Polyolefins

RECOVERY AND DISPOSAL OF POLYOLEFINS

INTRODUCTION

Owing to an increased use of Polyolefins and other plastics and to increased environmental and liability awareness, especially regarding packaging, automotive and other waste legislation, much attention today is paid to reuse, recovery and disposal of these materials.

As part of its Value Creation through Innovation strategy, Borealis' plastic solutions are developed to allow the reduction, reuse, recycling or safe recovery of waste.

Polyolefins (Polyethylene and Polypropylene) are used in many different products with varying demand of durability. Since the lifetime of a product depends on the usage and of the stabilising system used, it may be noted that:

- It is possible to stabilise polyolefins so that they maintain their mechanical properties for tens of years.
- An unmodified polyolefin product takes many years to degrade in the natural environment.

In order to handle polyolefin waste, the alternatives listed below are available.

MATERIAL RECYCLING

Recycling is an increasingly attractive waste handling method. As for all thermoplastics, polyolefin scrap and well defined waste, such as heavy duty film, drums, containers etc., can be mechanically recycled into new applications. The recyclability depends more on the application and the use of the product than on the polymer. Recycling normally requires shredding, washing and regranulation operations. Recycled material should generally be used in non-critical (e.g. non-food) applications. Polyethylene might also be used as compatibilising agent in mixed plastic applications. Up to 5 % contamination of polypropylene in polyethylene or vice versa will generally not cause problems in mono-material recycling.

Recycling of cross linkable polyethylene compounds containing peroxides or silane and foamable compounds containing a blowing agent is difficult, and the material can mainly be used as filler. Recycling of heavily filled materials and multimaterial structures might be difficult as well.

In all cases of recycling, references should be made to datasheets regarding virgin product, and to the Borealis technical service.

ENERGY RECOVERY

Incineration with energy recovery is the most effective way of handling post-consumer plastic waste not suitable for material recycling. Total combustion of polyolefins will generate only water vapor and carbon dioxide. If inefficient operating combustion equipment is used, and in the event of fire, soot and carbon monoxide and small quantities of organic compounds such as acrolein and other aldehydes may also be formed.

Incorporated organic additives decompose in the same way as the polymers. Inorganic additives used in the Borealis Polyolefins do not contain significant amounts of toxic heavy metals and in most cases additives will remain as clinker.

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Polyolefins have high heat content. The lower heating value is 43.3 MJ/kg for PE and 44.0 MJ/kg for PP (for comparison the value for light fuel oil is 42.5 MJ/kg). Polyolefins can be used very effectively as a fuel substitute in solid fuel furnaces; so called co-combustion.

LANDFILL

Land filling of plastics waste together with other waste is an increasingly restricted solution. Since polyolefins are very stable they will remain undegraded for a long period. Normally only small amounts of additives are used, and they are well incorporated in the product. No hazardous leaching residues will be formed.

However, plastics are too valuable to end up as landfill. Additionally, national legislations and industry standards are increasingly moving to limit or ban this practice. Recycling, Co-combustion and incineration with energy recovery should be preferred.

ADDITIONAL INFORMATION

A Technical Datasheet and a separate Safety Data Sheet are available for each product produced by Borealis giving information on health hazards, firefighting and handling. Please refer to these for more detailed information.

Issuer

This document is issued by Borealis Group Product Stewardship.

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