

Polyethylene different  
types of containers.  
films-glad wrap and



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Polyethylene also known as polyethylene or polythene, was the first of the polymers to be discovered.

Polyethene is a polymer produced by reacting oxygen and ethene, in this reaction the small ethene molecules attach together to form long chain polymer molecules. This process is known as addition polymerisation.

Polyethene in our world today has many uses, some of these are: mouldings- plastic bottles, lids and caps, different types of containers. films- glad wrap and various plastic bags. cable coverings- various pipes and insulating wire and cables As you can see polyethene has a huge variety of both domestic and industrial uses, this is fairly impressive when you see that polyethene has only been around since 1933. Polyethene is a thermoplastic material which is often described as wax-like it is extremely tough and it has an excellent chemical resistance. It is also less dense than water and is the simplest polymer, these attributes lead to polythene being an extremely useful substance.

Ethene ( $C_2H_4$ ), is a simple hydrocarbon molecule which consists of 2 carbon atoms and 4 hydrogen atoms. Ethene's main use is in the production of polythene yet it is one of the most widely used petrochemicals in the world. Ethene is an unsaturated colourless gas which can be ignited in the presence of oxygen. Below is a diagram of ethene: Polyethene is produced by allowing the free roaming ethene gas molecules to bond together to form long chain polyethene molecules.

In order for this to work a catalyst must be used, a catalyst is a substance that can alter the rate of a chemical reaction without undergoing any

chemical change itself. During this process thousands of ethene molecules bond to form each molecule of polyethene. Polyethene is simply a set of ethene molecules bonded together to form a chain, these chains can often stretch up to many many times longer than the original ethene molecule.

Below is a diagram of polyethene: Although normally ethene monomers have little attraction for one another, yet the polyethene molecules have a strong attraction for one another. When polyethene molecules are attracted and bond high-density polyethene is formed, thus polyethene is either formed by low-density or high-density polymerisation. Ethene can undergo the process called polymerisation due to the fact that it is unsaturated and because it has a double bond between its two carbon atoms. Both high-density and low-density polyethene have different uses.

Low-density polyethene is used in the production of products such as various bags, plastic bottles, cling wraps, and insulating cables. Low pressure polymerisation with the use of certain catalysts; has meant that the process of polymerization can be achieved at fairly low pressure (20 atmospheres or 2000 kPa) and at temperatures of approximately 100°C. The reactor itself contains a polyethene bed placed on a perforated plate. It works by allowing the recycled gas to enter near its base, the gas then passes through the plate and pushes up through the bed causing it to bubble. Finally the catalyst converts the ethene to polyethene, once the polyethene is cooled it forms a fine powder called 'fluff' which is then collected and transported to a storage bin.

Any ethene gas which has not reacted passes through a compressor and then a cooler, and is processed again. High-density polyethene is used to produce <https://assignbuster.com/polyethylene-different-types-of-containers-films-glad-wrap-and/>

items such as lids, caps, baskets, bowls and large containers such as garbage bins. These polyethene products are created in what is known as high-pressure polymerisation, this is a process that was originally used before low-pressure polymerisation was discovered and thus it is a fairly simple process. Firstly Ethene gas is compressed and liquefied, from here it is pumped into a large reactor at a pressure of up to 2660 atmospheres (266 Mpa). Amongst this oxygen and peroxides are pumped in to initiate the polymerisation reaction.

This process generates a huge amount of heat so the most complex part of the system is the cooling facilities. The many products of polyethene which are most commonly used are generally manufactured using any of these five different techniques. Extrusion - film, this technique is used for the production of items such as plastic bags such as garbage bags and glad wrap. These are the most common applications, while there are many others these are the best examples of this technique. This final product is achieved by blowing air into a tube of molten plastic this allows for extremely fine layers of the plastic to form. Blow moulding, this is used to make plastic bottles and some motor oils.

This technique is much like the previous one but rather