cams, gears, and many other moving parts due to their excellent abrasion and impact resistance. Nylon is also available in a variety of cast forms and mobdylidenum disulphide filled grades (Nylatron® GS).

PEEK® - Polyetheretherketone is a new material which has excellent chemical resistance and is rated for continuous service to 470F. It is tough and strong, with low creep, and has the best fire safety rating of all thermoplastics. It tolerates radiation to 1100M rads without undergoing significant change. Applications include engine parts, aerospace components and other uses which require PEEK®'s unique qualities.

PFA - Perfluoroalkoxy resins, which are marketed under the Teflon® trademark, have properties similar to FEP and PTFE. However, unlike FEP, PFA may be used to temperatures of approximately 500F. While PFA shares PTFE's chemical resistance and low coefficient of friction, it is also a moldable, and extrudable material. Some applications include packing and seals, cable sheathing, and fire-retardant insulation.

PES® - Crystal clear polyethersulfone has truly outstanding creep resistance, dimensional stability, and excellent mechanical properties. It can withstand continuous use in air and water at temperatures to above 350F. It has low flammability and minimal smoke emission during burning. Its weatherability and solvent resistance are also good. Since PES is sterilizable, it has a wide variety of medical applications. Other applications include electronic components of all types, and structural parts.

Phenolic - Phenolic laminates show Outstanding temperature resistance, dielectric strength and electrical resistance, all of which remain uniform to 420F or above. Most grades also exhibit good mechanical properties, such as impact strength, also outstanding dimensional stability under loading. Phenolics have long enjoyed industry-wide acceptance as insulators, electrical housings circuit boards, electric motor components, seals and valves.

Polyethylene (PE) - Because of it s flexibility at low temperatures, excellent electrical resistance and low dielectric constant, Polyethylene is unique. PE's also make it ideal for applications such as rollers, skids and other end-users. PE is available in a wide range of densities and formulations.

Polyproylene (PP) - This natural has good impact resistance and structural rigidity. It is unaffected by any solvent at room temperatures. It has excellent insulating properties and is extremely lightweight. Its high fatigue strength makes it a top choice under cyclic loading conditions.

Polystyrene (PS) - is naturally clear. It exhibits excellent chemical resistance and is more resistant to irradiation than is PE or PP. Electrical resistance is also good. This, plus the ease with PS can be painted or shielded, has led to extensive electrical and electronic applications. PS is also often used in appliances and housings. Special high gloss and high impact grades are also widely available.

Polysulfone (PSO) - is a naturally transparent, true engineering plastic whose electrical and mechanical properties are constant up to temperatures above 320F. It is also rated for continuous service in steam to 300F. It shows excellent resistance to alkalies, acids and salts, as well as to many hydrocarbons. PSO is suited for microwave use, and may also be plated or glass-filled. Amongst its many varied uses are many medical, automotive, and electronic applications.

PVC - Polyvinylchloride exhibits little or no water absorption. Since it is chlorinated, PVC also possesses natural flame retardant qualities. PVC's are available in a wide variety of colors and varying compositions. They are typically employed in packaging, water and chemical piping assemblies, appliances, furniture and other components.

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Teflon® (PTFE) - An extremely low coefficient of friction makes Polytetrafluoroethylene the ideal choice where surface wear might otherwise be a problem. PTFE also exhibits a useful service life from below -100F, to temperature of over 500F. Its resistance to solvents is also excellent throughout a wide range of temperature. Its low dielectric constant and electric resistance also remain constant throughout this range.

Tefzel® (ETFE) - Ethylene-tetrafluoroethylene copolymer is a high impact material with properties similar to ECTFE. It is commonly used to manufacture pumps, valves, computer housings, and other electrical components.

Torlon® (PAI) - Polyamide-imide possesses a combination of great mechanical strength, the ability to withstand radiation, usability from approximately -300F to 500F, and resistance to most chemicals at room temperature. It is also flame retardant and gives off almost no smoke when burned. It is available in unreinforced grades and is readily machinable. This combination of assets makes it a good metal substitute for aerospace and electronic applications. It is commonly used for bushings, seals, and distributors in engines and machinery.

ULTEM® - Unreinforced ULTEM® (polyetherimide) keeps its hardness, and mechanical properties from -40F, up to temperatures of 356F. It is radiation-resistant, microwave transparent and is naturally flame-retardant. Reinforced grades have even higher mechanical strength. Because of its unequalled properties, ULTEM® is the ideal replacement for steel and other metals. It also has a wide range of electronic and medical applications.

UHMW - While ultrahigh-molecular-weight polyethylene retains the inherent qualities of low-density polyethylene, its increased toughness allows its use in a wide variety of rugged applications. It is commonly employed to provide rollers, cams, impellers and bumper guards. Because of its high lubricity, it is also used to coat conveyer-belts, ramps and hoppers. UHMW's imperviousness to attack by steam and chemicals, and its continued good performance at low temperatures, has also enabled it to gain FDA approval for a variety of applications within the food and drug industries.

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