Precautions

Thermoplastics soften at rather low temperatures (from about 80 ºC for polystyrene tomore than300 ºC for polytetrafluoroethylene - PTFE). This should be kept in mind during processing. Thermoplastics are sometimes quite sensitive to chemicals or solvents: tables of chemical resistance should be consulted, particularly when devising cleaning methods.

Films are more or less fragile with respect to tearing, cutting, puncturing or folding, particularly in thin gauges. Anisotropy is frequent, the properties in one direction (the extrusion direction) being quite different from those in the perpendicular direction; this shall be considered in the design. The dimensional stability of plastic films in severe environments is not very good. They can be stabilized by a suitable thermal treatment. Static charges can develop on most plastic films (unless they are specially treated or metallized).

a. Sensitivity to chemicals and solvents is similar to that of the base plastic, but attack is rather rapid, owing to high surface or volume ratio. Metallized films are sensitive to abrasion, since the metal layer is extremely thin. Cleaning is not recommended and contamination shall therefore be avoided. Electrical grounding of metallized films is difficult; contacts are very sensitive to corrosion in the terrestrial environment. Most plastic films are flammable. Absorption of water by some plastic films can drastically change their electrical properties.

b. The dimensional stability of many thermoplastics is inferior to that of conventional metals:many fluorinated resins have a tendency to creep under load; polyamide plastics absorb water in normal atmospheres and shrink under dry conditions. Tough plastics can retain internal stresses after machining or forming operations, and this renders some stress-relieving thermal-treatment necessary (polycarbonate, acetal). Thermal conductivity of plastics is low; this shall be taken into account in the design and during processing. Most current plastics are flammable, but some exceptions exist (fluorinated), and self-extinguishing grades of conventional types can be found. Filled thermoplastics are generally more stable thermally and mechanically than plain grades. Further improvement is given by reinforcement, which permits the design of small, precise mechanical parts.