



# RUTLANDPLASTICS

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Abbreviation	Full Name	Brand Names	Properties	Colouring	Chemical Resistance	Finishing	Applications	Other
<b>ABS</b>	Acrylonitrile Butadiene Styrene	Magnum, Polyloc, Novodur, Ronfalin, Cycolac	Tough, opaque, rigid, hard, high gloss.	Wide variety of colours possible. Due to varying levels of opacity usually compounded rather than self-coloured	Good-Alkali, alcohol, oils/greases, detergents. Poor-Acids, ketone, hydrocarbons	Can be joined by welding or adhesives. Printing, embossing, metallising, plating possible. Can be machined	Automotive, office machines, domestic appliances, refrigeration, pipe fittings	High heat, plating & flame retardant grades available
<b>ASA</b>	Acrylonitrile Styrene Acrylonitrile	Luran S, Starex, Gelay, Kibilac	Rigid, transparent, tougher alternative to Styrene	Difficult to colour so generally supplied compounded. Selection of pigments critical to maintain weather resistant properties.	Good-Acids, alkali, alcohol, oils/greases, detergents. Poor-Ketone, hydrocarbons	Can be joined by spin welding or hot plate. Ultrasonic welding in some cases. Hot foiling, printing and metallising possible. Can be machined.	Automotive, telephones, traffic signs, electric fan components, wash basins	Alternative to ABS where UV properties required
<b>BDS</b>	Butadiene Styrene Block Copolymer (see also SBC/SBS)	Styrolux, Kibiton, K-Resin	Tough, crystal clear	Can be readily coloured although usually used in natural form	Good-Acids, alkali, Poor-Alcohol, ketone, hydrocarbons, oils/greases, detergents	Can be bonded using solvents or impact adhesives. Hot foiling and printing possible. Cannot be machined.	Medical products, drawing instruments	Less brittle than styrene. Often blended with styrene to reduce cost although this can reduce clarity
<b>EVA</b>	Ethylene Vinyl Acetate Copolymer	Escorene, Amplify	Tough, semi-opaque, flexible, good low temperature properties	Natural colour of the material from colourless to off-white so a wide colour range is possible. Universal masterbatches may be used but addition levels need to be high. Polymer specific masterbatches are preferred.	Good-Acids, alkali, alcohol, oils/greases. Poor-Ketone, hydrocarbons, detergents	Can be hot plate and ultrasonic welded. Hot foiling and printing possible.	Food packaging, surgical products, ice cube trays, bicycle saddles	Better stress cracking resistance and tougher than LDPE. Retain flexibility at very low temperatures.
<b>HDPE (PE-HD)</b>	High Density Polyethylene	Hostalen, Borealis, Sabic, Rigidex	Tough, semi-rigid, translucent, excellent weatherability/chemical resistance	HDPE is translucent white in its natural condition and is therefore easy to colour.	Good-Acids, alkali, alcohol, ketone, oils/greases. Poor-Hydrocarbons, detergents	Not suitable for joining using adhesives. Welding is possible. Difficult to machine.	Containers, bottle crates, food storage boxes, housewares, dustbins, pipe fittings	Retains strength & stiffness at low temperatures.
<b>HIPS</b>	High Impact Polystyrene	Styron, Styrolution, Lacqrene	Rigid, hard, translucent	Although HIPS is translucent rather than crystal clear a wide range of colours is possible.	Good-Diluted acids, alkali. Poor-Concentrated acids, alcohol, ketone, hydrocarbons, oils/greases, detergents	Can be joined using solvents and impact adhesives. Can be hot foiled, printed, metallised and painted. Can be machined with care.	Household appliances, toys, disposable cups, toilet seats	Resistance to light is poor so UV stabilisers essential.
<b>LCP</b>	Liquid Crystal Polymer	Vectra, Xydar	High stiffness, excellent stability at high temperatures	Wide range of colours possible. Ideally compounded or specialist masterbatch.			Precision parts, stainless steel and ceramic replacement, electrical connectors, surgical instruments, dental tools	
<b>LDPE (PE-LD)</b>	Low Density Polyethylene	Lupolen, Escorene, Hostalen	Flexible, translucent, durable, good weatherability/low temperature performance, excellent chemical resistance	Translucent white in natural form so easy to colour.	Good-Acids, alkali, alcohol, ketone, oils/greases. Poor-Hydrocarbons, detergents	Material has a waxy surface so not suited to joining by using adhesives. Snap-fits or welding, need to be considered. Machining can be difficult but is possible.	Lids and closures, containers, bins, laundry baskets	Poor UV stability
<b>LLDPE</b>	Linear Low Density Polyethylene	Dowlex, Lupolen, Innovex	Stronger and tougher than LDPE, better mechanical properties at low and high temperatures	Translucent white in natural form so easy to colour.	Good-Acids, alkali, alcohol, ketone, oils/greases. Poor-Hydrocarbons, detergents	Material has a waxy surface so not suited to joining by using adhesives. Snap-fits or welding, need to be considered. Machining can be difficult but is possible.	Closures, screw caps, cold room containers, high quality housewares, toys	Can have high gloss and good impact strength
<b>MDPE (PE-MD)</b>	Medium Density Polyethylene	Marlex, Lupolen, Rigidex	Fits midway between High and Low Density Polyethylene	MDPE is translucent white in its natural condition and is therefore easy to colour.	Good-Acids, alkali, alcohol, ketone, oils/greases. Poor-Hydrocarbons, detergents	Not suitable for joining using adhesives. Welding is possible. Difficult to machine.	Containers, bottle crates, food storage boxes, housewares, dustbins, pipe fittings	
<b>PA6</b>	Polyamide 6 (Nylon 6)	Akulon, Ultramid, Technyl	Rigid, tough, translucent, hard wearing	Natural colour ranges from translucent white to translucent brown. Colouring is difficult and polymer specific or high temperature masterbatches required.	Good-Alkali, alcohol, oils/greases, detergents. Poor-Acids, ketone, hydrocarbons	Can be joined with epoxy adhesive and sonic welding. Can be decorated by plating, painting, vacuum metallization, hot foil stamping, silk screen printing and laser printing. Can be machined.	Gears, bearings, bushes	Lighter in colour than PA66. Nylon absorbs moisture and may be conditioned post-moulding to improve performance.
<b>PA11</b>	Polyamide 11 (Nylon 11)	Schulamid, ...	As for Nylon 6 but better performance over wider	Natural colour ranges from translucent white to translucent brown. Colouring is	Good-Alkali, alcohol, oils/greases, detergents.	Can be joined with epoxy adhesive and sonic welding. Can be decorated by plating, painting,	Cable ties, aircraft battery	Nylon absorbs moisture and may be conditioned post-moulding to



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<b>PA12</b>	Polyamide 12 (Nylon 12)	Rilsan	performance over most temperature range	difficult and polymer specific or high temperature masterbatches required.	Poor-Acids, ketone, hydrocarbons	vacuum metallization, hot foil stamping, silk screen printing and laser printing. Can be machined.	cases, sports equipment	improve performance.
<b>PA46</b>	Polyamide 46 (Nylon 46)	Stanyl						Nylon absorbs moisture and may be conditioned post-moulding to in
<b>PA66</b>	Polyamide 66 (Nylon 66)	Ultramid, Akulon, Zytel	Rigid, tough, translucent, hard wearing	Natural colour ranges from translucent white to translucent brown. Colouring is difficult and polymer specific or high temperature masterbatches required.	Good-Alkali, alcohol, oils/greases, detergents. Poor-Acids, ketone, hydrocarbons	Can be joined with epoxy adhesive and sonic welding. Can be decorated by plating, painting, vacuum metallization, hot foil stamping, silk screen printing and laser printing. Can be machined.	Automotive fans, door handles and filters, kitchen appliance housings	Higher impact strength and better low temperature properties than Nylon 6. Nylon absorbs moisture and may be conditioned post-moulding to improve performance.
<b>PAA6</b>	Polyarylamide	Ixef	High rigidity, excellent strength, high temperature performance comparable to metals		Good-Alkali, alcohol, oils/greases, detergents. Poor-Acids, ketone, hydrocarbons		Automotive under bonnet components and door handles, electric motor housings, furniture	
<b>PBT</b>	Polybutylene Terephthalate	Arnite, Celanex, Valox, Pocan, Ultradur	Rigid, extremely tough, clear, wide operating temperature range	Natural colour of the material is clear so wide range of colours possible.	Good-Dilute acid, alcohol, oils/greases, detergents. Poor-Concentrated acid, alkali, ketone, hydrocarbons	Can be glued. Can be machined. Can be decorated but primer needs to be used.	Automotive windscreen wiper arms and door handles, electronic parts, household appliances	
<b>PC</b>	Polycarbonate	Calibre, Makrolon, Lexan	Rigid, tough, excellent impact resistance, good weatherability and dimensional stability	Natural colour is transparent so wide range of colours possible	Good-Dilute acids, alcohol, oils/greases, detergents. Poor-Concentrated acid, alkali, ketone, hydrocarbons	Can be machined but care needed to avoid scratching. Can be glued using epoxies or hot melt adhesives. Can be printed, hot foiled and painted. Can be ultrasonically welded.	Medical, glazing, lighting, CDs/DVDs, spectacles, safety helmets, automotive light covers and clear roof panels	Low resistance to hot water (above 60C).
<b>PC/ABS</b>	Polycarbonate/ABS blend	Bayblend, Pulse, Cycology	Combination of PC and ABS properties	Wide variety of colours possible. Compounding generally best route.			Similar applications to ABS but where greater toughness required	A blend where best properties of both materials achieved. Ideal where easier flowing tough material required
<b>PEEK</b>	Polyether Etherketone	Victrex	Outstanding stability at wide temperature range				Chemotherapy devices, surgical tools, microwave grills	High cost, specialist. Ideally needs special screw to process.
<b>PEI</b>	Polyetherimide	Ultem	High strength, excellent flame and heat resistance				Medical devices, electrical insulators, pharmaceutical process equipment	
<b>PET</b>	Polyethylene Terephthalate	Arnite A, Impet, Valox	Tough, good impact strength, clear, good high temperature performance	Needs specialist masterbatch but wide range of colours now available.	Good-Dilute acid, alcohol, oils/greases, detergents. Poor-Concentrated acid, alkali, ketone, hydrocarbons	Can be glued. Can be machined. Can be decorated but primer needs to be used.	Blow moulded bottles	PETG generally used for injection moulding
<b>PES</b>	Polyethersulphone	Radel A, Victrex	Tough, wide operating temperature, self-extinguishing	Natural colour is transparent amber so can be coloured with difficulty but must be aware of high processing temperatures	Good-Dilute acid, alkali, oils/greases, detergents Poor-Concentrated acid, alcohol, ketone, hydrocarbons	Can be machined. Glued and welded. Parts can be electroplated and painted.	Microwave grills and dishes, medical respirators, dental reamers	Lower impact strength than polycarbonate. PES has better creep resistance than PSU.
<b>PMMA</b>	Polymethyl Methacrylate (Acrylic)	Diakon, Altuglas	Hard, rigid, crystal clear, good weatherability	As the material is clear a good range of colours is possible, solid and translucent	Good-Dilute acid, alkali, alcohol, oils/greases, detergents Poor-Concentrated acid, ketone, hydrocarbons	Can be joined using solvents or ultrasonic welding. Can be machined but care needs to be taken	Lenses. Lighting covers (indoor and outdoor), automotive rear light lenses	Hardness comparable to aluminium. Good clarity even with thick sections. Can be easily scratched by dust or cleaning
<b>POM</b>	Polyoxymethylene (Acetal) (Polyformaldehyde)	Delrin, Hostaform, Lupital, Kocetal	Rigid, very tough, translucent, good dimensional stability and electrical properties	Natural colour is white so high levels of masterbatch required. Ideally need to be polymer specific due to high processing temperatures.	Good-Alkali, alcohol, ketone, hydrocarbons Poor-Acids	Can be machined. Few adhesives for acetal so mechanical fastening usually used. can also be ultrasonically welded. Decoration by painting, hot stamping, metallizing and electroplating are all possible.	Gears, bearings, electric kettles, plumbing fittings, valve and pump housings, automotive fuel systems	Black or UV stabilisers required for outdoor use. Homopolymers (Delrin) have greater rigidity, higher tensile strength, higher flexural strength and a higher resistance to fatigue. Copolymers (Majority of other acetals) have a better resistance to hot water, better resistance to alkalis and better long term temperature properties.



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<b>PP</b>	Polypropylene	Moplin, Capilene, Hostalen	Semi rigid, translucent, excellent chemical resistance, good recyclability	Translucent white so easy to colour.	Good-Acids, alkali, alcohol, oils/greases Poor-Ketone, hydrocarbons, detergents	May be machined. Adhesives available for gluing but with mixed results	Crates and bins, housewares, washing machine drums, plumbing fittings, kettle bodies, automotive bumpers and dashboards	UV Stabilisers needed for outdoor use. Some transparent grades available but not crystal clear, clarity declines with wall section. Homopolymers are high strength and stiff but become brittle at low temperatures. Block co-polymers have ethylene blended in to improve the low temperature performance. However, they have less clarity and gloss. There are also random copolymers that have a lower ethylene content and a slightly different chemical structure, these may be chosen when a lower melting point, greater flexibility or enhanced clarity may be required.
<b>PPE</b>	Polyphenylene Ether	Noryl	See PPO					
<b>PPO</b>	Polyphenylene Oxide (usually modified PPO-M)	Noryl, Luranyl	Rigid, tough, opaque, wide operating temperature, excellent dielectric properties, may be self extinguishing	Natural colour is beige so colours possible although usually black. Using masterbatch results in loss of properties.	Good-Dilute acid, alkali, alcohol, ketone, oils/greases hydrocarbons, oils/greases	Can be machined at slow speed. Can be joined by ultrasonic welding or adhesives. Painting, printing and other decorative techniques possible.	Washing machine, dishwasher and pump components, electrical and automotive components	Requires UV stabilisers for outside use.
<b>PPS</b>	Polyphenylene Sulphide	Fortron, Ryton	Rigid, tough, high temperature resistance (continuous use up to 240C), good mechanical and insulation properties	Natural colour light tan to dark brown so only limited colours available	Good-Acids, alkali, alcohol, ketone, oils/greases, detergents Poor-Hydrocarbons	Can be ultrasonically welded. Can be hot stamped but requires high temperatures	Connectors, terminal blocks, sockets, coil formers, relay components, automotive ignition parts	Frequently used as an aluminium substitute. Usually sold as glass fibre filled grades.
<b>PPVC (PVC-P)</b>	Plasticised Polyvinyl Chloride	Solvic, Vinnol	Flexible, strong, high abrasion resistance, good weathering properties	Usually clear so wide range of colours possible	Good-Dilute acid, alkali, oils/greases, detergents Poor-Concentrated acid, alcohol, ketone, hydrocarbons	Depending on hardness can be machined. Can be joined using solvents, heat, ultrasonic welding	Footwear, garden hoses, electric cable insulation	The material has high abrasion resistance and good strength even at low temperature. it has high clarity and good outdoor weathering characteristics. DUE TO THE NATURE OF THE MATERIAL IT IS NOT MOULDED BY RP
<b>uPVC (PVC-U)</b>	Unplasticised Polyvinyl Chloride	Corvic, Geon	Rigid, tough, good weatherability, flame retardant, usually clear	Usually clear so wide range of colours possible	Good-Acids, alkali, alcohol, oils/greases, detergents Poor-Alcohol, ketone, hydrocarbons	Easily machined. Join using adhesives, heat, ultrasonic welding. Can be painted, printed vacuum metallised	Replacement windows and doors, pipes and fittings, rainwater goods and bottles	Cheap, rigid material which is tough under ambient conditions but it is not reliably load bearing above 60°C. The material has good outdoor weathering characteristics along with high clarity and flame retardance. DUE TO THE NATURE OF THE MATERIAL IT IS NOT MOULDED BY RP
<b>PVDF</b>	Polyvinylidene Fluoride	Kynar, Solef	Strong, tough, excellent chemical and heat resistance and UV stability	Translucent milky white. Care needs to be taken with colouring as some pigments may cause rapid decomposition of PVDF	Good-Acids, alkali, alcohol, ketone, hydrocarbons, detergents, oils/greases Poor-Nothing	Excellent machinability. Join hot plate, friction, ultrasonic welding	Valves, pumps and bearings, mainly in the chemical process industries	Good weatherability. Need to take great care when processing
<b>SAN</b>	Styrene Acrylonitrile Copolymer	Tyrl, Luran	Rigid, tough, transparent	Usually supplied in transparent or tinted form. Can be difficult to get colour dispersion so usually compounded	Good-Acids, alkali, alcohol, oils/greases, detergents Poor-Ketone, hydrocarbons	Can be guled using solvents. Spin or ultrasonically welded. Easily printed	Automotive real lamp covers and reflectors, refrigerator doors and trays, washing machine trims and windows, quality kitchen utensils	Better resistance to oils and greases than polystyrene. There is also improved stress cracking and crazing resistance, enhanced impact strength and a higher heat distortion temperature.
<b>PP-EPDM</b>	Rubber Modified/Reinforced Polypropylene	Alfater XL, Enflex	Tough, flexible	Natural colour similar to polypropylene so can be readily coloured	Good-Acids, alkali, alcohol, oils/greases Poor-Ketone, hydrocarbons, detergents	Parts can be painted for decoration and to improve scratch resistance although they will need pretreating prior to painting.	Automotive bumpers and door protection strips	
<b>SBC/SBS</b>	Styrene Butadiene Styrene Block Copolymer	Styrolux, Kibiton	Tough, crystal clear	Clear so can be readily coloured although frequently used in its natural form	Good-Acids, alkali Poor-Alcohol, ketone, hydrocarbons, oils/greases, detergents	Easily bonded using solvents or impact adhesives. Does not machine well. Can be printed	Centrifuge tubes, medical bottles and mouth tubes, pens and drawing instruments	Less brittle than GPPS. Often mixed with GPPS to reduce cost although this can increase opacity.
<b>TPE</b>	Thermoplastic Elastomer (Rubber)	Arnitel, Hytel						
<b>TPR</b>	Thermoplastic Rubber (Elastomer)		Flexible, good low temperature properties	Natural colour similar to polypropylene so can be readily coloured	Good-Acids, alkali, alcohol, oils/greases Poor-Ketone, hydrocarbons, detergents	Parts can be painted for decoration and to improve scratch resistance although they will need pretreating prior to painting.	Rubber replacement, automotive gaiters, seals and gaskets. Used for overmoulding to provide 'soft-touch'.	
	Thermoplastic Rubber or Elastomer - Crosslinked	Santoprene, Lamod						



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TPU	Thermoplastic Polyurethane	Elastolan, Ravathane	Range from hard and rigid to soft and flexible, better abrasion and tear resistance than rubber, excellent weatherability and UV resistance	Can be readily coloured but specialist masterbatch usually required. SAN based works well.			Bellows, diaphragms, gaskets and seals, machinery mounts, shoe soles and heels. Overmoulding, especially in automotive interiors	Gives glossier finish than TPE/TPR.