

## Recycling of Plastic into Household Items

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**Abstract:** The purpose of Recycling of plastic into household items is to reduce use of plastic by making into useful household items to avoid landfills and to recycle the plastic. Since the use of plastic has been increasing day by day but plastic is so entrenched into our lives it cannot be easily removed. Plastic recycling process involves collecting, sorting, washing, shredding, heating and moulding. Recycling technologies have made the plastic recycling process easier and more cost effective. Consequently the reuse, recovery and recycling of plastic is important

**Keywords:** Plastic Recycling, Plastic Recycling Methodology Working.

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### I. Introduction

The evolution of plastic has a long and interesting history. Its use has been expanded rapidly over the past few decades. Every 15 years the quantity of plastic being produced has doubled. This is the fastest increase of any man-made material ever. We can see this increase in our daily lives, with plastic being used pretty much everywhere and for everything. Plastic can be found in so many places in our modern world: in our homes, in our automobiles, at our jobs, in our electronics, in our children's toys, in our gardens. Plastic even surrounds most of our food! All of this plastic use is quite significant for the environment, since the majority of plastics available today are derived from petroleum, a non-renewable resource. Globally, we have started to realize that we have a problem, but plastic is so entrenched into our lives it cannot be easily removed. One good way to stem the production of plastic is to recycle plastic that has already been produced and use it to make new products. Plastic recycling has become more advanced in recent years and is always becoming more efficient. Fortunately, a lot of plastic can be remade into new products. Plastic waste recycling reduces our need for more fossil fuels, saves energy, landfill space, and emissions of carbon dioxide and other greenhouse gases.

### II. Methodology

#### Plastic recycling process

Plastic recycling is broken up into a few distinct steps. Generally these steps remain same for most types of recycling programs

#### Step 1: Collection

The first step in the recycling process is always collecting the hdpe and pet plastic material that is to be recycled which can be collected from the waste available in the surroundings.

This step is completely reliant upon businesses, restaurants, and the public to dispose of their plastic waste in the correct place. If plastic waste is disposed of in normal trash bins, it will *not* be recycled, so it is extremely important to separate common waste and plastic waste. We can get plastic waste from the oceans, lakes and rivers as the wastage is more in water level compared to land.

Additionally, it is ideal for governments to have a recycling collection system that goes to people's houses or businesses to collect the plastic waste. If this is not possible, local collection points for plastic should be easy for the public to access. Making it easy and convenient for people to correctly dispose of plastic waste to avoid landfills.



Fig 1 (Plastic collection)

**Step 2: Sorting**

After plastics are collected the next step is sorting.

Manually sort plastics into different areas based upon different properties that are often dependent upon the recycling facility or what final product is being produced.

Plastics are usually sorted in a few common ways, such as the type of plastic (material it is made with), colour of the plastic, or even how it was made. This is important because different types of plastics must be processed in different ways and some recycling facilities are only capable of recycling one type of plastic. If the wrong type of plastic is used these plastics materials get stuck in the equipment in recycling process causing it to be break or stop. Due to this efficiency of the whole process is reduced and then it is proceed to next process washing



**Fig 2** (sorting of plastic)

**Step 3: Washing**

Just like we wash clothes, fruits/vegetables, and many other things, plastics must be washed before they are further processed. The goal of this step is to remove impurities and everything that is not made from plastic.

Most containers and packages have labels, adhesive, or even food residue that must be removed. This non-plastic waste cannot be recycled and can cause the failure of the final product.



**Fig 3** (Plastic washing)

**Step 4: Resizing (Size Reduction)**

Resizing consists of shredding the plastic waste into small particles with help of plastic shredder. This increases the surface area of the plastic, making it easier to process, reshape, and transport if needed.

Additionally, it gives recycling facilities one last opportunity to remove any non-plastic waste that has made it through the first 3 steps of processing.



**Fig 4** (Resizing of plastic)

**Step 5: Heating & Moulding of Plastic**

After the resizing process the next step in the recycling process is to heat & melt the plastic. The important factor when melting the plastic is that they have differing temperatures required to melt and process them. One plastic may melt while another is still solid this can affect the property of the final component for ex:

PET melts at 245 degree While HDPE Melts at 120-180degreeC. Plastics are heated and melted into new shapes with the help of mould cavity which can be later used in household items.



Fig 5 (Moulded plastic)

### III. Working

- The recycling process begins with collection of hdpe and pet plastic materials since this plastic have higher density and when this plastic materials are heated and cooled this plastic becomes hard enough and when it is compressed into a mould it obtain a good shape
- Sorting the various items by their resin content once sorted the plastics are shredded into small pieces with a help of plastic shredder made of mild steel this process is called shredding

### line diagram of shredder

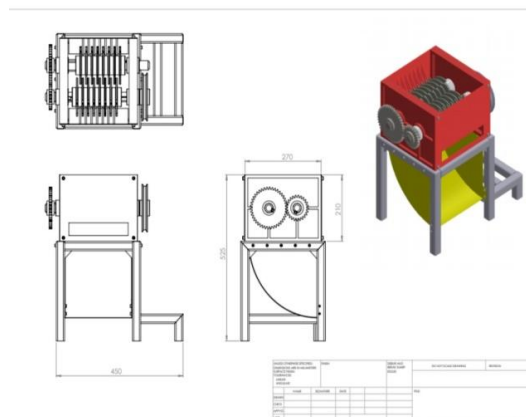


Fig 6 (line diagram of plastic shredder)

- These pieces are cleaned to further remove debris like paper labels ,residue from what was inside the plastic , dirt ,dust, and small impurities and then this plastics are proceeded for next step
- Plastics of same type are melted with help of induction(4500 watt) this process is called melting
- After melting process plastics are compressed into moulds and then it is cooled a final product is formed

### Working Flow chart



Fig 7 (working flow chart)

#### **IV. Results and Final output**

As results the Plastics that have recycled very easily if handled in care. It can be useful in many ways for the development of products and households item. Plastics have a large amount of applications which we should look and make proper use of it. Recycling is the only way to protect the nature to avoid landfills, carbon emission etc. As we have recycled Hdpe and Pet plastics into new product .This recycled product becomes hard and has high resistance to impact and it can recycled more number of time and obtained a good shape as shown in the figure below



**Fig 8 ( Recycled plastic)**

#### **V. Conclusion**

In today's world there is so much information available about recycling. But high quality education is a must if the amount of recycling is to be increased. We must communicate this message to people so that they understand the seriousness of the problem. Everyone should understand the subject thoroughly so that the only excuse can be a lack of interest. The problem of contamination of recycling bins must be overcome.

Recycling programs should be carried rapidly in order to avoid damage to nature. In today's world how money could be withdrawn at any corner of world easily. In the same manner the recycling programs should be carried and it we help people to utilize the dispose plastic material into recycled new product.

Together we must reduce, reuse and recycle. We can reduce by purchasing items with the least amount of packaging and buying in bulk when appropriate. We can reuse by avoiding disposable items. Finally we can recycle by using community recycling programs and purchasing products made from recycled materials. Never before has there been a time when environmental issues such as recycling have been more relevant. We must stop refusing to look past today.

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