PREVENT & SAVE

Retailer Packaging Optimisation Case Studies

REPAK
Business *funding* recycling

INTRODUCTION

Plastic packaging has played a crucial role in the development of the complex supply chains that allow us, as consumers, to source the various food products and convenience items we now take for granted on a daily basis.

Plastic has also been an extremely useful material for on-the-go products and enhances safety and convenience over and above other materials for these applications. However, plastic packaging has received plenty of negative media attention in recent times. The issue of marine litter in particular has led to calls for the use of plastic packaging to be reduced by producers and retailers. There have even been calls for outright bans on certain single use plastics. Such reductions or bans on plastic packaging require a cautious and measured approach to avoid unintended consequences.

We must bear in mind that in its various forms, the versatility and light weight of plastic packaging has helped us to reduce packaging weights and transport products in a more efficient way. The barrier properties of various plastic polymers have also allowed us to extend the shelf life of products, improving our supply chains and reducing food waste. Unless there are equivalent alternatives available then it may not be possible to move from plastics without significant risk.

If carefully managed after final use and not discarded irresponsibly, plastic packaging can be a valuable resource which can be recycled back into useful products. It may not always be possible to recycle plastics due to food contamination or other economic reasons however recovering the energy from these materials also allows us to power our homes and businesses.

In Ireland 80% of our plastics are either recycled (36%) or recovered through Waste to Energy (44%).
However we still have some work to do in order to improve our plastics recycling rates and the EU's Circular Economy Package will bring with it targets of 50% recycling by 2025 and 55% by 2030.

As the case studies included within this brochure will show, Repak's retailer members have been leading the way in reducing plastic packaging and preventing packaging waste for many years now and Repak's Prevent & Save Programme has helped to support industry in reducing all forms of packaging waste.

Along with reducing packaging, retailers have also been proactive in examining ways to increase the recyclability of packaging by eliminating composite materials or difficult to recycle plastics where possible and considering recycling sorting processes so that post-consumer packaging waste is easier to recycle.

PLASTICS & PACKAGING

PLASTIC TYPES

Plastics can be divided into three main types as follows:

Thermoplastics
Thermoplastics soften on heating and then harden again on cooling. This makes these materials possible to recycle where facilities are available as they can be reformed into either similar or very different shapes. Thermoplastics include some of the most commonly known packaging plastics used today and include polymers such as Polyethylene Terephthalate (PET - 1), Polyethylene [both High Density (HDPE - 2) and Low Density (LDPE - 4)], Polyvinyl Chloride (PVC - 3), Polypropylene (PP - 5) and Polystyrene (PS - 6).

In terms of resin identification codes as defined by the American Society for Testing and Materials (ASTM), Other - 7 covers all remaining plastic polymers including biopolymers. These polymers are not currently recyclable. See table below for more details.

Thermosets
Thermosets are not normally used for packaging applications. They are extensively used in sectors such as construction for coatings and insulation materials and also in electrical components and car parts. Once they have been moulded into their final shape they cannot be softened and remoulded without causing structural damage to the material. This makes these plastics unsuitable for recycling. Examples of thermoset plastics include Epoxide (EP), Polyurethane (PUR) and Polytetrafluoroethylene (PTFE).

Biopolymers
Biopolymers (sometimes called bioplastics) are polymers derived from biomass (plant based). They may be natural polymers, such as cellulose, or synthetic polymers made from plant-based materials such as Polylactic Acid (PLA). They may also be synthetic polymers which are made from synthetic materials that have been derived from biomass (e.g. Polyethylene derived from bioethanol).

Compostable packaging is currently viewed by many as a viable alternative to certain packaging plastics. Compostable means that biodegradable polymers will biodegrade and disintegrate under standard test conditions of high heat and moisture. A material in the form of a thin film might be compostable, but the same material in a thicker form may not. Compostability is not an inherent property of a material; it relates to the material when it is in a particular form. Compostable materials are often not recyclable and can act as a contaminant in the recycling stream even in small amounts. At present on street infrastructure (bins) is not available to deal with compostable packaging intended for on the go consumption.

COMMON PACKAGING PLASTICS (APPLICATIONS & PROPERTIES)

Source (Soroka, Emblem, & Emblem, 1996)

Plastic Type	Consumer Packaging Applications	Why is it used in Packaging
PET (1)	Bottles, Meat Trays, Fruit and Veg Trays, Films.	- High moisture barrier. - Good gas barrier properties - perfect for processing into bottles to hold water and soft drinks. - Durable - has largely replaced glass for on the go drinks products for safety reasons. - Can be produced in a wide range of shapes and colours. - Lightweight and can be transported in parison (preform) form for transport efficiency.
HDPE (2)	Milk Bottles, Shampoo Bottles, Detergent Bottles, motor oil and garden care bottles, Trays, Crates, Large Drums for industrial chemicals & solvents.	- Versatile and economical. - Low softening point resulting in low processing energy costs. - Excellent moisture barrier for applications such as coated papers where a plastic layer is a requirement to hold out water or grease.
PVC (3)	Cling films for meat, fruit and vegetables and cheeses, blister packaging for items such as medical devices, tablets, batteries and toys.	- Good clarity - Excellent stiffness for applications such as blister packaging. - Useful in film format for cling film and product wrapping applications.
LDPE (4)	Packaging films such as bin bags, fresh produce bags, bread bags, shrink-wrap films and pallet wraps. Other applications include thin wall bottles.	- Preferred for bagged product where good clarity and economy are required. - Excellent heat sealing properties for applications such as flow wrapping, shrink-wrapping or as a heat seal layer for multi-layer laminated materials. - Can be blended with other polymers to improve its tensile strength and stretch properties making it ideal for pallet wrap.
PP (5)	Trays for meat and fresh produce, flexible IBCs and woven sacks, bottle caps and other closures and films.	- By orienting PP you can improve its tensile strength, moisture and grease properties. - Oriented PP can be coated with coatings that allow for use in heat sealing applications.
PS (6)	Extruded PS - Thin Wall Containers e.g. yogurt pots, food trays, closures, disposable cups. Expanded PS - Take Away packaging, closures, EPS cushioning materials and fish boxes.	- Extruded PS - good dimensional stability. - Extruded PS - good chemical resistance to food acids and alkalis. - Expanded PS - excellent insulation properties and is commonly used to pack fish and some meat. - Expanded PS also has excellent cushioning properties making it ideal for protective packaging applications.
Other (7) All other polymers	Huge variation of applications such as returnable Polycarbonate (PC) water bottles, Polyvinylidene Chloride (PVDC) and Polyamide - Nylon (PA) films, Ethylene Vinyl Acetate (EVA) adhesives and biopolymers such as PLA.	- Polycarbonate is a high strength, high clarity material. - PVDC is used in food applications for moisture, flavour and gas barriers. - Polyamides have excellent clarity, abrasion and puncture resistance as well as oil and grease resistance. - The properties of PLA make it useful for rigid packaging formats.

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