



PREVENT & SAVE

**Packaging Optimisation Toolkit -
A Packaging Guide for Business**





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INTRODUCTION

This guide suggests an improvement strategy that your business can use to help optimise your packaging and save money.

The benefits of packaging optimisation to Repak members are many:

- Reduced packaging costs
- Reduced packaging waste costs
- Reduced energy bills
- Reduced packaging weights through innovation

The guide also explains the background to packaging waste prevention and minimisation and discusses the important role that packaging plays in getting your product to market.

PACKAGING WASTE PREVENTION

Although Ireland’s performance in increasing packaging recycling rates since Repak was established in 1997 has been good, there is now an emphasis on reducing the amount of packaging used to package everyday products and prevent packaging waste.

As the EU’s circular economy package comes to fruition in the form of new packaging waste legislation, businesses will now face new challenges as the focus increases on reducing packaging, maximising resource efficiency and meeting higher recycling targets.

Fig. 1 shows that packaging prevention/ minimisation or reuse options are more favourable than recycling, recovery or disposal options for dealing with our packaging waste.

As the packaging recycling rate is calculated by dividing the quantity in tonnes of packaging material recycled by the total tonnes of packaging waste placed on the Irish market, it is therefore possible to achieve an increase in the recycling rate in two ways;

Packaging Recycling Rate =

Packaging Material Recycled

Packaging Waste Arising on Irish Market

1. Find ways to **increase the tonnes of packaging recycled** in relation to the overall amount placed on the Irish market.
2. **Reduce the total tonnes of packaging waste placed on the market** by preventing the use of certain packaging or maximising its efficiency as a resource through reuse.

HOW CAN REPAK HELP?

To assist Irish businesses to recognise opportunities to prevent or reuse packaging, Repak introduced its free packaging technology service Prevent and Save to all members in 2007.

The programme provides Repak members with the expertise of packaging technologists in order to identify opportunities to reduce packaging material use, reduce cost and prevent waste.

The programme also forms part of the National Waste Prevention Programme and is supported by the Environmental Protection Agency and the Department of Communications, Climate Action and Environment.

Measures include case studies, publications, seminars and best practice initiatives.

Repak’s Pakman Awards also rewards members who implement waste prevention initiatives that reduce packaging placed on the Irish market.

Apart from developing these specific measures within the Prevent and Save Programme, Repak is working very closely with its members to examine ways of preventing the growth of packaging and to maximise recycling. The aim of this co-ordinated approach is to encourage all key players to optimise their packaging systems and to provide them with the tools that allow them to achieve this.

There are already economic incentives to reduce excess packaging. Businesses are consistently looking to reduce their product costs while Repak’s ‘pay by weight’ fee structure is designed to discourage companies from producing excess packaging.

At the back of this booklet are a number of tools and resources which can be used to optimise packaging or reduce packaging waste. There are also case studies showing how Repak members have employed these tools in order to reduce the amount of packaging they place on the market.

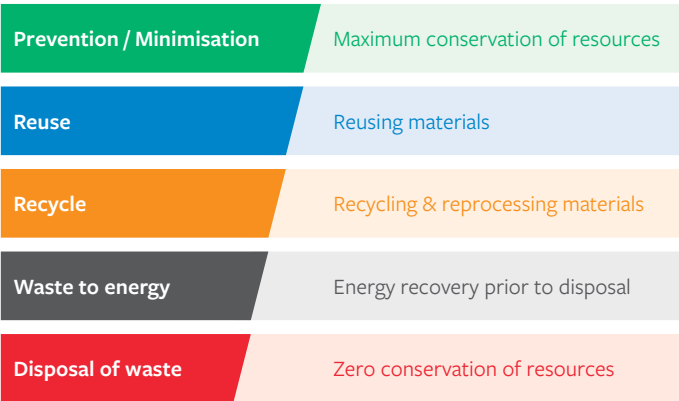


Fig. 1: The Waste Hierarchy

UNDERSTANDING PACKAGING

WHAT IS PACKAGING?

Packaging is best described as anything used in the containment, transport, handling, protection, marketing or sale of a product. The challenge for a business is to use the correct packaging relevant to the product which it surrounds. This means that an understanding is required of the packaging process, the functions packaging fulfils, and what happens to packaging once it has been removed from a product. This latter consideration is often where the least focus is placed.

To prevent waste, current legislation requires that packaging be designed to use the minimum amount of material to fulfil its function. Packaging should also facilitate reuse, recycling or recovery. As Europe moves towards a circular economy, new legislation means that more of our packaging will need to be reusable or recyclable.

PACKAGING TYPES

Consumer packaging is designed to attract a consumer in a retail sales environment. Industrial packaging on the other hand is defined by supply chain requirements as it is designed to deliver product from one manufacturer to another. It is generally not seen in the selling environment as a result.

Primary Packaging

Primary or sales packaging is that which surrounds a product when sold to a final consumer and includes its label and closure system. Primary packaging is often the primary sales tool for a product and requires strong stand out branding to convince the consumer to buy your product over another similar one.

Primary packaging also communicates key legislative text such as product shelf life and food information to consumers. It is also the packaging that consumers are most likely to critique if it is of poor quality, is not user friendly, is excessive or if it cannot be recycled.

Secondary Packaging

Secondary or grouped packaging collates a number of primary packs for handling within the selling environment. Examples include a carry out pack of 24 beers or a shelf ready cardboard box used to display shampoo bottles.

Tertiary Packaging

Tertiary or transport packaging is that which is used to facilitate handling and transport of a number of secondary packs in order to prevent handling and transport damage. Examples include wooden pallets, pallet wrap and layer pads.

FUNCTIONS OF PACKAGING

Containment

Packaging helps to contain a product so that it cannot leak into the environment, react with its surroundings, react with the packaging itself or become contaminated. The nature of the product dictates the packaging used and it is critical to consider this before designing or modifying the type of packaging currently used.

Preservation

Preservation of a product in packaging involves delaying chemical or biological changes that lead to deterioration in order to extend shelf life. It is therefore important to determine if your proposed changes will require product shelf life or stability testing before implementation.

Selling and Informing

Packaging is not only the primary sales tool for a product, it must also communicate important and legal information such as directions for use, nutritional information and product use by or best before date.

Protection

Protection involves guarding a product against physical damage such as shock, vibration or compression damage. Distribution packaging such as corrugated cardboard boxes are commonly used to serve these functions. Other examples of packaging that can provide extra cushioning include moulded pulp packaging and plastic blister packaging.

Convenience and Handling

It is important to consider if changes to primary, secondary and tertiary will negatively impact how the product is handled throughout the supply chain and most importantly by the final user. For example if a packaging change saves on material and cost but means that the pack becomes more difficult to open by the consumer, then it may increase complaints or even impact on sales.

DEVELOPING A PACKAGING STRATEGY

MOTIVATE MANAGEMENT AND STAFF

Get management buy in to ensure that you have the resources and tools needed.

Involve staff and recognise and reward them for their achievements.

Assign a project manager to coordinate activities.

SURVEY PACKAGING SYSTEMS

Consider all primary, secondary and tertiary packaging.

Determine net product weight, packaging weights and product sales volumes from internal documentation.

Consider both supplier packaging (inputs) and finished product packaging (outputs).

Calculate the Packaging Ratio by comparing the packaging system weight to the weight of product it contains (See page 8 for assistance in calculating the Packaging Ratio).

IDENTIFY AND PRIORITISE PROJECTS

Consider what products have the highest production volumes and can generate the greatest savings.

Investigate what can be done without capital investment at no or low cost.

Review packaging designs that have not been changed or redesigned recently.

Consider products that have the highest packaging ratio and where most packaging waste is generated in the business.

Determine suppliers that you can work with to reduce packaging or set up return/ reuse opportunities.

Look at where you can increase the recyclability of packaging.



SELECT APPROPRIATE TOOLS AND SUPPORT SERVICES

Decide if your business needs external supports such as packaging testing services, training or support from your supplier to increase packaging expertise within your company.

Write a packaging policy to communicate packaging priorities to staff, suppliers and customers and develop packaging specifications to ensure that packaging supplied fits with your process and priorities.

A packaging design brief can be used to ensure that the most important issues are considered when developing your product's packaging.

Use the techniques outlined below to help reduce supplier packaging (input) and finished product packaging (output). These techniques may also help you to increase the recyclability of packaging or reuse/ return more packaging.



IMPLEMENT STRATEGY

Once all the planning is completed and you have selected appropriate tools you can implement the strategy.

Ensure that you are aware of what you wish to achieve and where you have come from so that it can be measured through the packaging ratio calculation (See page 8).

Set strict protocols on how packaging trials will be conducted and what success looks like in terms of operational performance, transport and handling (it should be equivalent or better than your current packaging solution).



REVIEW AND REFINE

Review the strategy to ensure that you have achieved the goals set out at the beginning of the process.

Keep in touch with new packaging technologies through your suppliers and by benchmarking against competitors.

Refine your strategy to account for new technologies and changes to your own business that might allow you to invest in packaging equipment or reduce packaging even further in the future.

EXAMPLE: SURVEYING PACKAGING SYSTEMS

The best way to identify packaging reduction priorities is to establish the weight of packaging used on a particular product versus the weight of that product. This is called the product: packaging ratio and is a useful calculation to understand products within your range that contain the most packaging per product weight. Using this information then allows you to understand potential targets for packaging reduction.

The following examples shows you how to do this.

A manufacturing company makes two beverage products that are sold in cardboard boxes containing 12 units and 24 units. Product 1 is a 150 gram juice product and product 2 is a 300 gram water product.

Packaging weights are as follows:

Product Name	Bottles per Case	Bottle Weight	Empty Box Weight	Boxes per pallet	Empty Pallet Weight	Pallet Wrap Weight	Annual Volume
12 x 150g Juice	12	30g	100g	75	25kg	320	200,000
24 x 150g Juice	24	30g	150g	50	25kg	400	100,000
12 x 300g Water	12	50g	200g	60	25kg	320	150,000
24 x 300g Water	24	50g	250g	40	25kg	400	75,000

Therefore the Packaging Weight expressed per Box of Product is as follows:

Product Name	Weight of Bottles x No. per Case	Empty Box Weight x 1	Empty Pallet Weight / No. of Boxes per pallet	Pallet Wrap Weight / No. of Boxes per pallet	Packaging System Weight
12 x 150g Juice	360g	100g	333g	4.266g	0.797kg
24 x 150g Juice	720g	150g	500g	8g	1.378kg
12 x 300g Water	600g	200g	417g	5.333g	1.222kg
24 x 300g Water	1.2kg	250g	625g	10g	2.085kg

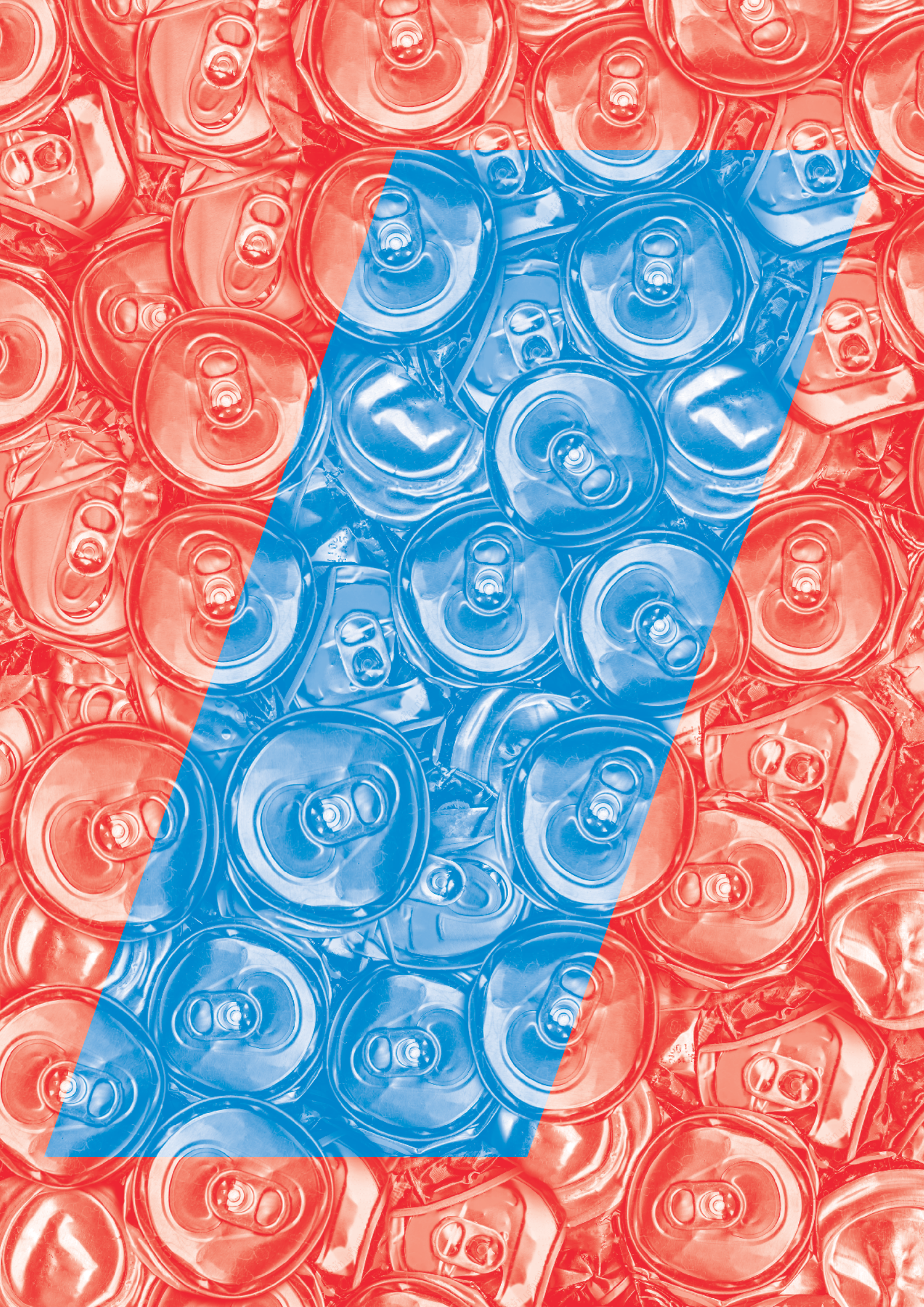
By dividing the packaging weight per case by the net product weight we can then calculate a Packaging Ratio for each product.

Product Name	Packaging System Weight	Product Net Weight	Annual Volume	Product Weight x Annual Volume	Packaging System Weight x Annual Volume	Packaging Ratio
12 x 150g Juice	0.797kg	1.8kg	200,000	360,000kg	159,400kg	44%
24 x 150g Juice	1.378kg	3.6kg	100,000	360,000kg	137,800kg	38%
12 x 300g Water	1.222kg	3.6kg	150,000	540,000kg	183,300kg	40%
24 x 300g Water	2.085kg	7.2kg	75,000	540,000kg	156,375kg	29%
Weighted Totals				1,800,000kg	636,875kg	35%

This ratio shows which packaging systems are the most efficient. Looking at the Packaging System weights in isolation would suggest that the 24 x 300g Water product contributes the highest amount of packaging. However when expressed against product weight it actually contains the least amount of packaging.

The above allows an analysis of individual packaging systems. However by considering total sales volume, a weighted ratio can be obtained for the company's entire product range.

The above example gives a weighted packaging ratio of 35% for the four products considered. Armed with this information you can set a target or benchmark for the company as a whole. Products above this benchmark can therefore be earmarked and investigated further for packaging reduction opportunities.



TOOLS & RESOURCES

The below tools and resources may be useful when optimising packaging where in house facilities or resources do not exist. These services include packaging advice from Repak, along with other examples of external resources such as training options and package testing facilities. It is essential that the project is described accurately and parameters for testing specified correctly for the project to be successful.

A. PACKAGING ADVICE

As part of the Prevent and Save programme, Repak provides advice on packaging optimisation on its website at www.repak.ie/preventandsave.

We would also be delighted to offer you free support at your premises with a detailed on site survey to identify where you can optimise packaging, reduce waste and save money.

B. PACKAGING TRAINING



The Irish Packaging Society provide packaging training through its range of Packaging Technology courses. For more information please contact Chairman David Little – davidlittl@gmail.com or visit www.iom3.org.

One example of a course provided by the society is the internationally recognised Diploma in Packaging Technology.

This course consists of modules that provide the learner with a broad context on packaging and its application.

Unit 1 Packaging in Today's World

This Unit introduces learners to the subject of packaging by examining what packaging is used for and what it does for the product and the user, both within its broad social, economic and marketing context, and meeting its specific functional and aesthetic requirements. Emphasis is placed on understanding product properties.

Unit 2 Packaging Materials and Components

In this Unit learners study the main packaging materials: glass, metals, paper/board and plastics, along with pack closures, adhesives and labels.

The raw materials, manufacturing processes and conversion processes used for high volume packaging materials and components are studied. Performance throughout all stages is considered.

Market uses and applications, along with the influencing factors which affect current and future usage are also reviewed.

Unit 3 Packaging Processes

In this Unit, participants study in detail packaging machinery and packaging line operations.

The Unit also introduces participants to many of the management functions associated with the design, development, production and use of packaging materials and components. These include design, decoration, line operations and quality systems.

Throughout this Unit there is a requirement for a high level of knowledge and understanding of materials properties, as studied in 'Packaging Materials and Components'.

Unit 4 Packaging Related Research Project

This Unit is designed to enable candidates to apply what they know and have learned about packaging to a concrete research project perhaps in their own company. This involves specifying what is to be learned, carrying out research and tests and reporting on their findings.

C. USE YOUR SUPPLIERS



Your supplier is the best source to help you understand your current packaging and how to get the best packaging solution for your product and its supply chain. Smurfit Kappa Ireland offer their customers a consultancy service called the Packaging Audit. Packaging accrues costs as it moves through the supply chain, from incoming raw materials to finished goods transportation and storage, through to final packaging disposal. The sum of all these costs is the 'Total Cost of Packaging'.

Benefits

The aim of Smurfit Kappa's packaging audit is to minimise the total cost of packaging for the customer and are therefore most successful when all supply chain stakeholders are involved from marketing and purchasing through to operations, engineering and logistics. For more information or to avail of the Packaging Audit service please contact Joe Kennedy, Design Supervisor at 01 4090021 or email Joe.Kennedy@smurfitkappa.ie.

D. PACKAGING TESTING



Anecto are an ISO17025 accredited test facility that provides world class support to product designers, developers and manufacturers. Anecto's test centre in Galway employs the latest testing capability and equipment to achieve compliance to product and packaging standards such as ISTA, ASTM D4169-o8 and ISO 11607.

Anecto also provide consultancy services and have the experience and resources to respond to the needs of newly formed start-ups as well as large multinational companies.

Their general consultancy is specifically structured to help start-up companies gain a foothold in the market. Whether you require consultancy on design, on what tests your product needs to undergo, or you require advice on any legal directives that need to be followed, Anecto can respond to this need.

Benefits

Anecto provide services such as Package and Transportation Testing, Cold Chain Testing, ISO 11607 for medical device packaging, package and integrity testing and dangerous goods package testing. These services can provide compliance with international standards, can eliminate unnecessary waste and cost and can determine the most appropriate packaging for your needs. For more information on the services provided by Anecto please contact David Morrissey at 091 757 404 or email dmorrissey@anecto.com.

E. PACKAGING POLICIES AND SPECIFICATIONS

Developing a packaging policy communicates your packaging priorities to staff, suppliers and customers while specifications allow you to implement that policy with your suppliers through receipt of packaging that meets those priorities. Priorities might include preventing packaging waste, ensuring that packaging is reusable, that all packaging is recyclable or that packaging contains recycled content.

However conflicts can arise when deciding on packaging priorities. For example using a lightweight plastic may mean using a less recyclable material, however it may also be the best option to enhance shelf life and reduce food waste.

Benefits

Some of the benefits that can result from implementing packaging specifications for materials are as follows:

- Reduced back door waste due to excess plastic or cardboard materials on pallets from suppliers.
- Allows you to specify returnable pallets rather than single trip pallets.
- Greater control over changes by suppliers to ensure trialling and approval in advance.
- Opportunity to reduce and minimise the amount of packaging while maintaining functionality and integrity.

Contact our Packaging Team for further advice on Packaging Policies and Specifications.

F. REPAK PACKAGING SUPPORT & CONTACTS

Repak's packaging technology team are available to support your business to improve packaging systems and optimise packaging. To avail of our Prevent and Save service please do not hesitate to contact one of our packaging technologists to arrange a site visit.

Our team can also provide you with information on packaging test facilities, packaging advisory services and pallet optimisation software for proposed packaging changes.

The Repak website also contains the following:

- Example case studies including best practice projects implemented by Repak members.
- Tips and advice on how to optimise packaging.
- Information on the "Essential Requirements" of the packaging legislation with regard to prevention and minimisation.

Visit www.repak.ie/preventandsave for more information

For information on all of the services provided by our packaging technology team please contact Brian or Colm at:

Phone **01 4670 190**
or email prevention@repak.ie

Repak Limited,
Red Cow Interchange Estate,
1 Ballymount Road,
Clondalkin,
Dublin 22

G. PACKAGING DESIGN BRIEF & CHECKLIST

It is often useful to follow the guidance of a checklist when designing packaging for new products or changing existing ones. This can result in large cost savings. For example a change to an existing outer die cut design might allow you to reduce board grade. On a high selling product this could result in significant cost savings.

By using a checklist you get:

- An overview of how the packaging system elements relate to each other.
- Savings in procurement costs due to tighter packaging specifications.
- Reduced producer responsibility fees.
- Less storage space requirements.
- Reduced transportation costs for finished goods.
- All design considerations captured.

Product Name:	Product Declared Weight:	Market:	
PRIMARY PACKAGING	Guidance	Complete?	Notes
Barrier properties	Suitability? Recyclable?	☐	
Material Type	Easily recyclable for end-user?	☐	
Composite/Non composite	Avoid composites where possible.	☐	
Material Dimensions	Minimum dimensions?	☐	
Material thickness	Minimum thickness? Affect on product?	☐	
Formed on-site / bought-in?	Can packaging be formed on-site?	☐	
Colour	Affect on recyclability?	☐	
Closure	Same material as main pack? Easy Open? Tamper proof?	☐	
Label	Same material as main pack? Easily removed?	☐	
Print	Are printer ink containers returned to suppliers?	☐	
Primary Packaging Weight	Minimum weight?	☐	
Shelf facing	Optimum configuration? Agreed with Sales? Marketing?	☐	
SECONDARY PACKAGING	Guidance	Complete?	Notes
Packing configuration	Most efficient packing configuration?	☐	
Pack Quantity	Optimum pack quantity?	☐	
Material Thickness, Grade	Most suitable grade of material?	☐	
Pack Dimensions	Minimum size? Minimum headspace?	☐	
Pack Weight, Type	Suitable protection for primary packs?	☐	
Shelf-Ready packaging	Required? Best design?	☐	
Material types	Suitability? Minimum weight?	☐	
Donnage Material	Required? Recyclable?	☐	
TERTIARY PACKAGING	Guidance	Complete?	Notes
Pallet Type	Appropriate for secondary packaging? Appropriate for transport container?	☐	
Pallet Material	Durability?	☐	
Pallet Stacking pattern	Optimum pattern for: pallet height, container headspace, Health & Safety limits?	☐	
Layer sheets	Required? Material type? Reusable? Cardboard from other process?	☐	
Corner Posts	Required? Affect on secondary packs?	☐	
Banding	Suitable? Metal or plastic? Recyclable?	☐	
Stretchwrap / Shrinkwrap	Minimum gauge? Efficient wrapping?	☐	
Reel cores	Returnable?	☐	
Stretchwrapper settings	Equipment maintained? Settings optimised?	☐	
Container size	Optimum size? Transport conditions?	☐	
Storage Facility	Racks suitable size for pallets? Suitable for product journey?	☐	
GENERAL	Guidance	Complete?	Notes
Legislation	Essential requirements? Hazardous substances?	☐	