



The Plastic Problem

What is Plastic?

Plastic is a material consisting of any of a wide range of synthetic or semi-synthetic organic compounds that are malleable and so can be molded into solid objects.

Plasticity is the general property of all materials which can deform without breaking, but in the case of plastics, this occurs to such a degree that their actual name derives from this specific ability.

The world's first fully synthetic plastic was bakelite, invented in New York in 1907 by Leo Baekeland, Leo also coined the term 'plastics'.

Generally plastics can be split into two groups, thermoplastics and thermoset plastics.

Thermoplastics can be remelted and reused.

Thermoset plastics cannot be remelted and reused.

Where does plastic come from?

Plastics are typically of organic origin. They are usually synthetic and most commonly derived from petrochemicals, however, some types are made from renewable materials such as corn or cotton.

What are the benefits of plastic?

Plastics are very durable, they are cheap and easy to manufacture, and mold into almost any shape. Plastic is also water proof and has replaced many traditional materials, such as wood, stone, horn and bone, leather, metal, glass, and ceramics.

Plastics have many uses in the medical field, providing cheap sterile equipment as well as polymer implants and other medical devices derived at least partially from plastic.

Why is plastic a problem?

Plastics most desirable quality is also its biggest problem. Its durability. Most plastics degrade



very slowly, as their chemical structure renders them resistant to many natural processes of degradation.

The success and dominance of plastic in all aspects of day-to-day life has produced an abundance of plastic waste that does not degrade and so persists long after its designed use has passed.

This excess of plastic has found its way into our food chain with plastic contamination steadily increasing since the 1960's. The long-term effects of plastic in the food chain are poorly understood.

How big is this problem?

There are differing estimates of how much plastic waste has been produced in the last century. By one estimate, one billion tons of plastic waste have been discarded since the 1950s.

Others estimate a land area the size of Argentina could be covered with all of the plastic waste produced to date. Much of this material may persist for centuries or longer until decomposition and degradation.

It has been estimated that 10% of modern waste was plastic, although estimates vary according to region. Meanwhile, 50–80% of debris in marine areas is plastic.

What can we do about it?

Thermoplastics can be remelted and reused, and thermoset plastics can be ground up and used as filler, although the purity of the material tends to degrade with each reuse cycle.

To aid in plastics re-use and promote a circular plastics economy make sure that you recycle all plastics.

If you have access to the correct type of equipment you can recycle your own plastic waste and create new objects. You can also repurpose or reuse items.

Plastics Recycling

The greatest challenge to the recycling of plastics is the difficulty of automating the sorting of plastic wastes, making it labor-intensive. Typically, workers sort the plastic by looking at the resin identification code, although common containers like soda bottles can be sorted from memory. Typically, the caps for PETE bottles are made from a different kind of plastic which is not recyclable, which presents additional problems for the sorting process. Other recyclable



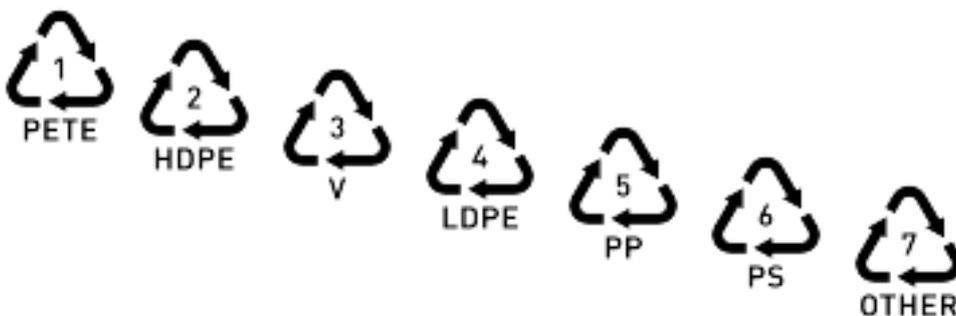
materials such as metals are easier to process mechanically. However, new processes of mechanical sorting are being developed to increase the capacity and efficiency of plastic recycling.

While containers are usually made from a single type and color of plastic, making them relatively easy to sort, a consumer product like a cellular phone may have many small parts consisting of over a dozen different types and colors of plastics. In such cases, the resources it would take to separate the plastics far exceed their value and the item is discarded. However, developments are taking place in the field of active disassembly, which may result in more product components being reused or recycled. Recycling certain types of plastics can be unprofitable as well. For example, polystyrene is rarely recycled because the process is usually not cost effective. These unrecycled wastes are typically disposed of in landfills, incinerated or used to produce electricity at waste-to-energy plants.

Plastic identification

In 1988, to assist recycling of disposable items, the Plastic Bottle Institute of the U.S. Society of the Plastics Industry devised a scheme to mark plastic bottles by plastic type.

Under this scheme, a plastic container is marked with a triangle of three "chasing arrows", which encloses a number denoting the plastic type:



Plastics type marks: the [resin identification code](#)

1. [Polyethylene terephthalate](#) (PET or PETE)
2. [High-density polyethylene](#) (HDPE)
3. [Polyvinyl chloride](#) (PVC)
4. [Low-density polyethylene](#) (LDPE)
5. [Polypropylene](#) (PP)
6. [Polystyrene](#) (PS)