

## PLASTIC PROCESS

### Waste Plastics and polymers to Fuel

The world is facing the problem of disposal of waste plastics. The ease of manufacture and the abundant availability of plastics in all walks of life, have created a situation where the useless and waste plastics from the abandoned electronics, carry bags, automobile accessories etc. are piling up day by day and there are no economical disposal methods available. Unless, economic disposal methods are found out, world will see the menace of soil degradation, loss of water table and many other problems associated with the non-biodegradable plastics.

Many technologies have been developed to address this problem since past, but they have posed one limitation or the other.

Based on this reasoning, the novel "POLYCRACK" process has been developed and successfully tested by Mr. Rao of SUSTECH. The main specialty of this process is that all kinds of plastics, both recyclable and non-recyclable plastics are converted into petroleum fuels, which can be used as alternate sources of fuels for industrial, residential and other needs.

### Waste Plastics to Fuel

#### How does it work?

All plastics are polymers manufactured from the petroleum lighter ends like propylene, mostly containing carbon and hydrogen and few other elements like chlorine, nitrogen etc. Polymers are made up of small molecules called as monomers which combine and form single large molecule called polymer.

When this long chain of monomers breaks at certain points or when lower molecular weight fractions are formed this is termed as degradation of polymer. This is the reverse of polymerization.

In the process of conversion of waste plastic into fuels random De—Po|ymerization is carried out in a specially designed Reactor in the absence of oxygen and in the presence of a proprietary catalyst. The maximum reaction temperature is 350 °C. The plastics are converted completely into value added fuel products.



## Waste Plastics to Fuel: Process brief

### The System

The system will consist of three separate skids. One skid will contain the forced circulation evaporator and catalytic conversion reactor, Catalytic converters etc.; the second skid will include the condensers and collection systems, exhaust gas scrubbers, and the third will consist of Gas Engine Generators. Additional small skids may be provided, based on the detailed engineering of the system and space requirements for the equipment.

The system will function as follows:



### Process brief:

The waste plastics are shredded and conveyed into a hopper. The plastics are then heated inside an extruder where the plastics melt into a liquid mass. The molten plastic mass is pumped into the reactors where the molten plastic is converted into a vapour phase. The vapours exit into a catalytic converter.

The catalytic converter converts the heavy hydrocarbon chains into lighter hydrocarbon chains. The lighter hydrocarbon chains of vapour will then pass into a condenser where the lighter ends are condensed and collected into the storage tank as petrol or gas oil., The uncondensed LPG gas is pumped to a receiver and from the receiver, the same is pumped to the burners in the TF boilers to act as fuel.

