

DIY Case Studies 2021

Recyclability by Design

April 2021



RECQUP



About RECOUP

RECYcling of Used Plastics Limited (RECOUP) is a charity and leading authority providing expertise and guidance across the plastics recycling value chain. Built on a network of valued members, collaboration is central to its activities. RECOUP is committed to securing sustainable, circular, and practical solutions for plastic resources both in the UK and world-wide.

The content and analysis contained in this document is based on the information received. While every effort has been made to ensure the accuracy of the contents, RECOUP cannot accept responsibility or liability for any errors or omissions. Opinions expressed and recommendations provided herein are offered for the purpose of guidance only and should not be considered legal advice.

RECOUP works to maximise plastic recycling through stimulating the development of sustainable plastics waste management, including the improvement of plastics collection and sorting activities across the UK, undertaking research and analysis to identify good practices and remove barriers to the adoption of efficient recycling systems.

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INTRODUCTION: Plastics in the DIY Sector

The DIY and home improvement sector is vast, covering a wide range of categories, from general tools and appliances, to kitchen taps and door knobs. In fact, decorating and DIY retailers in the UK made £7.1 billion in revenue in 2018¹. Although a lot of sectors have been hit hard by COVID-19, this does not seem to have been the case for the DIY sector, with an apparent surge in DIY projects and interior design improvements during lockdowns.

The construction industry is thought to produce an estimated 50 tonnes of plastic packaging waste each year². Although DIY is slightly different, there is still a very high prevalence of plastic packaging, often single use, in the form of bottles, pots, bags, tubes, labels, etc. This packaging is needed for a variety of reasons, for example to house liquids, provide protection to items as well as keep associated items together, such as keeping together a door hook and its accompanying screws. Unfortunately, because of this they are often tailored to meet the need, leaving limited opportunity for re-use, meaning that much is only used once before being discarded.

In the past the vast use of packaging in the sector has been recognised, and WRAP set up the Home Improvement Sector Commitment (HISC). This voluntary agreement between DIY retailers, manufacturers and WRAP aimed to reduce packaging by 15% and the amount of waste being sent to landfill by 50%, between 2007 and 2012. It also aimed to help consumers recycle more, with companies looking to achieve this by improving design of products and packaging, increasing guidance to suppliers as well as consumers, and providing initiatives to make recycling easier³. Valpak also completed a follow up study to this, in which it found that if 1 million units of 5l paint pots were changed to be the 'best in class' option, 83 tonnes of plastic and 207 tonnes of steel could be saved, as well as 113-304 tonnes of carbon and £193,000 - £687,000 in material costs⁴. Clearly there is room for improvement in the packaging space, and quick wins have been identified when it comes to maximising recyclability.

The focus on the plastic waste generated from packaging in the DIY sector has diminished recently compared to the emphasis placed on other sectors like supermarkets. However, large retailers such as B&Q do still recognise that reducing waste is a priority. B&Q are working with suppliers to redesign packaging for key product lines in the hopes of improving efficiency and recyclability without compromising on protection for products. B&Q have stated that PVC packaging is not allowed, and they are aiming for all packaging to be recyclable⁵.

There are many barriers that can hinder the recyclability of plastic packaging as a consequence of the role it needs to fulfil. For example, there can be confusion over contamination and toxicity of the contents of some packaging and therefore this can lead to hesitancy in recycling the item. Lack of guidance on the pack itself can see consumers unsure over how to correctly dispose of packaging in order for it to be recycled, something that can cause issues for items such as paint where it may not be easy to wash or removed dried-on sections. Packaging that is made up of different components can also be a problem if these are not easily separated, or not clearly communicated to consumers that they need to be separated. In all cases, clear and concise on-pack guidance is necessary to ensure the packaging has the best chance of being recycled, something that is often lacking on DIY products.

The aim of this document is to highlight selected packaging within the DIY sector, looking at how items are packaged, what materials are used and how they could be improved. Good and bad packaging designs will be highlighted, determined through factors such as the presence of on-pack guidance and how this packaging would perform through the process of mechanical recycling. The ideal packaging design would offer protection and functionality for the product, as well as being easily separated, sorted and processed through mechanical recycling.



General Principles When Considering Recyclability of DIY Packaging

There are many key points to consider when it comes to packaging for DIY items, for example:

- Small detachable items under 50mm diameter should be avoided if possible as they do not get through the sorting process and are therefore unlikely to be recycled.
- Clear PET, clear and coloured PP, and natural and coloured HDPE all have good current sorting and reprocessing capacity in the UK.
- Unpigmented polymer has the highest recycling value, and the widest variety of end uses. If colour is necessary, strong colours should be avoided.
- Clear and consistent instruction on how to recycle all components of the packaging should be available to consumers through on-pack labelling.
- Collection and recycling of pouches and film are currently less well developed than for rigid bottles, pots, tubs and trays.
- Trigger sprays with glass components, springs or ball bearings are not compatible for recycling and need to be avoided. They also need to be mono material, ideally PP, HDPE or LDPE.
- Mono-materials or mixed materials of the same type should be used where possible, but if not, the different materials should have different densities so they can be separated easily.
- If the item is a bottle, the label should not cover more than 40% of the pack. If it is a pot, tub or tray, the label should not cover more than 60% of the pack.
- Adhesives for labels should be used sparingly to maximise yield and ease of reprocessing. Water releasable adhesives are optimal as they are more easily removed during reprocessing.
- Use of paper labels should be carefully considered, as if they delaminate, they can cause fibres to be carried over into the recycling plastic, causing issues for the quality of the recycle. The paper can also pulp in the wash tank. If they are to be used, they are acceptable if the correct adhesive is used, and are easy to separate for removal during processing.

Further details can be found in RECOUP's 'Recyclability by Design' which can be downloaded here – <https://www.recoup.org/p/173/recoup-reports>.

¹ <https://www.statista.com/statistics/309203/decorating-and-diy-supplies-retail-sales-turnover-united-kingdom-uk/>

² <https://www.swiftpak.co.uk/insights/packaging-waste-in-construction-industry>

³ <https://www.recyclingwasteworld.co.uk/news/diy-sector-making-good-progress-says-wrap/73121/>

⁴ https://www.valpak.co.uk/docs/default-source/case-studies/consulting_wrap_packaging_benchmarking_home_improvement_case_study.pdf

⁵ <https://www.diy.com/one-planet-home/packaging>

Case Study 1: Flexible Bags and Sleeves

Flexible films in the form of bags, pouches and sleeves can be found extensively in the DIY sector. However, the RECOUP UK Household Plastics Collection Survey 2020 found that only 14% of Local Authorities collect plastic film at kerbside, with 42% of those only accepting carrier bags, and others including caveats on what film they can collect. This is because film can be complex for the consumer to sort, can be a challenge for current collection and sorting facilities, and has constraints in terms of economic viability. Film collections kerbside may become more widespread if they are included in the Defra consultation on consistent collections due to come into force in 2023. It is also envisaged that front of store collections at supermarkets may become a more prevalent way for consumers to dispose of their film plastics. Therefore, correct packaging design and guidance are important to give the packaging the potential to be recycled where possible.

High Performance Screws



These high performance screws are packaged in a small flexible bag. There is no indication what polymer the bag is made from.

The packaging does not have any instruction to the consumer on how to dispose or whether the film would be recyclable.

Note: Make sure on pack recycling guidance to citizens is as clear as possible.

Screw-in All Purpose Hooks



These all purpose hooks are found in a fully clear LDPE bag with a small sticker label.

Recycling instructions for the bag are actually printed onto the plastic along with the polymer code.



This is not ideal, as most Local Authorities do not use polymer codes in their instruction to citizens. However, it does indicate to the consumer that the bag is recyclable in certain situations and therefore prompts them to do this rather than dispose in general waste.

LDPE is the same polymer used in films such as bread bags, which display an OPRL logo like the one on the right. If this was included on the packaging for these all purpose hooks it would provide clearer disposal instructions for citizens.

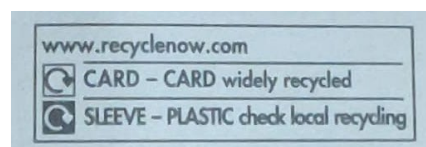


Masonry Drill Bit



The packaging for this drill bit consists of a long thin clear plastic sleeve with a black hanger. There is also a cardboard insert which is easily removable. The plastic is highly flexible and has a blue tint to it, therefore it is believed to be PVC, but there is no polymer code on the pack to verify this.

The cardboard insert does have clear recycling instruction to citizens for both the cardboard and the plastic sleeve, which states the cardboard is widely recycled, but to check local recycling for the sleeve.

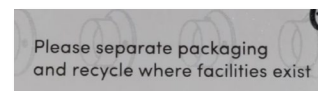


However, this instruction to 'check local recycling' for the plastic is confusing for citizens, as they have nothing to check against. Furthermore, if the sleeve is made from PVC which it is believed to be, then it would not be recyclable as household PVC is not currently recycled in the UK. Updating this guidance with the most recent OPRL labelling would be advisable.

End Socket

This packaging design is slightly different, with the End Socket still housed in a clear plastic bag, but the cardboard header label acts as a seal and is clasped around the opening of the bag where they are stapled together. This design means the components are easily separated before disposal. However, the staples do present a potential risk of littering.

The back of the cardboard label includes the instruction 'please separate packaging and recycle where facilities exist'. This guidance helps citizens recognise the components need separating, however without the presence of a polymer code it is difficult to know whether the bag would actually be able to be recycled or not. Despite this, the instruction prompts citizens to investigate potential recycling opportunities.



Case Study 2: Blister Packaging

Blister packaging is where a sheet of plastic is moulded into a shape to form a bubble for the item and is often accompanied by a cardboard back. It is ideal for protecting items, even unconventionally shaped ones, while also being lightweight, recyclable (if made from a recyclable polymer) and able to provide a clear and attractive view of the product⁶. Due to these advantages, blister packaging is a common occurrence in the DIY sector.

Wall Plugs & Screws



These wall plugs & screws are housed in a clamshell blister pack, where plastic encases both the front and the back of the product. To access the contents the edges pop open and the front swings down on a hinge at the base of the pack. This provides easy access to the product but also to the cardboard insert that can then be separated.

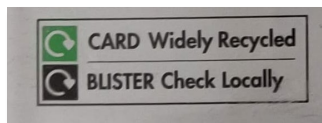
The back of the insert includes the instruction to 'recycle please' however there is no indication on whether this is referring to the cardboard or the plastic (or both), and there is no visible polymer code on the plastic. The cardboard insert and the plastic pack would need to be placed separately for recycling by citizens and there is no guidance on this on the pack.

However, the instruction prompts citizens to investigate the possibility of recycling the packaging.



The recyclability of this product relies on its ability to be seen by citizens as a tray and therefore collected for recycling as part of the pots, tubs and trays fraction.

Button Knobs



This blister pack used for the button knobs covers both the front and the back of the cardboard and is sealed all the way around. This makes it harder for citizens to separate the cardboard insert from the plastic. There is also a bubble on the back of the pack which houses accompanying screws which are also in a plastic bag.

The blister pack is made from PVC with the polymer code punched into the plastic. PVC packaging is not currently recycled and has been identified by the UK Plastic PACT as a problematic plastic. However, the recycling instructions on pack say to 'check locally', something that is therefore confusing for citizens. The instructions also advise that the card is widely recycled, but does not mention the bag for the screws, and therefore this has the potential to be littered or disposed of in general waste.

Note: Avoid using materials that are not readily recyclable.

⁶ <https://www.we-pack.co.uk/advice-centre/guides/blister-packaging-and-clam-packaging-what-they-are-and-why-your-business-should-be-using-them>

Tape Measure



The blister pack used for this tape measure is slightly different as it is made up of a plastic front and a cardboard back, with the plastic sealed to the cardboard around the edges.

Packaging that is a laminate of cardboard and plastic is not currently recyclable as it is very difficult to separate the two components in order for them to be sorted into the correct recycling streams. While this blister pack is not fully a laminate, the seal around the edges could cause the same issue.

There are no guidance or recycling instructions on the packaging meaning it is likely citizens will dispose in general waste.

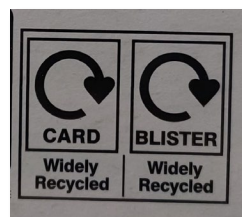
Hex Key Set



This hex key set once again has the blister packaging that covers both the front and back of the pack and is sealed all the way around the edges. Due to this it can make it difficult for citizens to separate the components in order to prepare for recycling collection.

The plastic is PET and is clearly marked as such through a polymer code both punched into the plastic and displayed on the back of the cardboard insert.

There is clear guidance to citizens on recycling, with both the cardboard and plastic marked as widely recycled.



The recyclability of this product relies on its ability to be seen by citizens as a tray and therefore collected for recycling as part of the pots, tubs and trays fraction.

Case Study 3: Bottles

It has been suggested that almost 20,000 plastic bottles are produced by humans every second⁷. Despite all Local Authorities offering kerbside collection of plastic bottles, only around 60% of the bottles Placed on the Market are collected for recycling⁸. It is essential this number is increased to avoid high quality plastic being lost.

Astonish Car Care



This wash & wax liquid is packaged in a black PP bottle with a screw top lid. Black plastic can be an issue when it comes to recycling processes as Carbon Black pigment is strongly light absorbing, interfering with sorting performed by NIR which relies on the reflections to detect the polymer. It is therefore recommended that Carbon Black pigment is avoided.

The screw top lid could potentially be littered as is not tethered to the bottle. The bottle also has significant labelling both to the front and the back which runs close to the 40% benchmark, however much of the label is the same colour as the bottle itself.

There are no recycling instructions for citizens on the packaging.

Insect Repellant

In contrast, the PET bottle used to house this insect repellent is transparent and therefore would pass through the recycling process more easily as well as command a higher recycling value. It has a white screw top lid and a label that wraps around the middle of the bottle. It is recommended the label is reviewed as it likely covers more than 40% of the surface area.

It is very difficult to understand whether a bottle that has been filled with chemicals can be recycled. It is therefore highly important that recycling instruction is included on the label. This bottle includes a small symbol saying 'please recycle', making it obvious to citizens. However, it doesn't state if the lid can be recycled.



Note: Avoid using plastic containing Carbon Black pigment as it cannot be sorted by Near Infrared Technology, and therefore will be rejected.

Spray & Shine



This spray & shine bottle is PET and made from black plastic. It also features a prominent label on both the front and back of the bottle, covering a large proportion of the surface.

As with the Astonish car care bottle, the use of Carbon Black pigment should be avoided as its capability to strongly absorb light interferes with NIR sorting.

Instead of a screw top lid this bottle features a trigger spray nozzle. The mechanics in trigger sprays can feature glass components, metal springs or ball bearings which are not compatible for recycling, and therefore can pose an issue. In order for it to be able to be recycled with the bottle it would also need to be mono material and easily separated.

This bottle does not feature any information or guidance for citizens on recyclability.

Fungus Stop



This bottle of fungus stop is made from HDPE and also features a trigger spray nozzle.

Although the green colour of the bottle is not ideal, it would not cause as much of an issue to the NIR sorting equipment as Carbon Black does, and instead may be suitable for recycling for some applications. It would be sorted into the Jazz HDPE fraction.

The bottle features a clear OPRL label advising citizens to recycle. However, it doesn't state whether the trigger spray can or cannot be recycled.



⁷ <https://www.theguardian.com/environment/2017/jun/28/a-million-a-minute-worlds-plastic-bottle-binge-as-dangerous-as-climate-change>

⁸ RECOUP UK Household Plastics Collection Survey 2020

Case Study 4: Rigid Containers

In the DIY sector rigid containers can be used across a wide range of categories, with their versatility seeing them able to house difficult shaped items, as well as keep multiple associated products together.

Cable Ties



In this instance, the rigid tub is the perfect way of packaging these cable ties in order to keep them all together for the consumer.

The tub is made from clear PET with a screw top lid. It is expected that this type of packaging will not be disposed of in the first instance as its design indicates it would be used to store the cable ties, however being made from a highly recyclable polymer means when the citizen does come to throw away the tub it is able to be recycled.

The tub has 1 small label that is stuck to the front of the packaging but it does not cover more than 60% of the surface area.

There is no instruction to the consumer around recyclability or guidance of how to dispose of the packaging.

Mortice Knobs

Unlike the cable ties, this plastic box used for the mortice knobs would be thrown away immediately after the product is removed. It is clear with a cardboard insert, and the two components are easily separated.

The packaging has no information to citizens on how to recycle, and also has no indication of what polymer is used for the plastic. This makes it very difficult for the consumer to dispose of responsibly, with the potential for high quality plastic to be lost to landfill instead of recycled.



Uno Plug with Screw



This container for the Uno Plugs with screws is made from clear rigid PP with a label that wraps around the top half of the product, but not covering over 60% of the surface area.

As with the cable ties tub, the design of this rigid container suggests it would be expected to be retained to store the screws and plugs for a long period until they are all used. However, being made from PP means that once the citizen has finished using the packaging it is widely recyclable.

That being said, although the fact that it is made from PP is communicated both on the label and punched into the plastic, there are no recycling instructions on the packaging, meaning it may be discarded incorrectly and not be recycled where it could be.

Spax Nails



These Spax nails are also found in a rigid container that would be expected to be retained and used more than once. It has a clear plastic front and a green plastic back, with a label on the front of the pack.

This container is made from Polystyrene, which is not widely recycled. Some Local Authorities may collect it but it is unlikely to actually be recycled. This means the container is most likely going to go to non-circular end destinations, such as EDF or landfill.

Also, if the container was made from a more recyclable polymer, the green pigment used in the back of the pack would still mean it would be separated into the Jazz stream and therefore command a lower end value.

There are no recyclability instructions to citizens on pack.

Note: Avoid using materials that are not readily recyclable.



SUMMARY & RECOMMENDATIONS

Despite the wide variety of products found in the DIY sector, the plastic packaging used to house it tends to follow only a few different base formats, largely those that have been investigated in these case studies. This could be advantageous when it comes to recyclability as a more uniform approach can be adopted, however there is still a long way to go in order to maximise the opportunity in this space and avoid valuable plastics being lost.

In order to ensure packaging will be accepted and processed in the UK's recycling streams, **recyclability guidelines, such as RECOUP's 'Recyclability by Design'⁹ or UK Plastics PACT's 'Design Tips for Recycling'¹⁰ should be consulted.**

The most obvious omission from the majority of the plastic packing investigated was on-pack recycling guidance to consumers. Despite many of the packs being made from highly recyclable polymers such as PET, HDPE and PP, in most cases there was no information to the citizens to place this packaging in their recycling bin. Information like this is imperative to make sure as much recyclable plastic as possible makes it to recycling facilities and contributes to the UK's wider recycling targets. It is also crucial when it comes to bottles housing liquids, as the DIY sector can see some dangerous chemicals (such as antifreeze), and those bottles should not be collected for recycling. Any guidance given should be as clear and direct as possible. Some packs included instruction such as 'recycle where facilities exist' which is confusing for citizens who may not be aware whether this pack would be recyclable in their area, or how indeed to find out. Preferably, OPRL labels should be included, as they are instantly noticeable and recognizable to citizens.

Ideally, **packaging that is made from mono-materials or mixed materials of the same type should be used** in order to maximise opportunities for the packaging to pass through mechanical recycling successfully. However, in many instances the DIY sector sees plastic and cardboard used in conjunction to package the items. In this instance, it is important that the components can be easily separated and consumers are aware they need to separate the components before placing in their recycling bin. Without clear on-pack guidance this could be missed, therefore this is another essential reason why instructions for citizens is a top priority.

In the majority of cases, the plastic used to package the items was clear. This is ideal as **clear plastic has the widest variety of end markets**. However, there were some instances where pigmented plastic, and even black plastic was used. This should be avoided, as heavily coloured plastic is strongly light absorbing and therefore may interfere with automated sorting machinery that uses Near Infrared (NIR) spectroscopy to identify the nature of the plastic. This is because plastic including Carbon Black pigment is non-recyclable, as it absorbs all the light, and therefore cannot be sorted correctly.

As always, **the acceptability and functionality of packaging should not be compromised in order to improve recyclability**. There needs to be a balance between the environmental credentials as well as the economic viability and the capability of the packaging to meet its core function.

⁹ <https://www.recoup.org/p/173/recoup-reports>

¹⁰ <https://wrap.org.uk/sites/default/files/2021-03/WRAP-rigid-plastic-packaging-design-tips-for-recycling-v2-Nov-2020.pdf>

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