

P12 PETROCHEMICALS

PRODUCTS OF THE PETROCHEMICAL INDUSTRY



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RESOURCE PACK

Organic solvents

Organic solvents are used in many industries, notably those producing paint, inks, coatings, adhesives, cosmetics and pharmaceuticals. Solvents are used to dissolve other substances (solutes) without chemically changing them. This enables the solutes in inks, paints and other coatings to be spread over a surface. The solvent eventually evaporates, leaving behind only the solutes. In the cosmetic industry, for example, solvents allow the essential oils in a perfume to be dabbed on ear lobes. How a solvent works is that the molecules of the solute get mixed up with those of the solvent, provided the force binding the solute's molecules together is of similar strength to that binding the solvent's molecules. Since the strength of the binding force can vary greatly between different substances, there are dozens of solvents on the market.



Perfumes and cosmetics require high-purity solvents

Source: *Mind over Matter*, www.sasol.com



Solvents are used in paints and adhesives

Source: *Mind over Matter*, www.sasol.com



A fire dancer with Poi sticks dipped in kerosene

Kerosene (paraffin)

The name kerosene is derived from the Greek word *keros* which means wax. The word kerosene was registered as a trademark by Abraham Gesner in 1854, and for several years only the North American Gas Light Company and the Downer Company (to which Gesner had granted the right) were allowed to call their lamp oil kerosene.

It is also called paraffin (sometimes paraffin oil) in the UK, South East Asia and South Africa (not to be confused with the much more viscous paraffin oil used as a laxative, or the waxy solid also called paraffin wax or just paraffin); the term kerosene is used in much of Canada, the United States, Australia (where it is usually referred to colloquially as kero) and New Zealand.

Kerosene is widely used to power jet-engined aircraft (jet fuel) and some rockets, but is also commonly used as a heating fuel.

What about the environment?

Disposal of plastics

Plastics are light, cheap, corrosion-resistant, versatile, and can be dyed in any colour. These properties have made plastics so popular that they have replaced many conventional materials, such as paper and metal alloys, in commodity items. But it is the same properties that also present problems when we want to dispose of the plastics. Plastic litter is highly visible and can be seen where it has been discarded along the streets and roads, in the countryside and on the beaches.

Contrary to popular belief, plastic packaging does not fill our landfill sites. Analysis of the waste stream shows that plastics represent only 7% by mass and 11% by volume of all waste. Paper represents 38% by mass of the waste stream. The inertness of plastics makes them effective stabilisers in a landfill.

There are more effective and economical methods of dealing with waste polymers than its disposal in

landfill. Polymers are hydrocarbons and they should make good fuels. Unfortunately the pollution from the incineration (burning) of plastics is high, and care must be taken not to release toxic fumes into the air. The obvious option is to recycle.

Some plastics are more suitable for recycling than others. Thermoplastic cooldrink bottles made from PET can easily be heated at low temperatures to melt the polymer and remoulded into new thermoplastic products.

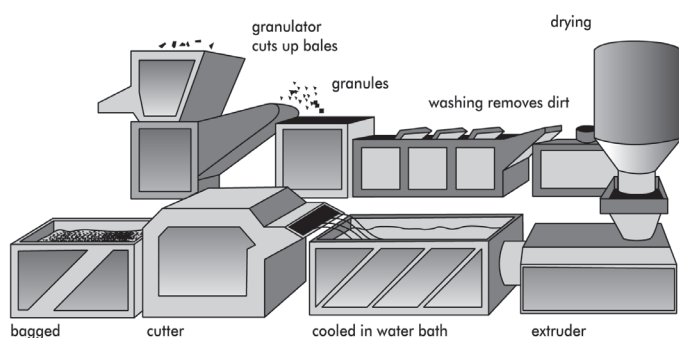
Each type of plastic needs specific recycling treatments, and to accommodate the recycling option, an international identifying system for packaging plastics has been introduced. Plastics are divided into seven groups, each with an identifying number inside the logo. These logos are moulded into the plastic, usually at the base of the article. This makes it easier to sort plastic waste for each type to be treated differently for recycling.

The recycling process

In South Africa, the plastics industry took responsibility for the post-consumer disposal of plastics via the Plastics Industry Environmental Initiative, Enviromark, Petco, Buyisa-e-bag, the Polystyrene Packaging Council and various recycling and recovery projects. Wire cages are placed in communities and retail areas to collect plastics for recycling. Most recycled waste plastics come from plastics packaging, especially films and bottles. In fact 30% of plastics used for packaging is recycled. Products made from recycled packaging include refuse bags, building film, containers, buckets, dustbins and agricultural piping.

Plastic materials are collected from various sources such as households, supermarkets, factories and garbage dumps. The collected materials are then sorted by type of plastic and colour, baled, and transported

The recycling process



to the plastics recycler. The recycler opens the baled plastics and feeds them into a granulator which cuts up the incoming material into flakes or granules. The granules then go through a washing plant to remove labels, residual contents and soil. After drying the granules, they are fed into an extruder where the dry granules are melted down. The molten plastic is then forced through a multi-hole screen and strings are formed. The strings are water-cooled in a bath, and chopped up into pellets by a revolving cutter. The pellets are bagged and sold to a factory that uses them to produce new plastic articles.

Numbering plastics

- ① PET polyethylene terephthalate
- ② PE-HD high-density polyethylene
- ③ PVC polyvinyl chloride
- ④ PE-LD low-density polyethylene
- ⑤ PP polypropylene
- ⑥ PS polystyrene
- ⑦ Others e.g. multilayer plastics and other engineering plastics

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