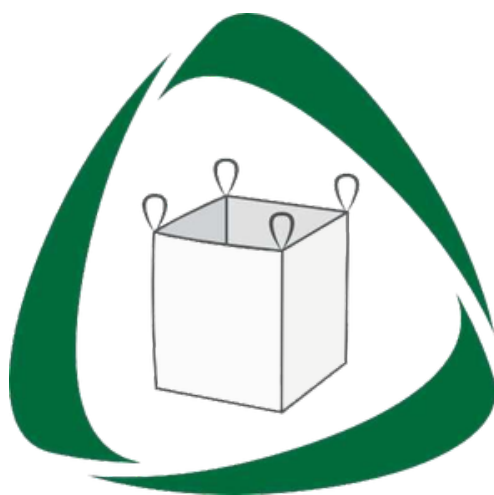




Designed for Recycling

POLYPROPYLENE FIBC





The Design for Recycling guidelines aim to make flexible packaging circular by:



Providing clarity to producers, distributors and users so FIBCs are designed for recycling



Helping increase the rate of recycling of FIBCs



Contributing to higher quality recycle for use in new products

Foreword

This Design for Recycling standard creates the basis for the development of a circular economy for the Flexible Intermediate Bulk Container (FIBC) industry. Only with widespread adoption of these standards will the ambition of a future circular economy be realized.

The ambition of this FIBC Design for Recycling (DfR) standard is to create a harmonised standard that will enable closed-loop recycling in the Flexible Intermediate Bulk Container (FIBC) industry. Closed-loop recycling refers exclusively to the recycling of FIBCs that have been used, reach their end-of-life, and are then recycled into Post-Consumer Recyclate (PCR). The DfR standard recognises that delivering a circular economy for flexible packaging starts with designing FIBCs to be recyclable in common market conditions, without compromising on their functionality and safety.

Work to develop this standard commenced in 2021 and draws on existing guidelines within the wider flexible packaging industry, including the [CEFLEX](#) 'Designing for a Circular Economy' Guidelines ([D4ACE](#)) and [RecyClass](#) Design for Recycling Guidelines. This document represents the work of the members of the industry associations [EFIBCA](#) and [Eurojute](#), and specifically the Circular Economy Working Group (CEW), to identify best practices and reach a common standard for the whole industry.

The standard is based on what is considered best practice in Europe in 2025, the practical experiences made by actors within the FIBC value chain, and the available best-in-class mechanical recycling facilities available in Europe. However, the collection and recycling infrastructure will likely develop in the coming years and understanding of recycling will improve. Therefore, this standard is a living document and will be reviewed regularly and updated to reflect the changing context.

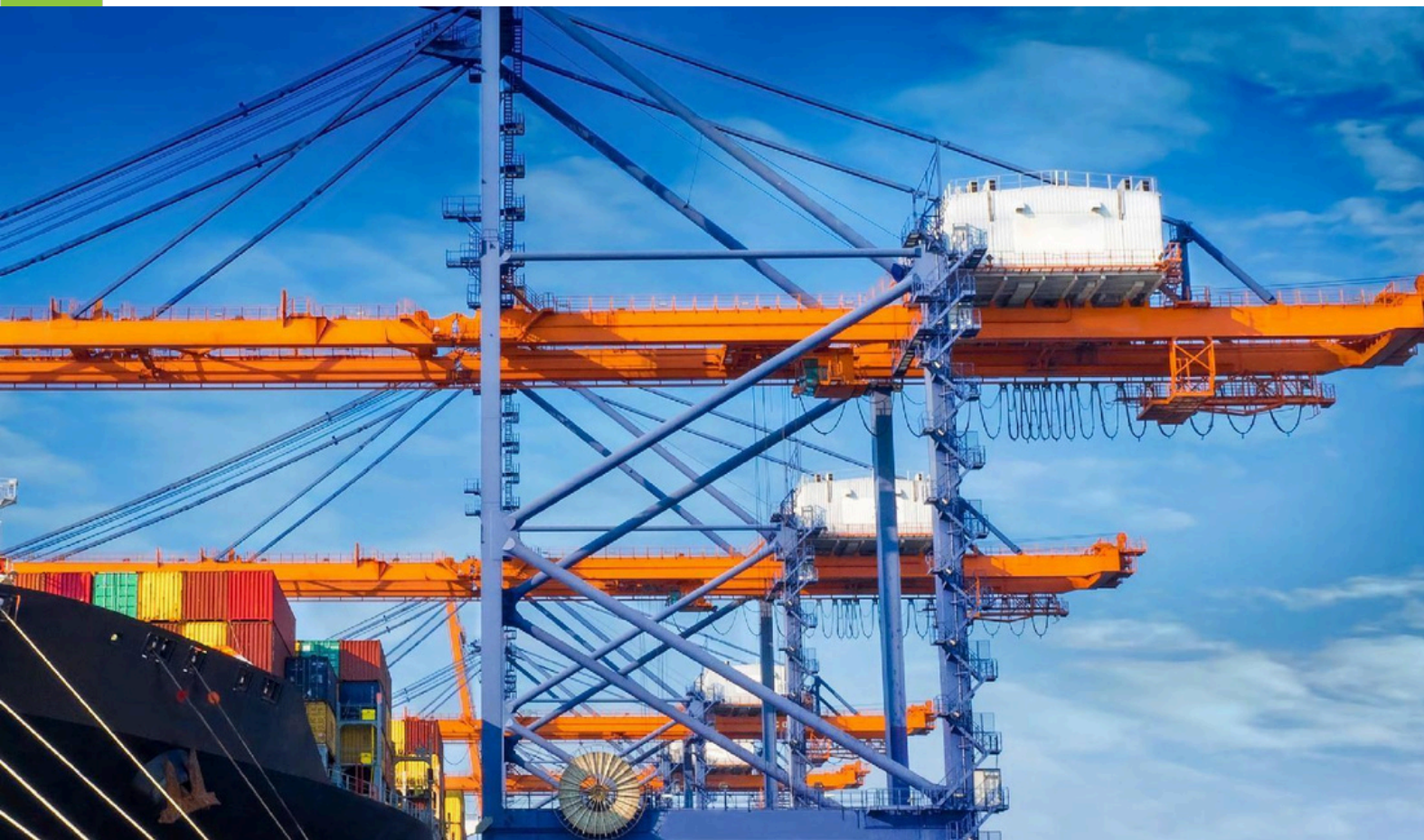
The Design for Recycling (DfR) standard has been developed in good faith by the CEW. This document is offered for all FIBC producers to adopt and use on a voluntary basis. In addition, EFIBCA and Eurojute members that abide by these standards will be able to make use of a common logo signifying that the big bag has been Designed for Recycling in a closed loop.

The EFIBCA & EuroJute Boards

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The main benefits of FIBCs are that they are made of light weight and flexible material, which allows for efficient transport.



Background and Context

FIBCs are an essential part of global value chains, and are used in nearly all sectors. They play a key role in protecting products, preventing waste, and minimising the use of resources needed for packaging.

Current Situation

Flexible Intermediate Bulk Containers (FIBCs) are used extensively in many value chains to transport dry bulk goods. They are an integral part of global trade and logistics supply chains in sectors such as Agriculture, Chemical, Food, Construction, Materials, Pharmaceutical and Recycling industries. It is estimated that 600-700 million FIBCs are used globally every year. The main benefits of FIBCs are that they are made of light weight and flexible material, which allows for efficient transport. Improved designs combined with technological developments in the field of barrier films have led to FIBCs increasingly being used to transport products globally, protecting products from transport and storage waste and with a very high safety requirement. As a result a very wide range of different products are transported in many different types and designs of FIBCs. This complexity of design, the risk of product contamination and the relative cost-efficiency of FIBCs means it is challenging to collect, sort and recycle FIBCs economically.

It is estimated that the majority of FIBCs globally are not recycled. Where FIBCs are recycled, they are recycled into lower grade applications rather than recycled into a quality that can be used to

produce new FIBCs. The objective of this Design for Recycling standard is to enhance the recyclability of FIBCs so that FIBCs can be recycled into new flexible packaging – ‘closed loop’ recycling.

FIBC Materials

FIBCs are typically made from woven polypropylene. This woven material may be coated with polypropylene or a polyolefin blend. The fabric is cut and sewn together to create different FIBC designs. This stitching can be made from a variety of materials, and may be complemented with different types of dust seams. FIBCs may also have a liner to provide further barrier protection to the packaged product. Liners are mostly made of polyethylene, although more complex composite liners including Aluminium, EVOH and PVC are also used. In order to prevent electrostatic charge build-up, FIBCs may be made with anti-static material, while a variety of different labels and inks are used.

This standard covers all FIBCs as defined by [ISO 21898/2024](#). Version 1 covers FIBCs produced from predominantly polypropylene. Future versions will include other materials used for FIBCs.

Methodology

The Design for Recycling standard has been developed by FIBC producers and distributors in collaboration with recycling and technology partners from EFIBCA and Eurojute.

Phased Approach

The FIBC DfR standard is being developed in a phased approach. In the first phase, the focus is on developing an agreed standard for closed-loop recycling of FIBCs, i.e., recycling FIBCs into new FIBCs. The specific focus on closed-loop recycling arises from the particular requirements of FIBC production for a very high quality recycle, even compared to other flexible packaging sub-sectors.

Recycling and sorting technology providers have been demonstrating a new approach for closed loop recycling of PP FIBC's with PE inner liner. Flakes are sorted based on Near Infra-Red (NIR) polymer separation into PP and PE fractions from the shredded material of FIBC with liner after washing. The recycler has achieved >90% PP content in the resulting PP fraction. The solution has now been in commercial operation for >2 years at a recycler together with FIBC producer with success. It allows for using 50% of the recycled PP in the making of new FIBC of same quality level as virgin FIBC. Alternative separation methods, including manual sorting PP from PE, can also give similar results. The liner fraction is also recycled back to other film applications. For this reason, FIBC with PE-Liner can be considered as DfR if manufactured according to this guideline.

In the second phase, the focus will widen to open-loop recycling (also termed 'downcycling'), incorporate the impact of emerging knowledge on additives and other compounds, and include other less common FIBC materials such as HDPE and PET. Testing is needed to better understand all these areas. This standard is therefore very much a 'living' document that should be revised as knowledge is gained and the available technology changes.

Scope

This DfR standard limits itself to assessing the recyclability of the FIBC itself and does not take into consideration the potential impact of any remaining product contamination inside of the FIBC. While this is a severe limitation, it is deemed necessary as FIBCs may be produced and sold without knowing what product will be transported in the FIBC. It is considered more important to promote recyclability with a clear identification of FIBCs that can be used for closed-loop recycling, even though some of these FIBCs will subsequently need to be removed because of contamination by the product. In this area, improvements in the washing infrastructure will be needed to ensure as many FIBCs as possible can be recycled into a high quality recycle.

Compliance

FIBCs produced in compliance with this Design for Recycling standard can be claimed to be closed-loop recyclable. The Design for Recycling collective mark is protected. Criteria for use of the mark are defined and claims of compliance must be documented and withstand controls.



“The Design for Recycling standard is a living document that will be updated regularly as technology develops and recycling knowledge is gained.”





Design for Recycling Standard

The following section defines how FIBCs should be designed in order to be considered Designed for Recycling for closed-loop recycling into new FIBCs. This can also be taken as guidance by users, distributors and producers of FIBCs to redesign existing FIBCs to increase their recyclability.

1. Elements of an FIBC

This DfR standard considers a range of elements of an FIBC that impact its recyclability, including the material selection, interior liners, adhesives, pigments, additives, fillers, printing inks and lacquers, labels, and additional features such as valves and cords.

2. Material selection

The materials used to produce FIBC play a critical role in the recyclability of FIBC. A polypropylene FIBC should be as close as possible to a mono-material. To be considered recyclable in a closed loop, the FIBC must be at least 95% mono-material, FIBC. The FIBC and liners are separable by the recycler if the liners are loose inserted or partially fixated in top and bottom and any additional materials must be compatible with high quality polypropylene recycling. This results in a group of materials that are compatible with mechanical PP recycling, which are allowed up to a cumulative maximum of 5% of the total FIBC weight, and a group that is not compatible with mechanical PP recycling and therefore are not allowed to be used in FIBCs that are Designed for Recycling.

3. Material selection for FIBC liner

The materials used to produce FIBC Liner play a critical role for the recyclability of the liner. A polyethylene film liner should be as close as possible to a mono-material. To be considered recyclable in a closed loop, the liner must be at least 95% mono-material, and any additional materials must be compatible with high quality polyethylene recycling and allowed up to a cumulative maximum of 5% of the total liner weight. This will facilitate both the NIR separation and the material quality after recycling.

Liners are in general not removed during recycling processes. However, some recycling facilities do this manually or through new sorting techniques. If the liner can be removed, the remaining PP material is often cleaner and very suitable for closed-loop recycling. To facilitate and promote this, it is encouraged to use liners that are not fixated or are easily removable.

4. Fixation of liner inside FIBC

For the sake of stability, the PE liner is often fixed inside of the inserted, or partially fixated in top and bottom. Tabs and sewing thread must be PP. Liners which are fully glued or fixed are not acceptable

Ideal	Compatible materials that can be tolerated	Non-compatible materials that are excluded
FIBC in a > 95% PP mono material design, where the additional material can only be a PE or pigments.	Up to a maximum of 10% of the total weight of the FIBC can be made from materials that are compatible with mechanical closed-loop recycling of FIBCs, including PE, additives and colours. Up to a maximum of 5% of the total weight of the liner can be made from materials that are compatible with mechanical closed-loop recycling of LDPE film including PE, additives and colours.	All other materials not mentioned in the list of compatible materials. These materials are not compatible with mechanical closed-loop recycling of FIBCs or the liners. This includes commonly used materials such as polyester or nylon stitching, polyamide rigid components, polyester Velcro, carbon black, barrier materials, metallization, Alu foil laminate. Use of any amount of these materials excludes the FIBC and its liners from being considered 'Designed for Recycling' for the purposes of closed-loop recycling of FIBC's and liners.

3.4 Design for Recycling: Components

	Ideal	Tolerated	Not Tolerated	Explanation and Advice
FIBC Fabric (body fabric, spouts or other fabric components)	100% 'raffia grade*' PP mono-material, no colour or white. *Raffia-grade PP is the grade of PP used for the production of woven-PP fabric.	Other PP grades and material (e.g.non-woven fabric). Up to maximum of 5% of total bag weight : - Polyethylene - Additives (UV and thermal stabilisers, antistatic agents, mineral cavitating agents etc.) - Colour masterbatch - Fillers (Calcium carbonate [CaCO ₃] or other) Additives, masterbatch and fillers are usually compounded in PP or PE as carrying material. If PP carrier is used this does not count towards the maximum limit.	Non PP/PE based materials, for example PET or PA threads. Biodegradable, Oxo-degradable or Compostable materials. Carbon Black components such as black masterbatch based on carbon black, and electrostatic tapes based on carbon black.	Non PP/PE materials cannot be sufficiently removed during recycling and undermine the quality of the recyclate. Biodegradable and compostable materials disrupt the mechanical recycling of PP and contaminate recyclate. Producers must understand if PP or PE based carriers are used and the proportion of polymer vs. additive. The additive, masterbatch and filler, PLUS any PE counts towards the 5% limit. For PP based additives, only the amount of the actual additive should be considered. For example, frequently colour masterbatch consists of 20% pigment and 80% PE or PP. Only the pigment and PE count towards the 5% upper limit. Colour cannot be removed during the recycling process. To facilitate recycling as little colour as possible should be used. Loops are made from similar tapes as FIBC fabric, however coloured loops are often required for operational purposes. Colours should be minimised as far as possible.
FIBC loops	100% PP mono-material, no colour or white.	Same as above.	Same as above.	
Fabric Coating or Lamination	100% PP mono-material, no colour or white.	PP/LDPE co-polymer as long as total of all non-PP elements in FIBC combined do not exceed 5% of total weight.	Special attention that no polyester locking-thread or similar is used. Non polyolefins.	Coating of FIBC fabric is commonly made from PP/LDPE blend. The % non-PP must be calculated based on the mixing recipe.
Stitching	100% PP mono-material, no colour or white.	Coloured PP yarns (excluding carbon black yarn). PE stitching as long as total of all non-PP elements in FIBC combined do not exceed 5% of total weight.	Non PP/PE based materials, for example polyester or nylon yarns are not accepted. Biodegradable or Compostable yarns.	Polyester yarns are frequently used in FIBC design, but significantly undermine closed-loop recycling as these yarns leave thin polyester threads in the recyclate. Polyester yarns must therefore be eliminated for closed loop recycling.
Liners	No liner.	PE Liners as long as total of all non-PE elements do not exceed 5% of liner weight and liners are separable.	Carbon Black yarns. Liners including PVC, polyester, polyamide, EVOH, Alu foil or metallization. Such complex liners made by coextrusion or lamination are not suitable for recycling Black liners using carbon black are also not suitable for closed-loop recycling.	Liners are frequently critical to functionality, preserving the product and preventing waste. However, many liners are usually fixated inside the FIBC and not removed after use or before recycling. Liner types include simple LDPE liners, but also more complex multi-layer barrier liners with aluminium or EVOH. PE liner materials shall be separated from PP FIBC with commercially available flake sorting technology which enable efficient sorting of the PP and PE fractions for the recycling. The recycler is responsible to ensure a proper separation of the liner fraction.

2.1 Design for Recycling: Components (continuation)

	Ideal	Tolerated	Not Tolerated	Explanation and Advice
Accessories	100% PP mono-material, no colour or white.	Non-PP accessories (e.g., HDPE B-Lock), as long as total of all non-PP elements in FIBC combined do not exceed 5% of total weight.	Non-PP/PE accessories such as Polyamide B-Lock, metal zips or hooks, Velcro (polyester) etc.	Non-PP/PE materials negatively impact on the quality of recyclate and should be eliminated from FIBC design.
Labels and document pockets	100% PP mono-material, no colour or white.	Non-PP labels and document pockets(e.g. current PE standard), as long as total of all non-PP elements in FIBC combined do not exceed 5% of total weight.	Non-polyolefin elastomers. Non PP/PE labels (e.g. polyester or metalised material).	Labels and document pockets make up a very small part of the overall FIBC weight and are commonly made from LDPE. Papers must be removed from FIBC document pocket after use. Replacement of paper documents with PP labels is recommended to reduce chance of documents being left in used bags, which undermines recyclability.
Printing	No printing.	Limited printing.		Inks are not removed during washing and printing process and therefore discolour the recyclate, limiting its applicability in future. Printing should therefore be minimised.
Liner fixation	No fixation	Liner is partly fixated.	Fully attached / fixed liners (e.g. glued etc). Liner attached / fixed with any other material than PP (e.g. Glasfiber Tabs).	Liners are often fixed inside FIBC to enhance stability, operations and safety. After shredding, the flakes must be separated and loose to facilitate separation of the PP in FIBC from LDPE flakes with NIR / optical sorting.

4. Other Considerations

4.1 Electrostatic FIBCs

Type A and Type B bags are considered recyclable. Type C conductive yarns based on carbon black are not considered compatible with closed-loop recycling. At this is stage it is not known what impact Type D bags, using antistatic yarns have on the recycling process. This should be investigated before using the DfR-Logo for such bags.

4.2 Colours, printing, and inks

The impact of colours, printing and inks for closed loop recycling needs further research to determine possible impacts. In the first phase, colours, printing, and inks are tolerated and count towards the upper limit tolerated for non-PP materials.

However, colour cannot be removed during the recycling process, therefore it is recommended to keep colours limited.

4.3 Post Consumer Recycled Material

Recycled Polypropylene is compatible with closed-loop mechanical recycling of FIBCs, regardless of the % of the recycled material. Consideration must be given to the amount of non-PP material in the rPP material used. If the recycled material contains a component of co-polymer (e.g. LDPE from labels of recycled FIBCs) this must be accounted for. For rPP the % PP and % non-PP is therefore important.



**This FIBC can be
100% closed-loop
recycled into a new FIBC.**



Design for Recycling Claim

EFIBCA and EuroJute members that produce FIBCs that comply with this Design for Recycling standard can use a harmonised logo to indicate the closed-loop recyclability of their FIBC, together with the optional text “This FIBC can be 100% closed-loop recycled into a new FIBC”.

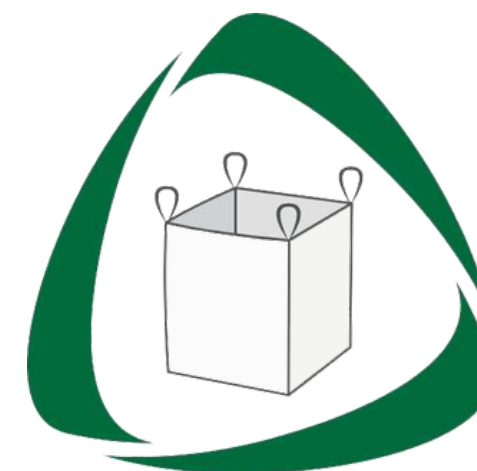
Control

The logo is officially registered by EFIBCA, only for use on products that abide by this Design for Recycling standard. EFIBCA and EuroJute members wishing to use the Design for Recycling logo to show compliance with this standard must sign a declaration confirming they have understood the standard and agree to penalties where the Designed for Recycling claim is incorrectly used.

EFIBCA and EuroJute are empowered to undertake spot-checks and controls to ensure the proper use of the logo and the recyclability claim.

Logo

The Logo has to be placed on a separate label showing the distributors' company details and the EFIBCA registration number.

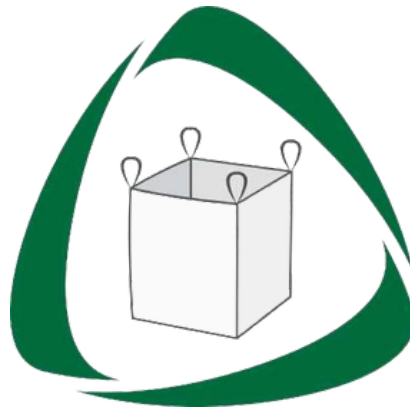


**Designed for
Recycling**
POLYPROPYLENE FIBC

List of Abbreviations

CEW	Circular Economy Working Group, a joint EFIBCA and EuroJute industry initiative
DfR / D4R	Design for Recycling
EFIBCA	European Flexible Intermediate Bulk Container Association
FIBC	Flexible Intermediate Bulk Container
PCR	Post-Consumer Recyclate
PIR	Post-Industrial Recyclate
LDPE	Low Density Polyethylene
HDPE	High Density Polyethylene
PE	Polyethylene
PP	Polypropylene
PVC	Polyvinylchloride
PET	Polyethylene Terephthalate





Designed for Recycling

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For questions related to this standard, the logo,
or to report instances of malpractice, please contact:

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