

Overview of the Different Kinds of Plastics and What They Are Used For (Consumer Applications)

As you read from my bio, I have a personal interest in plastics. I have good reason to be interested in plastics – and harmful chemical exposure in general.

My brother was a chemical engineer working for a number of years at a semi-conductor production facility. Presumably through the course of this work, he came into contact with many of the chemicals used in the production plant. Potentially because of this chemical exposure, and I say potentially because we could never definitely establish the link, he developed a rare form of bone cancer called Multiple Myeloma. Like any cancer, Multiple Myeloma is a horrible illness. It eats away at a person's bones, and is mostly found in older people (generally over 65). This type of cancer is very rare in people younger than 50 – my brother was 42 at the time. At younger ages, it is rare and could be caused by chemical exposure. He passed away 5 months after his diagnosis.

Hence my fascination with chemicals, most particularly plastics, began.

From shopping bags that you get at the grocers, to the containers you place the last night's leftovers in; plastics have revolutionized the once difficult act of storage. The concept of disposable items was created because of plastics, which made it not only easy but also very cheap to live one's life in the fast lane. To be specific and a bit technical about it, plastics are typically organic polymers of high molecular mass that often contain other substances.

Categorization in Plastics:

The plastics we see today have taken years to evolve into the current forms. They have developed from Parkesine that was made from cellulose to the formulated and synthetic Bakelite.

Today, plastics are classified into two major categories based on their rigidity, durability and reaction to heat:

- Thermosetting plastics
- Thermoplastics

Thermoset plastics, once cooled and hardened, retain their shapes, and are durable, while thermoplastics are less rigid, and can be easily molded.

All other plastic forms are divided between these two main categories. For example, polyurethanes (used in flooring), polyesters (used for many purposes such as fabrics), epoxy resins (glues) and phenolic resins fall under the thermoset plastics, whereas polyethylene (used in soda bottles), polypropylene (Tupperware) and polyvinyl chloride (pipes and tubing) fall under the category of thermoplastics.

Types of Plastics:

Now that we have outlined the categories that plastics are divided into, let us focus on the different types themselves, which would involve discussing where each type is used and whether or not they are recyclable.

Recycling, in the case of plastics, is very important because most of them are not biodegradable. There are some plastics made from cornstarch that is biodegradable under ordinary composting conditions, but most plastics are not.

Unlike wood and paper, plastics can exist forever. They do not mix into the soil and decompose. It is important therefore that if nature cannot disintegrate these, we – in a responsible society - should be able to.

In an attempt to simplify and categorize the forms of most commonly used plastics, The Society of the Plastics Industry created codes from 1 to 7. These codes are embedded into the plastic and each code represents a different formula for the plastic, signifying where each can be used, and its resistance to recycling. To find the recycling symbol, simply look at the bottom of the container and you should see it there.

- **Polyethylene Terephthalate (PET) - 1**

Domestic items like bottles of beverages (water and soda), medicines, salad trays, cords, garments and carpeting fibers are all the consumer products made from PET. The code for PET is 1 and it is commonly recycled.

- **High and Low Density Polyethylenes – 2 & 4**

Although the two may sound familiar, they are actually very different from each other. Retaining the codes 2 and 4 respectively, the products made from them and their recycling characteristics differ. While the High-Density Polyethylene is easily recycled, as they do not transmit the plastic chemicals, the one area where this plastic is lacking is that the containers are designed for 1 time use and cannot be reused a 2nd time for food storage. The products made from HDPE are usually used for the storage of bleaches, motor oil, detergents, milk, conditioners and shampoos and soap bottles. Other items also include Toys, buckets, rigid pipes, crates, plant pots, Plastic wood, garden furniture, Wheeled refuse bins, compost containers

Low-Density Polyethylene, on the contrary, is recognized as being ONLY occasionally recyclable. It is termed as a heavy plastic and is used for items such as plastic grocery bags, sandwich bags, cling-film wraps, and bottles that are squeezable are made from LDPE.

- **Polyvinyl Chloride - 3**

Sometimes recycled and bearing the code 3 this form of plastic is used in the manufacture of the plumbing pipes that you see around the house. It is a dangerous plastic to people, however, and must not come into make contact with food items. To further name the products created by Polyvinyl Chloride, the list includes credit cards, carpet backing and other floor covering window and doorframes, guttering and synthetic leather products.

- **Polypropylene - 5**

Polypropylene Code 5 is recycled intermittently, which means that it is tough and heat resistant. PP has been most famously used in Tupperware containers and is also used to make

lard containers, lunch boxes, yogurt jars, bottles for syrup, and container caps. Some other consumer goods include drinking straws, biscuit wrappers, crates, plant pots, hinged lunch boxes, potato crisp bags, refrigerated bottles, fabric/ carpet fibers and heavy-duty bags/tarpaulins. *If the product made from this plastic is food grade – this type of container can be reused for food storage.*

- **Polystyrene - 6**

Although it is frequently recycled, it is also tricky to do so and is not recycled easily. Code 6 PS creates items such as packing foam, disposable cups for coffee, storage boxes for food, and cutlery. Other items manufactured from PS include; yogurt containers, seed trays, egg boxes, video cases, fast food trays, clothing hangers and finally, low cost fragile playthings.

- **Other - 7**

The plastics that fall under code 7 are of miscellaneous nature. For example, polycarbonates and Polyactides are categorized as a part of this group and these plastics are much more difficult, if not impossible, to recycle. Polycarbonates are used in the formation of plastic beverage glasses, plastic tableware, medicinal containers and compact discs.

While other plastics also exist, my goal was to identify those that are most commonly found in consumer products. Over time, plastics have taken over all other sorts of storing techniques and now it is understandable why.