

Retail Carriage Packaging and the Environment

This document has been written to answer some specific questions about retail carriage packaging, to help both retailers and customers in the city understand what's involved, and what we can all do to improve our city environment.

Q. What exactly is Retail Carriage Packaging?

A. Retail carriage packaging refers to all the materials used at the point of sale to enable you to take your goods home. Principally this means small boxes and carrier bags, but it can include things like gift-wrapping, tissue paper and gift boxing. In short, anything the shop provides to enable you to take your goods home safely and cleanly.

Q Why do we need this stuff anyway?

A. Retailers regard their bags as a 'trading critical item'; they couldn't survive without them. The tradition of carrying a shopping basket has long been lost, and modern consumers expect their goods to be instantly portable. Today we shop as a leisure activity and on impulse, and are much less likely to be carrying a suitable bag of our own at such times. For the retailer there are two other very important reasons too: their bag is a highly visible marketing tool to promote their business and it is also a hugely important control in the reduction of shop theft. So these materials are a part of how our society's economy thrives. However, if we are using them, we must try to use the environmentally safest and use them again and again.

Q. What are the issues here?

A. 'Plastic bag-free' campaigning focuses strongly on the *litter* problem of polythene single use carrier materials, with a particular emphasis on their contribution to marine pollution and the impact on marine species. However, the types of solution often advocated to solve this element of the problem can often create other environmental ones, in both in manufacture and disposal. These are:

- greenhouse gas emissions
- abiotic depletion
- eutrophication
- transportation
- contamination of the recycling or waste chain

Brighton and Hove Council officers have taken the view that ALL the pollutant and energy depletion factors in manufacture, use and the waste chain need to be assessed when it comes to carriage packaging, *in addition* to the issues of marine and general litter. We are working to find the best environmental solutions so that we can support and assist retailers in making the right choices for their pack, wrap and carriage materials.

Q. Tell me more about those environmental concerns please.

Greenhouse gas emissions occur in the manufacturing process, and in some cases in the decay process, whatever the material being made.

(Please note: paper and cotton are not 'natural' materials. They are manufactured materials from natural elements.) The greenhouse gases we are talking about are nitrous oxide, carbon dioxide and

methane. The 'worst offenders' for all emissions in this category are paper and biodegradable (maize starch) bags. Cotton calico manufacture releases high levels of nitrous oxide emissions.

Abiotic depletion is the consumption in the manufacturing process of non-living finite resources such as oil, coal and gas. Whilst polyethylene is actually made from fossil fuel materials (oil) it still uses two-thirds less of these resources than paper, due to the very high volume of energy use in paper manufacture. (Polyethylene performs roughly the same as thermoplastic biodegradables in this category of depletion.)

Eutrophication is the leaching of nitrates and phosphates into waterways, either straight into the water table or as nitrogen oxides into the air, which then return to the water table. Once again paper is the 'worst' offender, leaching over twice the amount as biodegradables (maize starch) and five times that of polyethylene.

Transportation pollutant refers to the distance travelled and weight of material. As packaging materials come from all over the world they can generate emissions and contribute to congestion in their delivery to the end user. Polyethylene is extremely light, and the transport emission cost is lower than all other alternative materials. Paper products are much heavier and bulkier, requiring more transportation.

Q. What are the materials in use at present in retail carriage packaging?

A. The vast majority of carrier bags are made from polyethylene (also called polythene). This is the sort of carrier bag you get from the supermarket, or, in slightly higher density (gauge) from most other retail stores. This is used most as it is the cheapest, and in manufacturing terms the cleanest, material.

Others are made from paper, or plastic variants such as bioplastics or thermoplastics (made with varying levels of cornstarch as compostable or biodegradable), polyesters, which biodegrade, and modified polyethylene (with an added metal salt to improve the rate of degradation).

Within these overall groups there are many variants in polyethylene, thermoplastics and polybutylene (polyesters).

Today, retailers are increasingly using jute, cotton (calico) and recycled polyethylene as 'bag for life' materials as well.

Q. What's the difference between these types of material when it comes to degradation?

A ALL plastics, like everything else on earth, degrade – but at different rates and in different ways. These are the main types of plastic used now to speed up the rate of decay:

Degradable – now generally refers to a plastic with a metal salt additive to help it break down. The rate of degrade is achieved by rapidly speeding up the disintegration of the long molecular chains that make up the materials. Polyethylene and polypropylene are hydrocarbons, and the additive causes a breakdown in the carbon-carbon molecular bonding. The plastic becomes brittle, and fragments. As the molecular chains continue to reduce in size to very tiny pieces oxygen is permitted to bond with the residual material and produce CO₂. At this stage the material becomes wettable and micro-organisms become capable of accessing the carbon and hydrogen. These types of degradable plastics are often called 'fit for purpose', i.e. they can be engineered to break down to

'on demand' timescales. The technology to deliver this sort of breakdown has come a long way in the last few months.

Biodegradable – generally refers to thermoplastic starch-based materials. These incorporate maize, corn, tapioca or even potato starch into the material. They are attacked by micro-organisms when oxygen and moisture are present. They cannot degrade in Landfill, which is a sealed inert environment. Biodegradables sound friendly, but the residues can be toxic, and if they get into the plastics recycling chain they can cause problems. There are also some forms of polyesters in the biodegradable group of materials.

Compostable – A 'friendlier' form of bio-degradation. These materials undergo biological decomposition just like vegetable waste, and do not leave toxic residues, so can be composted at home or in industrial composters. However, like biodegradables, they are not suitable for Landfill.

Photo-degradable - Broken down by exposure to light. This is not a typical use in carriage packaging, but is used a lot in agricultural plastics for obvious reasons.

Q I don't understand - what's wrong with sending them some of these to Landfill?

A. Landfills are not, as you might picture them, rubbish dumps or heaps. A modern Landfill is a stable, sealed environment. Biodegradables and compostables are not suitable for landfill, firstly as they need an organically active environment to work, and secondly because when they do, they give off harmful greenhouse gases in potentially dangerous amounts. In fact, the European Landfill directive requires that such materials be kept out of landfill.

Q OK, so how long do these materials hang about?

A. Firstly, you may have heard frightening stories suggesting that plastics can take up to 1,000 years to break down. This is an exaggeration. All plastics, like all materials are degradable, and it is possible that some heavy duty plastics may take more than 100 years to break down.

- A typical 'High Street' plastic bag, composed of medium-gauge polyethylene with no accelerators, is designed to degrade in about 30 years.
- Modern biodegradable (starch) bags take about 40-45 days.
- A modern degradable bag, with accelerator additives (the trade names are EPI or D2W) is 'made to order' – with a degradation from 60 days to 5 years depending on the needs of the retailer. For example, a shop that uses only a few bags would need a longer lifespan or its stocks would decay. Big supermarkets can, and do, use a 60 day decay rate on average.
- Paper bags take from 40 days to a year depending on the resilience of the material, although in the sealed environment of Landfill, paper has been found to take as long as plastics, even up to 40 years!
- Jute, cotton and recycled 'bag-for-life' polyethylene take a long time to degrade as they are designed for years of practical use.

Q. How do I know which is best for my waste collection?

A. One of the problems facing Local Authorities is that many of these new materials need different handling methods to process them – and not everyone can do it yet. Imagine your shopping containing a compostable, a biodegradable, a degradable and an an EPI degradable bag! The first one needs an industrial composter if

the householder hasn't got one, the first two should be kept out of landfill, the third one can be recycled and the last one can't!

Different manufacturers are championing different 'green' solutions, and in many cases the material development is ahead of the post-use processing available at point of disposal. Think of it as being a bit like the 'war' between VHS and Betamax – two different technologies delivering the same outcome at the same time.

This is why Brighton and Hove City Council is looking into the best thing for our particular waste chain, and we'll be making sure retailers understand what's best for Brighton and Hove.

Q. Is how much we use as important as what we use?

A. Actually it's probably more important! The biggest and best contribution you can make to eliminating plastic bag litter is to simply use less. If you're a retailer, adopt the habit of asking if a bag is required – you might be surprised these days how many customers will say no. If you're the customer, think before you answer that question, maybe there is another bag you can pop the item in. And when you get your shopping home, make sure you reuse those bags. Most supermarkets and large stores offer bags for life now, and the concern about environmental littering means that there are lots of lifetime-lasting practical, funky, traditional, sexy, smart shopping bags and baskets on the market for you to accessorise with!

Q. What's the Council doing in its shops?

A. The Councils own retail outlets, like the Booklover Store in the Jubilee Library and the Royal Pavilion Shop, are using up the remains of their stock of long-term (30 year) degradable bags. We have decided to replace this with a three year enhanced

degradable, suitable for our city's landfills, as soon as these stocks have run out.

All customers are now asked if a bag is necessary, and we're pleased to report that attitudes are changing fast. In spring we'll also be launching a 'Clean Sea Clean City' bag-for-life, which is made – you've guessed it - from recycled plastic carrier bags! This bag is strong and of a substantial size yet folds up neatly and tidily for the handbag or pocket. If you are a retailer and would like to have them in your own store, contact Camay Chapman-Cameron on 01273 292790. We'll be selling them in all our outlets.

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