# FIBRE-BASED PACKAGING

## Introduction

This Quickstart provides design guidance for fibre-based packaging destined for consumer households in Australia and should be utilised by packaging designers to ensure packaging is designed for recycling.

This design guidance was developed alongside the Standardised Test Method for Repulpability Assessment via consultation across the fibre packaging supply chain in Australia. This guidance reflects the recycling infrastructure in Australia and the need for high value recovery of fibre packaging towards achieving the 2025 National Packaging Targets.

## Fibre-based packaging recycling context in Australia

Over half of the packaging placed on the market in 2020-2021 was paper and paperboard packaging (50.3%) at 3,387,000 tonnes. It has the highest recovery rate of material streams at 63%, with room to increase recovery and utilisation of recycled content.

**Note:** APCO's Quickstart Guides are intended to be used when considering the first Sustainable Packaging Principle of the Sustainable Packaging Guidelines (SPGs) - 'Design for Recovery: Design for Material Recycling'.

## Best practice design guidance

**To create a more valuable material with greater functionality once recycled:**

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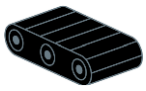
|  | **CONSIDER YOUR PACKAGING FUNCTION**<br>When selecting your packaging materials, consider the functional performance to contain, protect and safely deliver the product to consumers. Packaging needs to be clean, dry and empty to be recycled. |
|  | **USE MONO-MATERIALS TO MAXIMISE RECYCLABILITY**<br>Use only one material for all components if possible. Non-fibre components including coatings and laminates should be minimised to enable the greatest potential fibre recovery, and to reduce losses in the recycling process. |
|  | **DESIGN TO ENABLE SORTING**<br>Ensure that fibre-based packaging is designed to be readily flattened by consumers or through the recycling process. Material Recycling Facilities (MRFs) are designed to generally sort 2-dimensional paper items away from 3-dimensional plastic and aluminium items. |

**To support a circular economy:**

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|  | **INCORPORATE RECYCLED CONTENT**<br>Use the maximum possible percentage of recycled content to help create and support sustainable end markets. |
|  | **INCLUDE LABELLING FOR RECYCLING**<br>Use the Australasian Recycling Label (ARL) to educate consumers on how to correctly dispose of each component of the packaging. |



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## Guide to selecting materials for fibre based packaging

The following table outlines:

- **Preferred:** best practice design of household consumer fibre-based packaging.
- **Recyclable with reduced value:** detail on what are the minimum design requirements to be accepted for recycling in Australia.
- **Avoid:** Things to avoid when designing fibre-based packaging.

| COMPONENT | PREFERRED | RECYCLABLE WITH REDUCED VALUE | AVOID (NOT COMPATIBLE) |
|---|---|---|---|
| **Material** | Wood fibre at a minimum of 95% by weight (including accepted fillers).<br><br>Bleached softwood fibre.<br><br>Unbleached Kraft – end-markets include new packaging.<br><br>Uncoated and untreated glassine<br><br>Other materials must be included at compatible limits – see below. | Wood fibre 85 – 94% of the total weight (including accepted fillers).<br><br>Other materials must be included at compatible limits – see below. | Wood fibre less than 85% by weight.<br><br>Treated and coated glassine.<br><br>**Requires testing:** Non-wood fibre (e.g. bagasse, bamboo) at any % by weight. As these alternative fibres have different properties (e.g. strength), testing is required with results assessed to local contexts for kerbside recyclability. |
| **Plastic laminates, coatings and secondary materials** | For best practice and reduced contamination, aim to include the least amount of secondary materials as possible.<br><br>If required, the following secondary materials are accepted when less than the percentage indicated cumulatively:<br>- PE (HDPE, LDPE, LLDPE) – less than 5%<br>- PP (PP, OPP, BOPP) – less than 5%<br>- PET – less than 5%<br><br>One-sided coatings and laminates.<br><br>Where required, utilise peelable layers consumers can separate from the fibre packaging. | The following secondary materials are accepted when their combined percentage is up to 15% by weight, and their individual percentage is:<br>- PE (HDPE, LDPE, LLDPE) – between 5 - 15%<br>- PP (PP, OPP, BOPP) – between 5 - 15%<br>- PET – between 5-15%<br>- PS – between 0-5%<br>- EVOH – between 0-5%<br>- Steel – between 0-5%<br><br>One-sided coatings and laminates. | The following secondary materials are not accepted at any level:<br>- Silicone **(Under review)**<br>- PVC<br>- PVDC<br>- EPS<br>- Other plastics<br>- Other materials<br><br>The following secondary materials are not accepted if their combined percentage is greater than 15% by weight, or if their individual percentage is:<br>- PE (HDPE, LDPE, LLDPE) – greater than 15%<br>- PP (PP, OPP, BOPP) – greater than 15%<br>- PET – greater than 15%<br>- PS – greater than 5%<br>- EVOH – greater than 5%<br>- Steel – greater than 5%<br><br>**Requires testing:**<br>- PLA<br>- PHA<br>- New coatings and technologies such as aqueous coatings, water dispersion coatings etc. up to 15% by weight when combined.<br>- Waxed, (e.g. baking paper), greaseproof papers.<br>- Double-sided coatings or laminates |



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|---|---|---|---|
| **Additives** | Less than 15% by weight (cumulative).<br><br>Mineral fillers such as kaolin, talc, calcium carbonate and starch do not interfere with the recycling process. | | **Requires testing:**<br>- All Wet Strength Additive at any % by weight.<br>- Any additives greater than 15% by weight (cumulative). |
| **Inks, printing, varnishes and dyes** | Minimal inks. | Cured or UV cured materials should be limited as they are not readily removed by de-inking technologies.<br><br>Inks: UV, fluorescent.<br><br>Dyes: extremely dark colours, particularly black. | |
| **Metallic finishes and layers** | | | **Requires testing:**<br>- Metallic/foil block printing at any % of the surface area.<br>- Metallisation at any % inclusion. |
| **Adhesives** | Adhesives that do not soften during pulping e.g. cold set, curable or water-soluble adhesives.<br><br>Water-soluble adhesives enable separation of layers (e.g. plastic laminates) in the recycling process.<br><br>Those that do not lead to problematic stickies in the recycling process. | Hot-melt adhesives if used in very minor (<5%) amounts.<br><br>Pressure sensitive adhesives. | Adhesives that impact the final product in the paper recycling process.<br><br>Adhesives that do not disperse can agglomerate and become tacky, forming 'stickies'. Stickies can contaminate machinery, cause tears to recycled products and impact product formation. |
| **Additional components (e.g. windows, pull-strip)** | Less than 5% by weight (cumulative). | Less than 15% by weight (cumulative).<br><br>If plastic liners or windows are required, design to ensure they are easily removable by consumers. | Plastic windows, labels and components that are not easily separated from the paper and interfere with reprocessing.<br><br>Rigid metal components (e.g. tear strip or cutting bar for cling wrap). |
| **Product (food and non-food) contamination** | No product residue. | Loose product residue or surface staining.<br><br>Residual and unattached product (e.g. pizza crusts) must be removed before disposal.<br><br>The use of on-pack messaging to advise consumers to remove loose product or food residue before recycling is strongly recommended. E.g. 'Clean, dry & empty' alongside any disposal advice, such as the ARL. | Fixed product residue (e.g. baked on cheese) that is unable to be cleaned and removed by consumers can interrupt recycling process and impact the quality of the recycled material.<br><br>More specifically, food residue can lead to excessive microbial growth and increased risks of pest infestation at Material Recovery Facilities (MRFs) and reprocessors. |



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| **Chemicals of concern** | | Mineral Oils (found in some inks) have been identified as challenging - reduce where possible. | PFAS including fluoropolymers (Please refer to the Action Plan for PFAS in Fibre-Based Food Contact Packaging).<br><br>Substances or precursors of substances listed in Annex XIV of Regulation 1907/2006 (REACH), according to article 64(8) of REACH.<br><br>Chemicals listed on DCCEEW's Chemicals Management page. |

## More information

To support evidence-based design for recyclability, APCO have developed Standardised Test Method for Repulpability Assessment. The method provides organisations a standard process for assessing acceptability of innovation fibre-based materials in Australia.

If your packaging is listed under the 'Requires testing' heading and you have evidence via the approved testing methodology to support consideration of the material/format as recyclable through the ARL, you may bring this matter to the attention of the ARL team by making a Fibre Submission.

- For details on the ARL Fibre Submission process: *Fibre Submissions Process*
- ARL Fibre Submission Criteria Form: *Fibre Submission Criteria Form*

For a comprehensive view of the current state of fibre-based packaging design and recycling, please use the below resources:

- To find out more information about PREP:
  - PREP Design PTY Ltd (2023), available here.
- World Packaging Organisation (2020), *Packaging Design for Recycling*
- Confederation of European Paper Industries (2020), *Paper-Based Packaging Recyclability Guidelines*
- 4evergreen (2023), *Circularity by Design Guideline for Fibre-Based Packaging Version 2*

**Disclaimer:** This document has been developed by the Australian Packaging Covenant Organisation (APCO) with consultation from packaging manufacturers and experts in the waste and recycling industry. The document is intended to be general guidance only and the information contained within has been developed based on current knowledge at the time of publication.

Some information may not be relevant to all packaging types. For specific guidance on individual packaging items and to classify recyclability through kerbside recycling in Australia and New Zealand, please refer to the Packaging Recyclability Evaluation Portal (PREP). PREP is a living and dynamic platform that can be edited or expanded in consultation with a Technical Advisory Committee, as market and infrastructure adapt.



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