PLUSS®

Pluss Polymers is an offshoot of Manas, established to develop and market new technologies and products developed inhouse. Pluss Polymers was incorporated in 1993 to commercialise the technology for grafted modified polymers and alloys and blends. Backed by competent technical staff, laboratory facilities, a good library and technical database with a retrievable wealth of information marketed the OPTIM® brand of grafted polymers for the first time in India in 1996.

OPTIM® coupling agents and compatibilisers allow plastics manufacturers of world class quality products to *OPTIMise* their compound properties. The ADNYL® range of nylon alloys provide the user with extra tough nylon for increased strength.

Profiles and other rigid and flexible containers for thermal energy storage have also been introduced in India for the first time by Pluss Polymers.

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PET/PE Mixed Waste Recycling

PLUSS®

Introduction

All film converting operations result in trim and other waste. This is quite voluminous and difficult to dispose of.

If the waste is of a single type, e.g., LDPE or BOPP or simple mixtures such as LDPE + HDPE it can be easily reprocessed. However, when it is a laminate waste such as PET/PE (Polyester film laminated with LDPE) recycling is not possible. In such cases incineration is the usual method but it leads to heavy smoke generation resulting in atmospheric pollution.

MANAS have now developed a process to recycle such waste. The process is ideally suited to Indian conditions and no imports of any type are involved.

Products/Applications

Currently the following extruded products are considered feasible: flooring, sheets for architectural uses, e.g., office partitions, roofing - corrugated and otherwise, slats for benches and chairs and generally any extruded sections needing mechanical load bearing capacity similar to aforesaid applications.

The resulting product has mechanical properties intermediate between General Purpose Polystyrene and HIPS.

Process

Basically, the process involves

(a) Compaction of the waste either by agglomeration or shredding followed by extrusion.

(b) Dry the granules, mix with the compatibiliser and other additives.

(c) Extrusion into final usable shapes.

(d) Lamination for decorative finish.

Depending upon the application and type of waste a filler or other additives may be added in stage (b) along with compatibiliser.

Use of a compatibilizer and the control of process parameters is the key to the successful operation of the technology. The compatibilizer has also been developed indigenously and this has kept the cost of the whole process low.

Due to the presence of all kinds of inks in the PET/PE film laminate waste available from conversion industry, the final colour of the product from this reprocessed material is likely to be dark (e.g., olive green). Some further colour variation may be brought about by the presence of metallised film in the waste.

Machinery and Cost

Process is feasible with totally indigenous machines. Equipment cost shall be between Rs. 20-30 lakhs (depending ondegree of sophistication required) for a waste processing capacity of approx. 700 kg/day. The cost shall be Rs. 30 - 70 lakhs for a capacity of approx. 2.0 t/day.

Major pieces of machinery are listed below:

700 kg/day capacity	**2T/day** capacity
Shredder	
Shredder/agglomerator	
65 mm extruder	Extruder
Vibrating screen	
Sheet/profile extruder	
Drier	Vibrating screen
Blender	Drier
Sheet/profile extruder	Blender
Total connected power	
Approx. 100 kw.	200 kw.

Technology

This will cover the following:

a. Details of equipment including purchase specifications.

b. Details of formulation, including compatibiliser.

c. Process parameters/technology.

d. Help with selection of finished products to be produced.

Total cost will depend upon the extent of service required. Commissioning help is available at extra cost.

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