

# Domestic mixed plastics packaging

## Recycling Guide





## What is domestic mixed plastics packaging?

**Mixed plastics is a term that covers all non-bottle plastic packaging sourced from the domestic waste stream and includes rigid and flexible plastic items of various polymer types and colours that are typically found in the household bin. It excludes plastic bottles and non-packaging items.**

## Why Produce A Guidance Document Now?

**More and more local authorities are collecting a range of plastics for recycling through their kerbside and bring recycling systems. Following these simple guidelines will enable you to identify which plastics can currently be recycled, minimise contamination, achieve the best prices for your material and optimise your transport costs.**

During 2008 WRAP commissioned research led by Recoup, which provided evidence that mixed plastics packaging could be processed and separated through existing technologies. [www.wrap.org.uk/downloads/Mixed\\_Plastic\\_Final\\_Report.be6128a9.5496.pdf](http://www.wrap.org.uk/downloads/Mixed_Plastic_Final_Report.be6128a9.5496.pdf)

Independently, some of the UK's leading waste management and plastic recycling companies also invested heavily in sorting equipment to process both bottles and a range of other plastic packaging items.

This document provides general guidance and may be used as part of scheme development proposals or define collection instructions. Individual reprocessing companies may from time to time amend their acceptance specifications. If in any doubt you should verify requirements with your buyer(s).

### **MRF's and PRF's: Understanding the Acronyms**

Materials reclamation facility (or MRF) is a well known term for a facility which sorts mixed recyclables. These are commonly found across the UK accepting a range of recyclables including paper, card, cans, plastics and sometimes glass.

In 2008 Recoup identified the new facilities installed to sort plastics as Plastic Reclamation Facilities (or PRF's) – a term which is now becoming more common when discussing mixed plastics recycling. These sites utilise ballistic separation and optical sorting equipment to achieve high levels of plastic separation. These sites provide the opportunity to sort different colours and plastic types for onward sale. It is important that the PRF's can efficiently handle the input materials supplied to provide high quality outputs.



Materials reclamation facility



Plastic reclamation facility



## Primary Principles

These guidelines are aimed at collectors and handlers, with the intention of providing a co-ordinated and consistent specification for those already collecting a range of plastics packaging from households, and providing good practice indicators for others looking to develop mixed plastics packaging recycling systems.

Mixed plastic packaging should not be collected for recycling without a definite and sustainable end market identified in advance. Local Authorities who are collecting mixed plastics should have a full audit trail in place, including details of the waste management company, broker, end reprocessor and end application for the recycled plastics.

The key is to ensure a rational and practical approach, collecting only materials which can be sorted and have sustainable and auditable market outlets. It is important to consider the impact of collecting mixed plastics packaging on the output quality of other sorted materials such as newspapers and magazines, cardboard and steel and aluminium cans.

The addition of mixed plastics into an existing 'plastic bottle' material grade will significantly reduce the overall sales value, but at the same time the tonnage collected will increase. It is not specified in these guidelines whether collectors should mix the bottles and other rigid plastic packaging together. However, the end markets for non bottle packaging plastics are more limited at the current time with consequent commercial implications.

Any local authorities intending to implement mixed plastic collections should discuss collection and handling options with their collection contractors, material handling facilities and plastic reprocessors. Recoup can provide assistance and good practice guidance on a case by case basis. To avoid any unnecessary issues when supplying plastic sorting facilities with plastic, the material description should be as accurate as possible. For example, a grade described as 'mixed bottles' should not contain any other plastics.

## Recyclability By Design

Work has also continued to encourage packaging designers to consider recyclability as part of the design process. This outlines good design where the packaging is fit for purpose, commercially viable, recyclable across Europe and recognises operational requirements of recycling processes. Recyclability by Design (Version 2) provides the packaging designers and retail marketing sectors with additional information to help them assist in producing and purchasing recyclable packaging.

A copy of Recyclability by Design (Version 2) can be downloaded FREE at [www.recoup.org/design/rbdv2](http://www.recoup.org/design/rbdv2)



## So which mixed plastics packaging can currently be recycled?

Initially the focus must be on collecting rigid mixed plastics packaging. This will typically include pots, tubs and trays used in the house, but excluding black packaging. Also excluded should be any form of plastic film. Products used for DIY, gardening and those typically found in the garage (as is the case for plastic bottle collection instructions) should also be excluded.

## MIXED PLASTICS TO COLLECT

DESCRIPTION		YES
Rigid plastic packaging from the household only		

## UNDESIRABLE IN THE COLLECTED MIXED PLASTICS

DESCRIPTION		UNDESIRABLE
Other materials should be removed where possible; caps, lids, closures, seals, foil.		
Food residues should be minimised and removed		

## MIXED PLASTICS EXCLUSIONS

DESCRIPTION		NO
No plastics film		
No black packaging		
No Medical, DIY, garage or greenhouse products		



The inclusion of non-recyclable plastics makes the sorting process more complicated, and increases handling and residual waste costs. It is much easier to 'add in' additional items once the technology and recycling opportunity is proven. We should only be collecting material that meets the reprocessor specifications, not what householders or pressure groups would like to see recycled.

### **Why are the limitations identified?**

It does not make sense to collect materials which cannot be recycled and will be ultimately landfilled. Recoup regard incineration (with energy recovery) as recovery not recycling for the purposes of this guidance.

### **No Plastic Films**

Household films such as carrier bags can be recycled but into relatively low value applications. Therefore some household films are collected, baled and sold to reprocessors, but this is often at a negative value. The plastic film also causes technical issues with the automated sorting equipment, causing mis-sorting and reducing process efficiency. Film covers from plastics trays should also be removed where possible.

### **No Black Plastics**

The main technology used to sort whole plastic items is optical sorting. This technology is based on the reflection of light to identify the polymer or colour type. Since black does not reflect light, any black plastics will not be seen by the optical sorting units and therefore stay within the residual waste fraction. While the black plastic could be sorted manually, or by changing the colour of the conveyor belt, neither are feasible options. The omission of black plastics is also likely to reduce the food waste contamination, and prevent CPET microwave trays from contaminating other PET trays in the recycling process.



Black plastic should not be collected

### **Packaging Only**

Non packaging plastics in the domestic waste stream such as toys and furniture present a number of logistic problems for collection and handling within recycling systems. They can also contain different plastic types and metal inserts which can be difficult to segregate and cause unnecessary contamination.

### **Food Contamination**

One of the key challenges in developing mixed plastics packaging recycling is the potential losses from high food contamination. It is undesirable for heavily contaminated packs to enter the recycling system due to the potential implications for plastic recyclers and other materials, particularly paper. Householders should empty out and rinse heavily contaminated packs to remove traces of food, or alternatively place these items in to the residual bin.



Food contamination



## No DIY, garage or greenhouse products

Those items which are classed as DIY, garage or greenhouse plastics may contain products which can lead to sorting and reprocessing difficulties, and in some cases, severe processing and material quality contamination. While these items may be suitable for niche applications, in general terms these products should be placed in the residual waste bin.



Lids and labels that are integral are not normally classed as contaminants

## The Importance of Material Quality

You can make sure that baled mixed plastics packaging achieve higher prices and more consistent end markets by minimising the level of contamination in the bales. Typically, 2 – 5% by weight of general contamination can usually be tolerated. Plastic lids and labels are integral to packaging are not normally classed as critical or hazardous contaminants, and do not need to be removed before baling. Deliveries with bales found to contain critical or hazardous contaminants will not normally be accepted.

General contamination includes: plastics that have contained substances such as engine oil or paint; plastic film, carrier bags or kerbside collection bags; black plastics, and foreign objects, e.g. cans, cardboard, paper, textiles and cardboard end pieces used to secure baled materials.

Critical contamination is defined as: significantly hazardous items such as glass, sharps, hazardous and DIY, pesticide or chemical products.

In some cases, reprocessors deduct the weight of contamination before calculating the price payable. To avoid confusion before any delivery problems emerge take time to check and understand your buyer's policy prior to issuing local collection instructions and certainly before any shipment. Please note that plastic reprocessors regard bio-degradable plastic as contaminants and may reject loads containing such materials.



Critical contaminants include DIY, pesticide and chemical products

## Can I Shred Plastics?

Reprocessors will normally only accept baled plastic as their systems are designed to separate whole items rather than flake. This makes the contamination easier to identify and remove.

## Communicating The Message

Effective communication strategies will play an important role in the successful development of mixed plastics packaging recycling in the UK. Instructions for householders on what to put out for collection should be unambiguous and easy to follow. Best practice is still being developed in this area, Recoup will be providing shortly some practical examples and tools which will help Local Authorities and Waste Management companies provide easy to follow instructions with appropriate visuals.



flake makes it more difficult to identify contamination and is therefore not usually accepted

## Optimising Transport Costs Through Efficient Baling

You will improve the value of your material by producing dense, tightly packed bales as this will minimise handling and delivery costs. You should aim to generate minimum loads of 15 tonnes. This will typically provide you with the widest choice of markets and optimum pricing. Conversely, loads of under 10 tonnes will be least attractive to reprocessors. Loosely packed bales can collapse in transit and could, as a result, be refused to be handled by the haulage contractor and/or reprocessor. The table below highlights that lower bale density can have a significant impact on the commercial value to collectors of delivered baled material.



Maximise loads

	Low bale weight	Acceptable bale weight	Optimum bale weight
<b>Weight of load (tonnes)</b>	10	15	20
<b>Value of load delivered to reprocessor</b> (based on £100/tonne)	£1000	£1500	£2000
<b>Cost of delivery</b>	£250	£250	£250
<b>Net ex-works value of load</b>	£750	£1250	£1750
<b>Equivalent ex-works value (£/t)</b>	£75/t	£83.33/t	£87.50/t

**\*Based on shipments made on a standard 40ft curtain sided trailer or shipment container**

The selection and operation of your baling equipment is the most important factor in determining the bale density achieved. Recoup has found that most large horizontal balers can be used to bale plastic. A baler with a ram force of over 40 tonnes is generally required. Larger paper balers can often be used to bale plastic successfully. Vertical balers are not recommended for baling plastic.

Balers used to bale other materials should only be used if cross-contamination of sorted materials can be avoided. If you are choosing a new baler that will handle plastic, check with the supplier that the equipment meets the required standards and make this a condition of purchase.



Baling

If you are baling plastic on an existing baler and are not achieving optimum shipment weights, check with the supplier whether it is possible to modify machine settings to improve the performance of the unit. Some operators have increased shipment weights by over 20% and generated extra revenue as a result of this.

A variety of bale dimensions up to a standard "mill size" are generally acceptable. Bales of up to 1.8m x 1.2m x 1.0m dimensions are common. Some bales over mill size are too large to be handled by reprocessors' bale breaking equipment. Very small bales are more difficult to handle and store.



The information within this document was correct at the time of issue and the guidance may be updated in due course as the situation evolves, based on industry led information. This document is supported by the following organisations;



Recoup welcome support of these guidelines. If you would like to add your company logo above in support of this document, have any comments, or would like advice on co-ordinating or developing a mixed plastics packaging recycling scheme, then call us now on +44 (0) 1733 390021.

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