FIBRE-BASED PACKAGING

Introduction

This Quickstart is intended to be used alongside APCO's Sustainable Packaging Guidelines (SPGs) by providing a quick guide to design strategies that improve the recyclability of fibre-based packaging in Australia. In accordance with the waste hierarchy and our transition to a circular economy, options for elimination, reduction or reuse should be explored before recycling.

Over half of the packaging placed on the market in 2018-2019 was paper and paperboard packaging (55.1%) at 3,262,000 tonnes. It has the highest recovery rate of material streams at 63%, with room to increase recovery and utilisation of recycled content. The two greatest opportunities for fibre-based packaging are to:

1. Reduce the amount of non-fibre-based components in packaging, which will improve percentage recovery in the reprocessing of fibre.

2. Design fibre-based packaging to be flattened when disposed of. Fibre-based packaging is sorted at a MRF according to its size and shape, with 3D formats unable to be sorted. By designing to be flat or 2D, this provides the greatest opportunity for sorting and recovery.

These two measures will assist in the necessary step changes to improve collection and reprocessing of fibre-based packaging in Australia.

Australian recyclable packaging: actual and targets

Recyclable Packaging	2018-2019	2025
Packaging with good recyclability	90%[1]	100%

NOTE: *This Quickstart is intended to be general guidance only, and the information is based on industry knowledge at the time of publication. To classify recyclability of consumer packaging through kerbside recycling in Australia/ New Zealand, please refer to the Packaging Recyclability Evaluation Portal (PREP). For further guidance, use the links to resources at the end of this document.*

Tips for 'best practice' design for recycling

FOLLOW THE WASTE HIERARCHY AND AIM FOR ELIMINATION, REDUCTION OR REUSE BEFORE RECYCLING

It is important to keep in mind the SPGs and the waste hierarchy to achieve the highest potential environmental value for packaging recovery.

CONSIDER YOUR PACKAGING FUNCTION

When selecting your packaging materials, consider the functional performance to contain, protect and safely deliver the product to consumers. Packaging needs to be empty, clean, and dry to be recycled.

Where packaging is used for food products, consider the impacts of food residue on the packaging. Residual product can mean that fibre-based packaging is unable to be recycled, as this is unable to be separated from the fibre and contaminates the materials. Include additional consumer instructions to remove food contamination if needed. Where excessive residue is still likely to occur, investigate if other materials may be suitable or if another recovery pathway is more suitable for your packaging. Refer to the *Quickstart: Design for recovery, reuse, recycling or composting* for details.

USE MONO-MATERIALS TO MAXIMISE RECYCLABILITY

Paper mills would prefer to not receive any plastic-laminated paper or treated board, and designers should minimise the inclusion of plastic as much as possible.

Use only one material for all components if possible. Aim to improve package recyclability by meeting PREP design requirements. 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. Where treatment/coatings/lining are required to meet functional requirements (i.e. moisture & grease proofing, barrier or surface treatments), chose one that meets criteria for kerbside recyclability (assessed through PREP or a recognised pulpability test for new innovations).
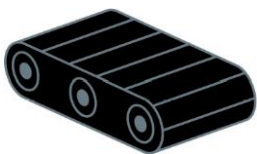
DESIGN TO ENABLE SORTING

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 items. As a rule of thumb, after crushing the item the shortest dimension should be <10% of longest dimension, after you stand on it.

Ensure that small components, e.g. backing cards or price tags, are greater than 50mm in three dimensions. If the items are too small, they will be lost at the MRF and directed to landfill. Utilise messaging 'Place in used envelope' to enable conditional recyclability for these small items through a MRF.

INCORPORATE RECYCLED CONTENT

Use the maximum percentage of recycled content to help create and support sustainable end markets for recycled materials and assist Australia to meet the target of 50% average recycled content in packaging by 2025. Work with your paper/board supplier to ensure recycled content is included without compromising the performance/protection of the contents.

INCLUDE LABELLING FOR RECYCLING

Use the Australasian Recycling Label (ARL) to educate consumers on how to correctly recycle each component of the packaging, including if the packaging needs to be 'flattened' before it can be recycled.

Guide to selecting materials

COMPONENT	PREFERRED	RECYCLABLE WITH REDUCED VALUE	AVOID (NOT COMPATIBLE)
Material	Wood fibre at a minimum of 90% by weight (including accepted fillers). Bleached softwood fibre. Unbleached Kraft – end-markets include new packaging. Uncoated and untreated glassine Other materials must be included at compatible limits – see below.	Wood fibre 85 – 90% of the total weight (including accepted fillers). Other materials must be included at compatible limits – see below.	Wood fibre less than 85% by weight. **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 and coatings	For best practice and reduced contamination, aim to include the least amount of secondary materials as possible. If required, the following secondary materials are accepted when less than the percentage indicated cumulatively: - PE (HDPE, LDPE, LLDPE) – less than 5% - PP (PP, OPP, BOPP) – less than 5% - PET – less than 5% One-sided coatings and laminates. 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: - PE (HDPE, LDPE, LLDPE) – between 5 - 15% - PP (PP, OPP, BOPP) – between 5 - 15% - PET – between 5-15% - PS – between 0-5% -EVOH – between 0-5% One-sided coatings and laminates.	The following secondary materials are not accepted at any level: - Silicone **(Under review)** - PVC - PVDC - Other plastics - Other materials The following secondary materials are not accepted if their combined percentage is greater than 15% by weight, or if their individual percentage is: - PE (HDPE, LDPE, LLDPE) – greater than 15% - PP (PP, OPP, BOPP) – greater than 15% - PET – greater than 15% - PS – greater than 5% -EVOH – greater than 5% **Requires testing:** Coatings or laminates applied to both sides of the packaging, PLA, PHA, new coatings and technologies such as aqueous coatings, water dispersion coatings etc. up to 15% by weight when combined.
Aluminium foil			**Requires testing: Aluminium foil used as a layer in fibre-based packaging at any % by weight**
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. Inks: UV, fluorescent. Dyes: extremely dark colours, particularly black.	**Requires testing:** metallic/foil block printing at any % of the surface area. Metallisation at any percentage inclusion.

COMPONENT	PREFERRED	RECYCLABLE WITH REDUCED VALUE	AVOID (NOT COMPATIBLE)
Non-fibre components including windows	Less than 5% by weight (cumulative).	Less than 15% by weight (cumulative). 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. Rigid metal components (e.g. tear strip or cutting bar for cling wrap).
Additives	Less than 15% by weight (cumulative). Mineral fillers such as kaolin, talc, calcium carbonate and starch can be used as they do not interfere with the recycling process.		**Requires testing:** All Wet Strength Additive at any % by weight. Any additives greater than 15% by weight (cumulative).
Adhesives	Adhesives that do not soften during pulping e.g. cold set, curable or water-soluble adhesives. Water-soluble adhesives enable separation of layers (e.g. plastic laminates) in the recycling process. Those that do not lead to problematic stickies in the recycling process.	Hot-melt adhesives if used in very minor (<5%) amounts. Pressure sensitive adhesives.	Adhesives that impact the final product in the paper recycling process, 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.
Food contamination	No food.	Surface staining - residual and unattached (loose) foods and residual grease e.g. pizza crusts must be removed before disposal. Must label for this to ensure it is clean and empty. This includes additional messaging to remove food contamination.	Baked on food (e.g. sauce, cheese) that is unable to be cleaned and removed from the packaging by consumers.
Other considerations	Tracing paper with no water resistance or product contamination.	If in doubt, use the APCO testing method to confirm.	Waxed, (e.g. baking paper), greaseproof papers. Heavily laminated or foiled wrapping papers. Tissue.
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) Chemicals listed on DCCEEW's Chemicals Management page

More information

To support evidence-based design for recyclability, APCO have developed a pulpability standard methodology. These methods provide organisations a standard process for assessing acceptability of innovation fibre-based materials in Australia and New Zealand.

- ***Standard test method for repulpability assessment***.
- Screening questions to determine the suitability of pulpability testing: ***Considerations for undertaking pulpability testing.***

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

- To find out more information about PREP:
  - ➢ PREP Design PTY Ltd (2021), available at: ***http://prep.org.au/***
- Polymer Coated Paperboard Working Group (2018), ***Key Findings Report***
- World Packaging Organisation (2020), ***Packaging Design for Recycling, A global recommendation for circular packaging design***.
- Confederation of Paper Industries (2020), ***Paper and Board Packaging Recyclability Guidelines***
- For an overview guide on fibre-based packaging including life cycle impacts:
  - ➢ SRU and Helen Lewis Research (2013), Design smart material guide: ***Fibre-based packaging and composite packaging***
- GreenBlue (2011), ***Design for recovery guidelines: paper packaging***
- US Fiber Box Association ***Voluntary standard for repulping and recycling corrugated fibreboard treated to improve its performance in the presence of water and water vapor***
- Western Michigan University ***certification***

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