

Plastics: Petroleum Based and Alternative Plastics

Recycle numbers 1 through 6 are fossil-based (petroleum-oil-based), 7 is a catch-all for all other plastics, can be plant-based or oil-based.



1: PET also called PETE: Polyethylene Terephthalate

(pronounced: polly-etha-leen ter-ef-thal-ate).

USES: Clear plastic, commonly used for water bottles, clam-packs, blister packs, film, flow-wrap bags (any bag sealed at both ends, like a potato chip bag, makes a clear, shiny bag). Usually shinier/glossier than HDPE or LDPE. FPET is a form of 1, used for graphically printed shrink-sleeving.

MADE FROM: Oil (Fossil-based petroleum), No known health hazards.

END OF LIFE: Widely recycled. If it ends in the landfill, it is inert, it does not give off methane gas.



2: HDPE High Density Polyethylene (polly-etha-leen)

USES: Cloudy-clear plastic, or white or colors. If a bottle has a handle, like a milk-jug, its HDPE, because other plastics cannot structurally take this much detailed form. Some shampoo bottles, toiletry tubes, some plastic shopping bags, take-out soup containers.

MADE FROM: Oil (Fossil-based petroleum), No known health hazards.

END OF LIFE: Widely recycled. If it ends in the landfill, it is inert, it does not give off methane gas.



3: PVC Polyvinyl Chloride (polly-vy-nil-klor-ride)

USES: Blister packs, non-food packaging like hardware & automotive. Some shampoo bottles and toiletries, and thin, plastic, see-through boxes for packaging; some pvc shrink sleeves. Shiny like PET, flexible like HDPE.

This is the film wrapped around meat in trays then gas-flushed (either pure oxygen, carbon dioxide or nitrogen which keeps meat from discoloring and greatly extends the shelf-life, because it removes normal air from around the foods and prevents microbes from living and causing deterioration.

MADE FROM: Oil (Fossil-based petroleum). The production emissions (gases given off during manufacture) of this plastic have been linked to causing cancer and infertility, and they stay in the environment (in water and in animals). So LDPE is often being used to replace PVC in food packaging because of health concerns.

PVC is the plastic sometimes has phthalates (fal-lates) added to it, to increase its softness. Phthalates is the plastic which has been called an endocrine disruptor, and is hazardous to your health. Do not heat food in this in the microwave.

END OF LIFE: Not widely recycled. Looks like PET in bottle form, but if recycled along with PET bottles it contaminates the recycle stream, even when PET bottles are shrink-wrapped with PVC. Can leach bad chemical additives, like phthalates, into the landfill, soil and water.



4: LDPE Low Density Polyethylene (polly-etha-leen)

USES: One of the layers in Tetrapak, some plastic shopping bags, some flow-wrap bags (any bag sealed at both ends, like a potato chip bag), six-pack holders, and cushioning for shipping fragile goods (as polyethylene foam).

MADE FROM: Oil (Fossil-based petroleum), No known health hazards.

END OF LIFE: Shopping bags of LDPE are collected for recycling, often at grocery stores, but not always actually recycled. Biodegradable look-alikes have slowed down the recycling of LDPE, because they could contaminate the recycle stream.



5: PP Polypropylene (polly-pro-pa-leen)

USES: Cloudy, but not as cloudy as HDPE. Yogurt containers, resealable tubs; most plastic lids are made from this, including trigger-spray bottle-lids and flip-top lids. Flexible tubes for toiletries, jars, plastic cartons, pouches and doy bags, molded trays, thin plastic film, some plastic shopping bags, re-usable plastic shipping crates (milk crates).

MADE FROM: Oil (Fossil-based petroleum), No known health hazards.

END OF LIFE: Not widely recyclable, possibly in the future. In the Landfill emissions are too slow to be damaging (hundreds of years).



6. PS Polystyrene (polly-sty-reen)

USES: Two states: foam burger-boxes, egg-dozen-cases, other such cushioning foam uses, and hard, white, brittle plastic, like some yogurt and margarine tubs.

MADE FROM: Oil (Fossil-based petroleum). Hazardous to marine life as litter.

END OF LIFE: Not recycled at this time, but possibly in the future.

7. Other:

All plastics not listed under the current system. Some are petroleum based and some are bio-plastics.



BPA, or Bisphenol A, this is the petroleum-based plastic which is most questionable to health. Its use has been discontinued except for non-food packaging, such as automotive parts.

Degradable and Bio-degradeable (see more below): these make up two categories. Degradable Plastics are petroleum based, with other additives which make them break up into minute particles. Bio-degradeables are usually plant-based, and intended to be compostable, to return to an organic state within a short time-frame.

Degradable Plastics *make up three categories, all petroleum based:*

HDPS: Hydrolytically degradable (water causes their break-up)

OBPS: Oxo-degradable (oxygen causes their break-up, usually in soil)

PBPS: Photo-degradable (light causes their break-up)



HDPS Hydrolytically Degradable Plastics:

USES: It is used to make thin plastic film, usually made into thin plastic shopping bags. The idea is to prevent harm to marine life.

MADE FROM: LDPE (# 2, above) mixed with corn starch or another water-soluble bio-material.

END OF LIFE: They are non-recyclable, non-compostable and will not degrade in the landfill, but may degrade even before they reach the landfill.



OBPS Oxygen-Degradeable Plastics:

USES: Used for thin plastic shopping bags. Intended to prevent harm to wild-life.

MADE FROM: Oxo-degradable plastics are made from congenial oil-based plastics, but mixed with chemicals in the master-batch which make them degrade in the presence of oxygen, typically in soil. These are cheaper to make than true-bio-based degradable plastics.

END OF LIFE: Possibly recyclable, some argue it will weaken the finished product. Non compostable. Their manufacturers claim they are both recyclable and biodegradable, but scientists say not really biodegradable, that they remain plastic, just in minute particles. Their additives can be toxic. The manufacturers claim they break-down in the landfill, but in the landfill there may not be enough oxygen to allow them to break-down.



PBPS Photolytically (light)-Degradeable Plastics

USES: Used to make thin plastic bags and take-out, styrafoam-like containers.

MADE FROM: oil-based plastics but with additives which cause them to break-down in sunlight. Sometimes combined with oxo-degradable plastics, to aid break-down.

END OF LIFE: Non compostable. Their manufacturers claim they are both recyclable and biodegradable, but scientists say not really biodegradable, that they remain plastic, just in minute particles. The manufacturers claim they break-down in the landfill, but in the landfill there may not be suitable conditions to allow them to break-down.

Biodegradable Plastics (Listed Below)

Also not numbered with a system yet, like the main six, above), so its harder to distinguish them from each other, or from oil-based plastics. Identification is a major hurdle to recycling and beneficial end-of-life cycle. Biodegradable plastics are usually not good for landfill, since they emit methane in the anaerobic situation. They are compostable but not for back-yard compost bins, they must be industrially composted at high temperatures and with air & water.



Starch

USES: Used for packing pellets, burger boxes.

MADE FROM: Simple bio-plastic, can be made from corn, sugar cane, potatoes, wheat, soy, rice, tapioca, cassava.

END OF LIFE: Not recyclable, is compostable, but in the landfill it emits methane.



High Amylose Corn Starch

USES: Thin plastic bags, plastic bags for produce, foam trays for fruits, vegetables, trays for chocolate packaging.

MADE FROM: Made from a special hybrid corn plant with a high amylose content.

END OF LIFE: Bio-degrades on contact with water, so very compostable. Not recyclable, would contaminate the recycle stream; emits methane in the landfill.



PLA Polylactic Acid (polly-lack-tick-acid)

USES: Can be made into clear bottles, shopping bags, yogurt containers, flow-wrap bags (any bag sealed at both ends, like a potato chip bag), foam packing-pellets.

MADE FROM: Behaves much like fossil-fuel-based plastic, but made from fermented starch, more durable than the starch plastic above, derived from sugar cane or cellulose (wood);

END OF LIFE: Naturally biodegrades in a wet environment or composted, but releases

methane in the anaerobic conditions of landfill. Its greatest drawback now is that if confused with synthetic plastics it will contaminate the recycle stream.



Green Polyethylene and BIO PET (green polly-ethal-leen)

USES: Clear plastic bottles for water and other beverages, plastic lids and caps, film, thin plastic bags.

MADE FROM: Sugarcane, but chemically identical to petroleum based Polyethylene. Expensive to produce. Produced in Brazil and may contribute to the destruction of the rain forest, and uses industrial farming methods which use fossil fuel and fertilizers which may produce nitrous oxide.

END OF LIFE: Recyclable, same as PET, which is a big attraction. However, colors and metallic/pearlescent additives make the plastics not recyclable. Non biodegradable, non-compostable, and will take hundreds of years to breakdown in the landfill.



PHA and PHB Polyhydroxyalkanoate and Polyhydroxybutyrate

USES: Bottles, thin plastic film, yoghurt containers, thin plastic bags.

MADE FROM: Microbes convert corn-sugar into bioplastic. Expensive to produce.

END OF LIFE: Compostable. Breaks down in the presence of water in two to three months. Non-recyclable, contaminates the recycle stream. Emits methane in the landfill.



Cellophane, (cell-oh-fane)

USES: Widely used for wrapping candy and cookies and scotch tape. It has air-permeability, so it is used for food products that need to “breathe” like aged cheeses and cigars. It is also water-permeable, unless coated with other chemicals/plastics.

MADE FROM: A biodegradable plastic film, in use since 1927. Made from wood (cellulose).

END OF LIFE: Naturally biodegrades in the landfill or compost pile; emits some methane. Non-recyclable.



Paper Foam

MADE FROM: A mixture of potato starch and wood fiber. Resembles plastic foam. Structurally durable and light-weight.

USES: Used for CD trays, shipping containers for cell phones, and cameras. This is a

END OF LIFE: A biodegradable alternative to cd jewel-cases. Recyclable with paper and card. Compostable. Emits methane in the landfill.