

PLASTICS RECYCLING CODES



Polyethylene Terephthalate (PET):

Since its development in the 1940's, PET's excellent tensile, thermal, mechanical, optical and electrical properties have continue to earn it new markets. PET is the premium resin, on a per kilogram basis, of the "big six".

Properties: Transparent, strong and tough, PET offers both excellent gas and moisture barrier properties, and is resistant to heat, mineral oils, solvent and acids (but not bases). Widely used in fibers and films, PET is also available in a stiffer, semi-crystalline form for blow molded and thermoformed products.

Applications: PET is used to make bottles for soft drinks, water, liquor, mouthwash, peanut butter, edible oils and salad dressing, as well as many other food and non-food containers. Good heat resistance means it can be used in ovenproof films, microwaveable food trays and boil-in bags. It is also used to make audio and videotapes, many injection-molded consumer products, textiles, fiberfill insulation, electrical components, some auto parts, and strapping and molding compounds. When made into a fiber, the resulting clothes are crease resistant.

Recycling: Clean flakes and pellets or recycled PET are used to spin fiber for carpet yarns and backing, and produce fiberfill clothing and geotextiles. Other products made from recycled PET include non-food bottles and containers, boat hulls, paint-brush bristles, cassette cases, scouring pads, office binders and furniture.



High Density Polyethylene (HDPE):

Harder, stronger and a little heavier than LDPE, and with even better chemical resistance, HDPE is used to make pipes, sheet products, films and bottles.

Properties: HDPE is strong, resistant to moisture and most chemicals (except ones with aromatic or chlorine content), and relatively stable when heated. However, it is permeable to gas. Lusterless and translucent when unpigmented, pigmented bottles generally have better stress, crack and chemical resistance than unpigmented HDPE bottles. The resin can be easily processed and formed; it can be welded together, but is difficult to glue. HDPE is available in either flexible or semi-rigid forms.

Applications: HDPE is used to make bottles for milk, juice, water and laundry products, as well as yogurt containers, margarine and ice cream tubs, cereal box liners, drums and other containers for many kinds of household and industrial chemicals, the "crinkly" kind of shopping and trash bags, reusable crates and pallets, children's toys, sporting goods, and many other products and packages.

Recycling: Products made from recycled HDPE include liquid laundry detergent and motor oils bottles, drainage pipe, recycling bins, trash cans, drums and pails, reusable shipping pallets and dairy crates, floor tiles, benches and picnic tables, plastic lumber and various kinds of fencing.



Polyvinyl Chloride (PVC or vinyl):

A cost-effective substitute for many scarce natural materials, PVC products are equally at home on the construction site and the operating theatre. PVC resins are the most versatile, in terms of both application and processing, of any of the "big six". PVC can be compounded with a large variety of additives to form products that range from rigid rain gutters to flexible cable insulation. It's also one of the least expensive resins.

Properties: Shiny, tough and moderately strong, PVC plastics are available in clear, translucent and opaque forms. Exceptionally resistant to grease, oil and most chemicals (although not all solvents), PVC is reasonably stable and stands up well to the weather, especially when formulated with certain additives. Chemically inert and nonflammable, it has good UV resistance, but has a limited operational temperature range and starts to decompose at 100° C. Both rigid PVC and, through the addition of softeners, flexible PVC products are available. Of particular interest in some applications, the resin will not kink if bent.

Applications: PVC is used in clear food packaging, bottles for mineral water, cooking oil, liquor, mouthwash, shampoo, cosmetics and other personal care products, as well as many of the familiar blister packs. Any clear, colorless bottle not made of PET is likely made of PVC. The resin is widely used in the construction business to make pipes and fittings, siding and cladding, floor coverings, carpet backing, roof gutters and windows. Other applications include PVC blood bags and hoses, wire and cable insulation, toys, shower curtains, pool liners and other sheeting products, coatings, synthetic leathers and vinyl furniture covering, credit cards and many more product lines.

Recycling: Products made from recycled PVC include packaging, binders, decking, paneling, garden hoses, drainage pipes, mud flaps, sheeting, flooring and tiles, cable, traffic cones and speed bumps, mats, and so on.



Low Density Polyethylene (LDPE):

LDPE offers a unique combination of properties: toughness and high impact strength, high gloss and clarity, good heat stability and chemical resistance, low permeability to water, outstanding electrical properties, flexibility and processibility.

Properties: Strong but lightweight, LDPE is easy to process, use and seal. It has excellent insulating properties, and provides a good barrier to water, moisture and most organic chemicals (except ones with aromatic or chlorine content). Although not as stiff and strong as HDPE, LDPE is more flexible and offers better impact resistance. LDPE is opaque except in the thinner films and foils.

Applications: LDPE is used to “shrink” wrap thousands of consumer products and make various foils, trays and bags – the soft kind that do not crackle – for both food (milk pouches, and bread, sandwich and frozen food bags) and non-food items (most soft plastic shopping bags, as well as dry cleaning and trash bags). The more rigid form is used in an assortment of flexible lids and squeezable bottles. The resin is also used as a protective coating on paper, textiles and other plastics (for example, in milk cartons), as a chemically resistant lining, in wire/cable and electrical/electronic applications.

Recycling: Products made from highly recyclable LDPE include shipping envelopes, film and sheeting, garbage can liners, floor tiles, paneling, compost bins and trash cans, trash bags and grocery sacks, irrigation pipes, plastic lumber and so on.



Polypropylene (PP):

From fibers to flexible packaging to car bumpers, polypropylene is one of the most versatile resins. Relatively inexpensive, easily modified to meet a wide range of thermal and mechanical requirements, and suitable for virtually all kinds of processing equipment, PP has found many applications both within and outside the packaging field.

Properties: A light, ductile material – PP has the lowest density of the major packaging polymers – the surface can be soft and scratches easily. Though not as strong as some other polymers, PP can be strengthened and stiffened using various additives. The resin is usually white and opaque, but can be colored. It offers reasonable resistance to the weather, and has exceptional resistance to moisture, oil/grease, acid, bases and some solvents. Similar to HDPE, PP is stiffer, lighter, strong, and can withstand higher temperatures. It also shows good fatigue resistance which means it can be used for hinged caps. Copolymers may be needed to survive cold conditions, and stabilizers added for UV protection.

Applications: Packaging applications include ketchup bottles, yogurt containers, margarine tubs, caps and lids, the wrappings used on cigarette packs and candies, and some pourable containers (like syrup jugs). A high melting point makes PP ideal for hot beverages. It's also used to make drinking straws, storage boxes and bins, tanks, suit cases, appliance housings, housewares, cassette holders, and battery casings. PP fibers are used in rope and twine, carpeting and carpet backing, monofilaments, and broom fibers. PP copolymers and used in pipes, containers, boat hulls, seat shells and automotive parts.

Recycling: Product made from recycled PP include auto battery cases and cables, signal lights, brooms and brushes, ice scrappers, oil funnels, landscaping borders, bins and pails, recycling containers, pallets, sheeting and geotextiles, trays, etc.



Polystyrene (PS):

Very popular since its development in the 1930's, polystyrene is prized for its transparency, thermal stability, lightness, excellent electrical properties, ease of fabrication, and low cost.

Properties: Hard, rigid and almost glasslike (though readily colored), PS is brittle and more easily broken than some other polymers. A very versatile and easy-to-process resin, PS can also be used in its lightweight expanded form to make a number of foam products. Not particularly weather resistant, so not usually suitable for outdoor use, PS is resistant to water, oxygen (but not carbon dioxide), acids, bases and detergents. However, it dissolves in almost all solvents. When modified by elastomers, PS becomes high impact polystyrene (HIPS) with even more applications.

Applications: PS is used to make drinking glasses, hot beverage cups and plates, trays and lids, clear carry-out food containers, medicine bottles, and (in its expanded form) grocery store meat trays, egg cartons, foam "clamshell" containers, and preparation cups for instant soups and noodles. It is also used in protective packaging (such as CD and cassette covers), cutlery, tape reels, razors and housewares, glazing and light diffusers, and disposable medicalware. HIPS is used for casings, cups and take-out containers. PS is also widely used as a structural or insulating foam and expanded into beads for packaging and cushioning.

Recycling: Products made from recycled PS include thermal insulation board, egg cartons, office equipment and accessories, packing "peanuts" and molded protective packaging, light switch plates, toys, reusable cafeteria trays, and so on.



Other Polymers:

This coding means the product is made of another resin than the six listed above, or is composed of more than one resin used in combination.

Properties: The properties exhibited will depend on the type or mix of resins used.

Applications: Food product packaging made from other resins include three and five-gallon reusable water bottles, as well as some citrus juice and ketchup bottles.

Recycling: A number of custom products and plastic lumber is made from assorted or mixed plastics. The heating value will depend on the type or mix of resins.

Source: EPIC – Environment and Plastics Industry Council