



PackLAB



PackLAB

*A Guide to Sustainable
Packaging Solutions*



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*A Guide to Sustainable
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www.jamnik.si/en/packlab.html



Dear Reader,

In today's fast-paced and competitive market, packaging plays a much greater role than mere product protection. It shapes first impressions, communicates brand values, enhances user experience, and reflects a company's commitment to sustainability.

PackLAB was developed as a dedicated information hub for professionals seeking in-depth, reliable guidance on custom cardboard packaging. Whether you are a designer, developer, buyer, or brand owner, you'll find actionable insights, technical expertise, and real-world examples to help you navigate materials, printing techniques, and structural solutions.

Drawing on decades of experience in producing sustainable, high-quality cardboard packaging, we've created PackLAB to be your trusted companion – a single access point to knowledge that empowers better decisions, inspires innovation, and supports your packaging development journey.

*Welcome to PackLAB,
where packaging knowledge meets purpose.*

Your Jamnik Packaging team





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The circular economy represents a shift to a system where materials and products remain in use for as long as possible.





Types of cardboard

The difference between cardboard and paper lies primarily in their load-bearing capacity. Cardboard is multi-layered and usually coated only on one side (most commonly matte), whereas paper is coated on both sides (matte or glossy) and consists of a single layer. Their intended use also differs: paper is used for commercial purposes such as brochures, folders, catalogues and magazines, while cardboard is mainly used for packaging.

At Jamnik, we manufacture packaging from solid and corrugated cardboard. **Solid cardboard** is significantly sturdier than corrugated cardboard. Due to its density and single-layer structure, it has a high load capacity and resistance to various stresses. Therefore, it is used for packaging, folders, covers, and other products that require greater strength.

Solid cardboard has a smooth and flat surface, allowing for easy printing, drawing or gluing. Its rigid structure provides high stability and stiffness. This means it retains its shape and does not easily deform under loads or under pressure. It is generally less sensitive to moisture than corrugated cardboard. Its density and smooth surface make it less prone to moisture absorption, helping to preserve its properties and strength.



Corrugated cardboard consists of at least two layers and can go up to five or even seven layers. The first outer layer is smooth, while the inner layer is corrugated, which is where its name comes from.

Layers of corrugated cardboard



Open 2-layer corrugated cardboard (single-face)



Closed 3-layer corrugated cardboard (single-wall)



Open 4-layer corrugated cardboard

The shape of the corrugations, or flutes, and the spacing between them can vary depending on the desired strength and rigidity of the cardboard. At our company, we make F, E and B flutes. EE, EF or EB flutes may also be used in exceptional cases.



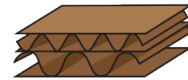
F flute
(approx. 1.1 mm)



E flute
(approx. 1.3 mm)



B flute
(approx. 3.0 mm)



EB flute
(approx. 4.5 mm)

Printing can be done directly onto corrugated cardboard (flexographic printing), or a lower-weight cardboard (typically 230 g) can be printed and then laminated onto either two-layer or multi-layer corrugated cardboard. This is called laminated cardboard.

Below are the cardboard groups we use most often in the production of our cartons. We have included key information on their areas of application, material composition, and specific properties and characteristics.





1 - SBS/GZ

Single-sided or double-sided bleached cardboard

CHARACTERISTICS	APPLICATIONS	COMPOSITION	PROPERTIES
High-quality cardboard	Postcards	100% cellulose	Front side whiteness 95%
Glossy whiteness	Book covers		Reverse side whiteness 93%
Superior performance	Brochures		Recyclability** – confirmed
	Folders		CWompostability**** – confirmed
Exceptional smoothness	Calendars		
	Premium-quality chocolate packaging		
	Cosmetics packaging		

2 - GC1

Cellulose cardboard

CHARACTERISTICS	APPLICATIONS	COMPOSITION	PROPERTIES
Consistent quality	Chocolate and confectionery packaging	86% cellulose	Front side whiteness 92%
Excellent printability		Pigment coating 14%	Reverse side whiteness 91%
Very smooth surface	Pharmaceutical and healthcare packaging		Recyclability** – confirmed
High whiteness	Cosmetics and personal care product packaging		
High gloss	Electronics packaging		
Good creasing properties	Other non-food packaging		



3 - GC2

Cellulose cardboard with a cream reverse side

CHARACTERISTICS	APPLICATIONS	COMPOSITION	PROPERTIES
High level of rigidity	Dry food packaging	90% cellulose	Front side whiteness 87%
Excellent yield (lower gram weight, higher bulk compared to GC1)	Frozen food packaging (including as secondary packaging)	Pigment coating 10%	Recyclability** confirmed
Very good printability	Chocolate and confectionery packaging		Biodegradability*** confirmed
	Pharmaceutical and healthcare packaging		
	Cosmetics packaging and personal care product packaging		
	Other non-food packaging		

4 - GT4

Recycled cardboard (brown reverse side)

CHARACTERISTICS	APPLICATIONS	COMPOSITION	PROPERTIES
Kraft brown reverse side	Dry food packaging	30% cellulose	Front side whiteness 79%
High level of rigidity	Frozen food packaging (including as secondary packaging)	PIW* 20%	Recyclability** confirmed
Good printability	Fruit and vegetable packaging	PCW* 20%	Biodegradability*** confirmed
	Beverage packaging (as secondary packaging)	Pigment coating 10%	
	Packaging for detergent (in powdered form)		



5 - GT2

Recycled single-sided coated cardboard (white reverse side)

CHARACTERISTICS	APPLICATIONS	COMPOSITION	PROPERTIES
Good brightness	Dry food packaging	20% cellulose	Front side whiteness 80%
High level of rigidity	Frozen food packaging (including as secondary packaging)	PIW* 50%	Reverse side whiteness 72%
Excellent printability	Fruit and vegetable packaging	PCW* 20%	Recyclability** confirmed
	Beverage packaging (as secondary packaging)	Pigment coating 10%	Biodegradability*** confirmed
	Pharmaceutical and healthcare packaging		
	Cosmetics packaging and personal care product packaging		

6 - GD2

Recycled cardboard (grey reverse side)

CHARACTERISTICS	APPLICATIONS	COMPOSITION	PROPERTIES
High level of rigidity	Dry food packaging	10% cellulose	Front side whiteness 80%
Good printability	Frozen food packaging (including as secondary packaging)	PIW* 20%	Recyclability** confirmed
	Fruit and vegetable packaging	PCW* 60%	Biodegradability*** confirmed
	Beverage packaging (as secondary packaging)	Pigment coating 10%	
	Shelf-ready packaging		



***PCW** – post-consumer waste

***PIW** – post-industrial waste

****Recyclability** – processing of used, waste materials into new products; recycling reduces the amount of waste that otherwise takes up valuable space in landfill sites, reduces the consumption of natural raw materials that are otherwise needed to make new products, and saves water and energy.

*****Biodegradability** – the degree to which microorganisms (bacteria and fungi) can decompose a substance, which should mean that the decomposition residues are non-toxic; does not mean that waste can be thrown into compost but must still be properly separated.

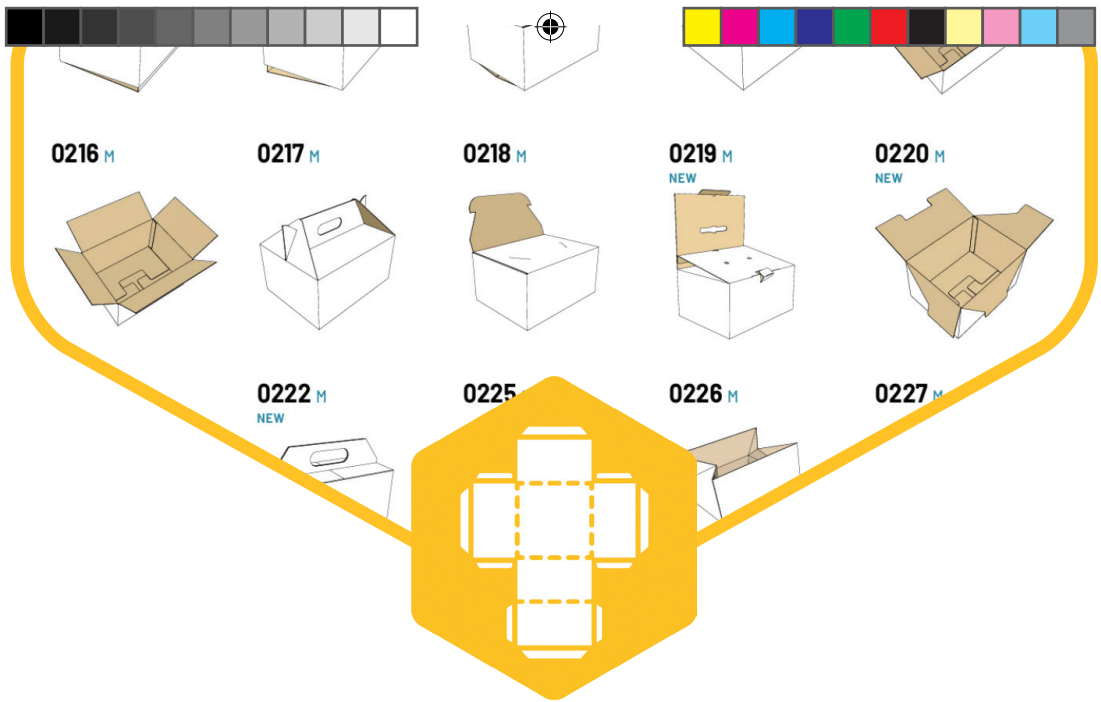
******Compostability** – material can be composted when its biological decomposition is in accordance with the conditions (temperature, humidity, time) found in composting facilities.

Two-layer corrugated cardboard

	F flute (brown/white)	E flute (brown/white)	B flute (brown/white)
COMPOSITION	Brown or white outer layer / F flute Gram weight: 140 g / 100 g Average flute height 1 mm	Brown or white outer layer / E flute Gram weight: 140 g / 100 g Average flute height 1.4 mm	Brown or white outer layer / B flute Gram weight: 140 g / 100 g Average flute height 2.8 mm

Three-layer corrugated cardboard

	F flute (brown/white)	E flute (brown/white)	B flute (brown/white)
COMPOSITION	Brown or white outer layer / F flute / Brown or white inner layer Gram weight: 120 g / 125 g / 120 g Average flute height 1.1 mm	Brown or white outer layer / E flute / Brown or white inner layer Gram weight: 120 g / 125 g / 120 g Average flute height 1.6 mm	Brown or white outer layer / B flute / Brown or white inner layer Gram weight: 120 g / 125 g / 120 g Average flute height 3.0 mm



Standard packaging shapes

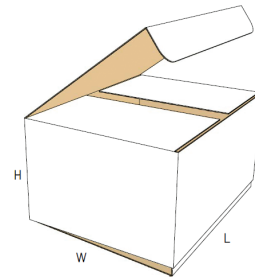
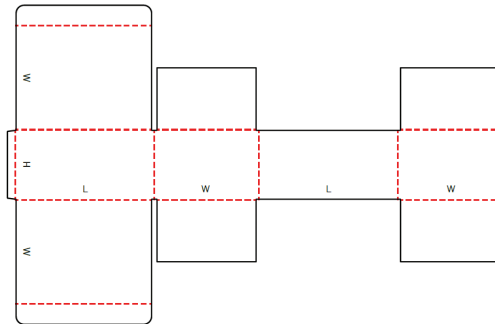
Packaging design can be fully customised to suit its contents. In the technology department, our development team creates perfect solutions tailored to your needs. There are of course many standard shapes to choose from. This page presents nine of the most commonly used shapes, along with descriptions. You can find other standard shapes in the FEFCO catalogue at this link.

Packaging dimensions are always given in order of **length (L)**, **width (W)**, and **height (H)**. The length always corresponds to the longer side, while the width corresponds to the shorter side along the opening surface of the packaging. The height of the packaging is the distance between the opening surface and its opposite surface.

We provide the **internal dimensions of the packaging**, ensuring a precise fit for the product inside. External dimensions may vary depending on cardboard thicknesses, which we account for in transport and pallet configuration planning.



FEFCO 210

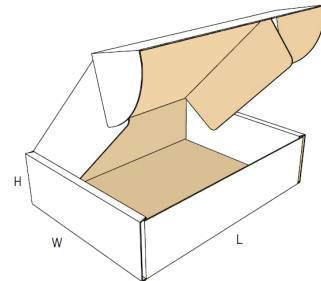
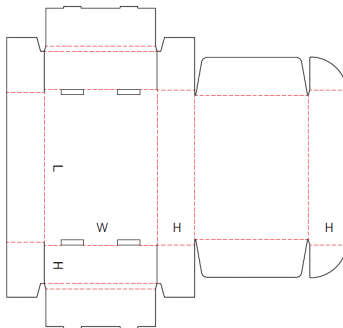


Mainly used for cosmetics, pharmaceuticals and dietary supplements. Cartons can be made from all types of material, but are mostly made from solid cardboard. It is possible to change or add a so-called "cosmetic closure", euro lock, integrated insert, etc. Can also be used for automatic packaging lines.



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FEFCO 427



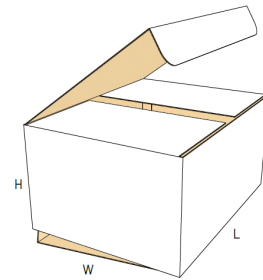
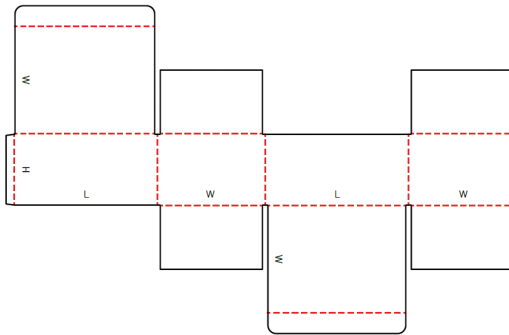
Mainly used for technical items, postal shipping, etc. Cartons can be made from all types of material, but we primarily recommend corrugated or laminated cardboard. The closure can be modified to eliminate holes.



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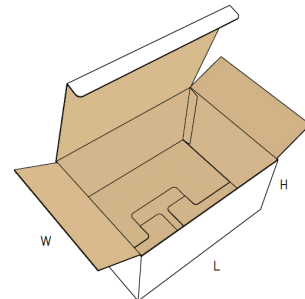
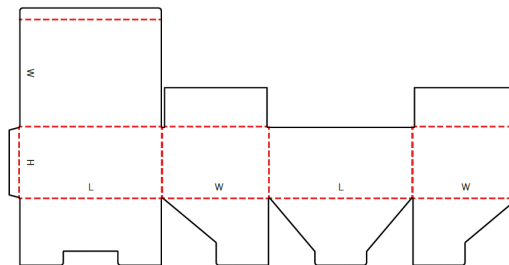


Mainly used for cosmetics, pharmaceuticals, dietary supplements, technical items, etc. The cartons can be made from all types of material, but are mostly made from solid cardboard. It is possible to change or add a so-called "cosmetic closure", euro lock, integrated insert, etc. Can also be used for automatic packaging lines.



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FEFCO 215



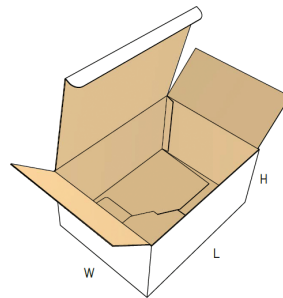
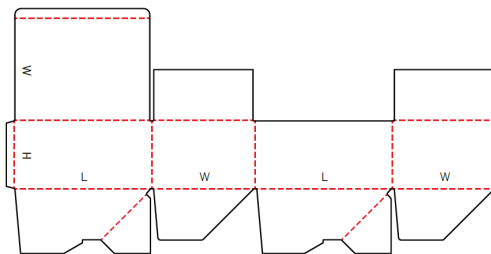
Mainly used for cosmetics, pharmaceuticals, dietary supplements, technical items, etc. The cartons can be made from all types of material, but are mostly made from solid cardboard. It is possible to change or add a so-called "cosmetic closure", euro lock, integrated insert, safety catch, etc. The bottom is assembled manually and is therefore mostly used in smaller quantities.



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FEFCO 713

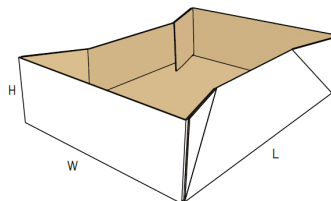
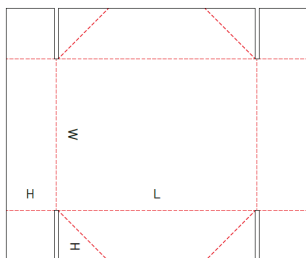


Mostly used for food supplements, technical items, food, etc. The cartons can be made from all types of material, but are mostly made from solid cardboard. It is possible to change or add a so-called "cosmetic closure", euro lock, safety pin, etc. Assembly of this type of packaging is much faster than other similar cartons as the bottom is moulded automatically. Special features: due to the glued bottom, it can hold more weight than other similar carton types.



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FEFCO 451 (bottom only) or 759 (with lid)



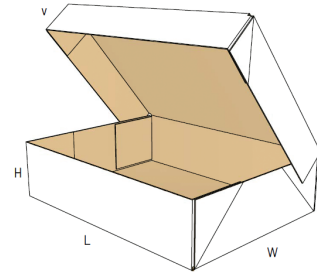
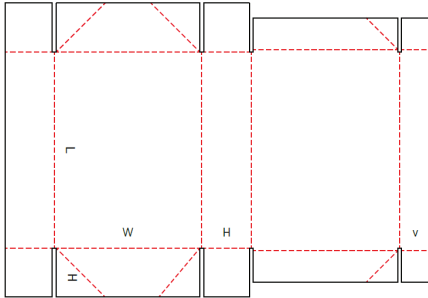
Mostly used in the food industry, technology sector, etc. The cartons can be made from all types of material, but are mostly made from solid cardboard. A lid can be modified or added.



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FEFCO 761 or 760

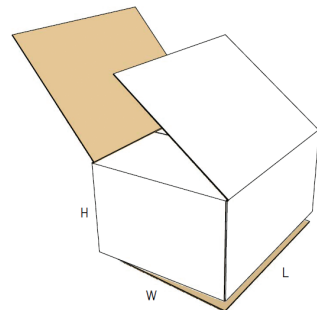
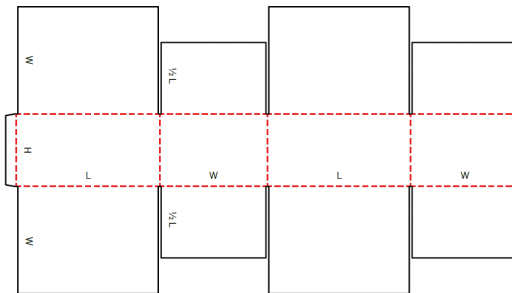


Mostly used in the food industry, technology sector, etc. The cartons can be made from all types of material, but are mostly made from solid cardboard.



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FEFCO 206



Mostly used in the food industry, technology sector, etc. The cartons can be made from all types of material, but are mostly made from solid cardboard. Various fastening options are available for opening. The carton is made exclusively for packaging lines (a single point is glued by us, the rest by the customer).



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Cardboard printing techniques

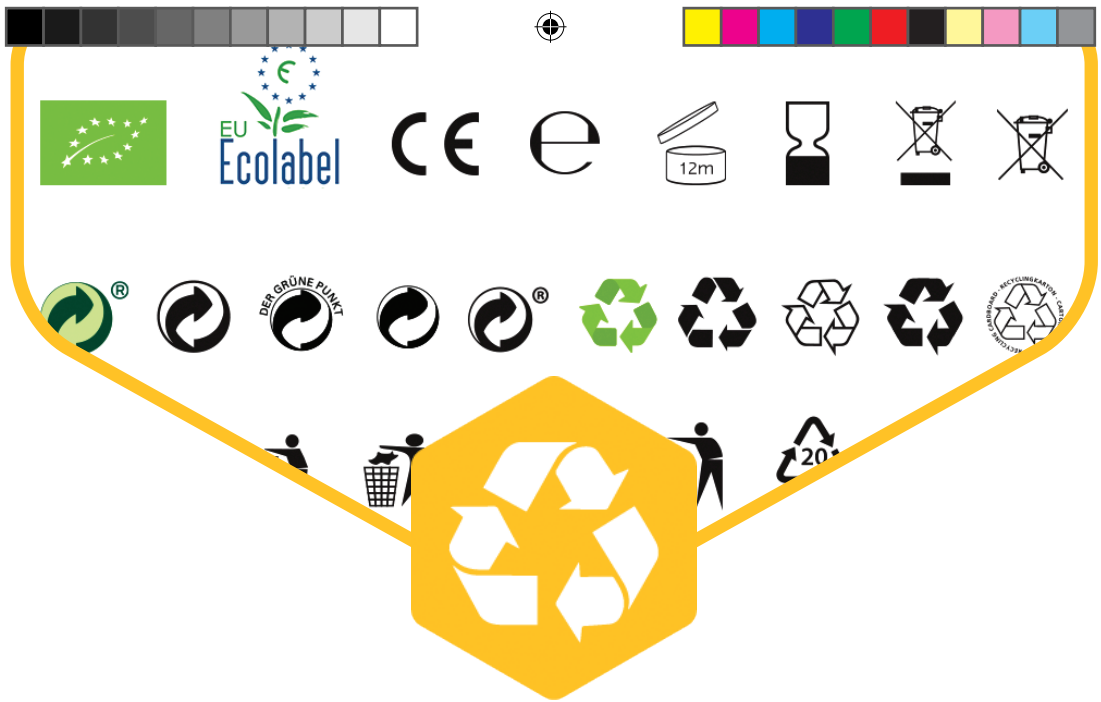
Customers often wonder what the difference is between the three most common forms of packaging printing. Choosing the right printing technique is key to the quality of the final product, cost efficiency, and the visual appeal of custom cardboard packaging. Each printing technology offers unique advantages and limitations, influencing the choice based on print volume, material type, required precision and aesthetic characteristics.

As each printing technique evolves and improves, it is important to know their current capabilities and limitations. This overview will help you choose the optimal solution for your custom packaging, ensuring both cost-effectiveness and visual appeal.

This chapter summarises the pros and cons of each printing technology, while noting that general guidelines may vary depending on machine type, machine age, the selected material to be printed on. While the information provided applies to most machines in our industry, it does not encompass everything available on the market.



	OFFSET PRINTING	FLEXO PRINTING	DIGITAL PRINTING
Image transfer to material	Indirect	Indirect	Direct
Printing form	CTP plate	Polymer cliché	No printing form
Suitable print run	Upwards of 1000 sheets	Upwards of 1000 sheets	Up to 1000 sheets
Suitable print applications	All types of cardboard packaging, printed materials, magazines, etc.	Corrugated cardboard packaging, displays, etc.	Printed materials, posters, packaging, etc.
Materials printed on	Solid cardboard, paper	Corrugated cardboard, types of foil (plastic, aluminium, etc.)	Solid cardboard, paper
Print quality	Highest, sharp	Lowest, soft	Comparable to offset printing
Position, accuracy	Precise (0.5 mm deviation)	Poorer (1–2 mm deviation)	Precise (0.5 mm deviation)
Finishing options with varnishes	Many possibilities	Limited use of varnishes	Inadequate, mostly without protective coatings
Colour selection	All colours (CMYK + Pantones)	Largest colour selection (CMYK + Pantones)	Smallest colour selection (CMYK + orange, violet, green) – no Pantone colours
Material thickness	Up to 1 mm	Can be more than 5 mm	Up to 0.7 mm
Initial costs, Preparation costs	Slightly lower than flexo printing	Highest	Lowest
Price comparison	Slightly more expensive than flexo (plate changes required for certain quantities)	Cheapest for larger quantities (faster, clichés have a longer lifespan)	For larger quantities, considerably more expensive than offset and flexo printing



Cardboard packaging marks

On packaging we find a whole range of different marks that inform consumers about the packaging material and recycling, how to handle waste packaging, and compliance with EU legislation. Some marks promote sustainable practices, others carry information about the amount of packaging and the shelf life of the product. Certain EU packaging marks are used on the basis of a certificate, others can be included on the packaging arbitrarily. Do you know what they mean, and which ones are mandatory packaging marks?

Packaging marks are crucial for **B2B users and companies**, testifying to compliance with legislation, demonstrating environmental certification and informing end customers. They are used to ensure transparency regarding recycling, material composition, and safety and quality standards. Mandatory marks that must be observed include: **CE for compliance with EU regulations**, **WEEE for electronic products**, **the Euro-leaf for organic food** and **the open jar or hourglass symbols for cosmetic products**. When applying EU packaging marks, they must be **clearly visible and legible**. Marks related to **recycling and packaging material** (e.g. the Mobius loop, FSC and PAP marks) are usually placed **on the bottom or back of the packaging**, while **safety marks** (CE, WEEE,



nominal quantity e) must be placed **near key product information**. Correct placement of marks ensures compliance with regulations and raises the profile of the product as safe and environmentally friendly.

This page summarises the most commonly used EU packaging marks. To make packaging design easier for you, we have prepared PDF documents of marks that you can download to your computer.

The Mobius Loop

The Mobius Loop is a general recycling mark that indicates that a product is technically suitable for recycling at the end of its life cycle (but not necessarily included in a recycling system). Each arm of the mark symbolises a key stage in the recycling process (e.g. collection, processing into a new product, and the purchase of a product from recycled material).



The label is not a compulsory packaging mark in Slovenia and EU countries. Nevertheless, many companies voluntarily use it to label their packaging as part of their environmental responsibility strategy.

In some cases, there is a number inside the triangle indicating the type of material, and a material abbreviation – more in the section below called Marks for cardboard and paper.



Marks for cardboard and paper

Marks for cardboard and paper are part of the packaging material identification system but are not mandatory packaging marks. The directive stipulates that packaging must be marked in a way that facilitates collection, reuse and recycling, using a numerical identification system. The mark consists of a number in a triangle and an abbreviation below the mark, indicating the type of material.

- PAP 20 – corrugated cardboard
- PAP 21 – non-corrugated cardboard
- PAP 22 – paper

The use of this mark is optional but recommended for easier identification and separation of packaging materials. Detailed packaging marking requirements are outlined in Article 9 of the Regulation on packaging and packaging waste.



Green Dot

The Green Dot mark is one of the most commonly used marks on packaging, indicating that the packaging is included in a waste packaging management system. This means that the company using this mark pays an environmental fee and thus contributes to the organised collection, recycling and processing of packaging. The use of the mark is conditioned by membership in a specific packaging system (in Slovenia, this is the company Slopak).

More about packaging and packaging waste can be found on the website Directive 94/62/EC on packaging and packaging waste.





Trash can

The trash can sign warns that packaging must be disposed of in an appropriate place. It is not generally mandatory under European legislation. However, individual EU member states or specific packaging systems may mandate its use to promote proper waste separation awareness.



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WEEE

The WEEE mark indicates that waste electrical and electronic equipment (mobile phones, televisions, batteries, household appliances, etc.) must be collected separately and must not be disposed of with ordinary household waste. This mark is mandatory on the packaging of all electrical and electronic equipment placed on the EU market.

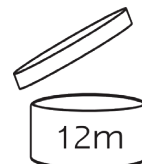


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Open jar

The open jar sign is a symbol that indicates the safe usage period of a cosmetic product after opening. It is often seen on the packaging of creams, shampoos, makeup, and other long-shelf-life cosmetics. The symbol shows a small open jar with an inscription e.g. 6M. The number indicates the number of months the product remains safe for use after opening.

It is a mandatory packaging mark for cosmetic products with a shelf life of more than 30 months.



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Hourglass

The hourglass sign indicates a cosmetic product's minimum durability date, ensuring product safety and effectiveness if stored properly until that date. • It appears on cosmetic products where the shelf life does not exceed 30 months. The minimum durability date is stated next to the symbol (e.g. 31.12.2025). After this date, the product may no longer be as effective or safe to use.

It is a mandatory packaging mark for cosmetic products with a shelf life of less than 30 months.



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Nominal quantity

The "e" sign (e-mark or estimated sign), often seen next to the weight or volume of a product, means that the packaging contains the nominal quantity of the product in accordance with European metrological regulations. It confirms that the stated quantity of the product is measured in accordance with standardised EU methods. It allows the free flow of sales of products throughout the European Union without requiring additional quantity verification in individual member states. It is used for products that are packaged without the presence of the customer and have a predetermined weight or volume (food and drink, cosmetics, chemicals and household products, pharmaceuticals).

The use of the "e" sign is optional, but manufacturers often use it to demonstrate compliance with legislation and facilitate the export of products within the EU.



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European conformity

The CE (Conformité Européenne) sign is a mark that means that the product meets the safety, health and environmental requirements set out in European Union legislation. It is a mandatory mark for certain product groups sold in EU member states. It confirms that the product complies with European standards for safety, health and the environment, and allows the free movement of products within the European Union without requiring additional testing in individual countries.

It is a mandatory packaging mark for products that fall under harmonised EU directives, such as: electronic devices (e.g. telephones, computers), toys and children's equipment, medical devices, construction materials, and personal protective equipment (e.g. masks, gloves).



Euro-leaf

The Euro-leaf is the official organic mark of the European Union, used to label organically produced food and feed. The mark confirms that the product complies with EU organic production legislation and meets strict conditions regarding production, processing and distribution. It ensures that the product is produced without synthetic pesticides and fertilisers. It means that at least 95% of agricultural ingredients originate from organic production. The entire production chain is monitored – from farm to final product. It emphasises concern for sustainable agriculture and animal welfare.

If a product is labelled "organic" and sold in the European Union, the Euro-leaf mark on the packaging is mandatory. It is used on organically produced food, organic baby food and food supplements, organic flour products, bakery products and packaged organic food in shops.





FSC

The FSC (Forest Stewardship Council) mark is an international certification system that ensures that wood and paper products originate from responsibly managed forests and sustainable sources. The FSC packaging mark means that the materials are obtained in a way that respects environmental, social and economic standards.

The FSC mark is not legally mandatory, but companies voluntarily use it as proof that their products comply with sustainable development principle. If a company wishes to use the FSC packaging mark, it must have a valid FSC certificate. The officially approved FSC mark with the correct dimensions and design must be used and confirmation of logo use obtained from a certified FSC organisation before printing on packaging.

For a better understanding, you can look at the following website or on our news updates. Our FSC® mark is C106947, the validity of which can be checked on this website.



The mark of
responsible forestry



EU Flower

The EU Flower (EU Ecolabel) is the official environmental mark of the European Union, which marks products and services with a reduced environmental impact throughout their life cycle – from raw materials to production, use and recycling. It means that a product or packaging with the mark meets strict environmental and sustainability criteria set by the European Commission. Certified products must have a low level of pollution, reduced resource consumption and be suitable for recycling. The Environmental Daisy helps consumers identify more sustainable and environmentally friendly products.

It is not a mandatory packaging mark, but a voluntary certificate that companies can obtain if their packaging meets strict environmental requirements.





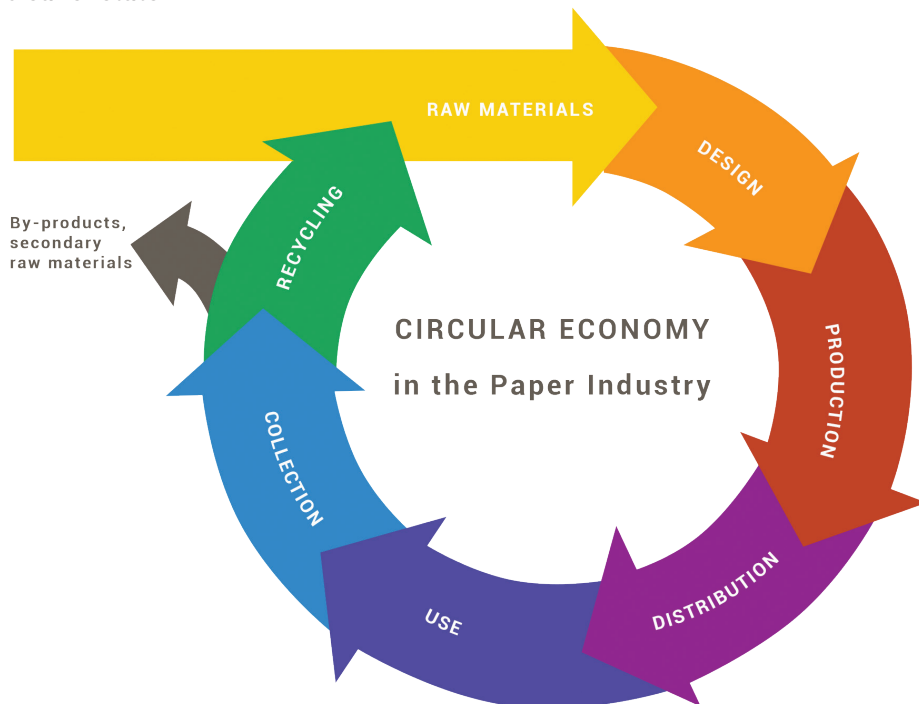
Ecology and sustainability of packaging

The **circular economy** is a concept that arose in response to the pressure of a growing economy and consumption on limited resources and the capacity of the environment to support it. It focuses on the reuse, repair and recycling of existing materials and products, is based on the use of energy from renewable sources, abandons the use of hazardous chemicals, reduces the consumption of raw materials and reduces waste generation through careful product design.

The paper industry has, through systematic efforts and investments, become a **model of sustainable development in the industry** in recent years. It does not endanger forests, as cellulose fibres are obtained from lower quality wood or waste wood. For the production of paper and cardboard, it more or less uses cellulose with FSC or PEFC certification, which means that it is obtained from a responsibly managed forest. The paper industry ranks among the most energy-efficient industries, contributing to a more balanced greenhouse gas emissions profile. With efficient modern technologies, paper mills have managed to reduce the consumption of water resources despite increased production. Thanks to



efficient treatment plants, the “borrowed” water is returned to nature in an even cleaner state.



Recycling waste paper and cardboard is **beneficial from an ecological point of view, mainly because of the sensible use of natural resources. Paper reconditioning is a demanding process that is not environmentally friendly.** The removal of printing inks through the deinking process is particularly challenging, as it requires significant energy and chemical input.

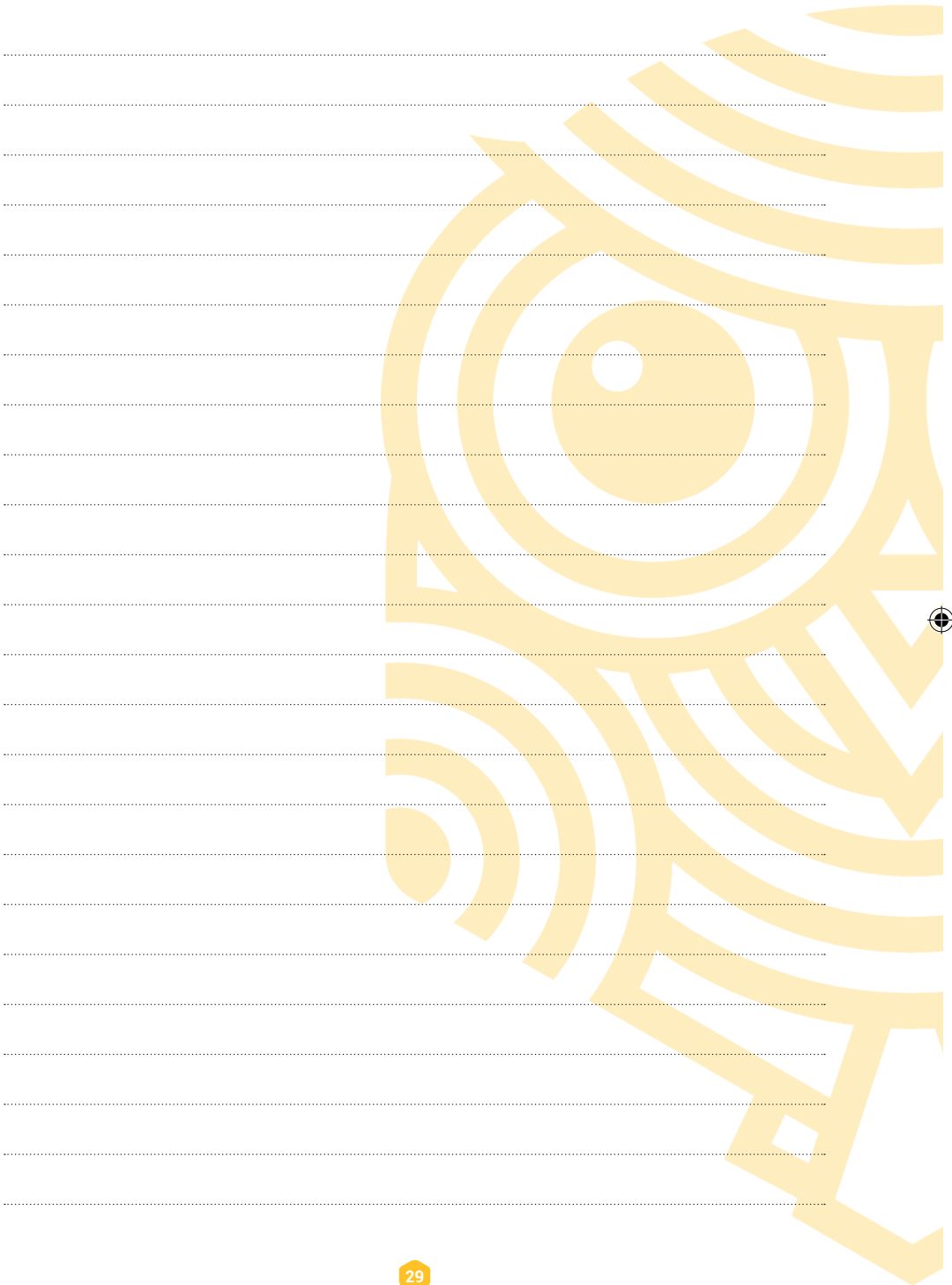
Cellulose fibres can be recycled more than 25 times. Through repeated processing of the cellulose fibre, the fibre is damaged, so a certain proportion of fresh fibres is added to maintain the desired physical properties of paper and cardboard. Recycled fibres cannot be used to reproduce paper or cardboard of the same quality, but are used to produce a lower quality grade than the original. It should be emphasised that cellulose fibres do not represent a foreign body for the environment even after the end of their useful life, and they decompose by themselves in nature.



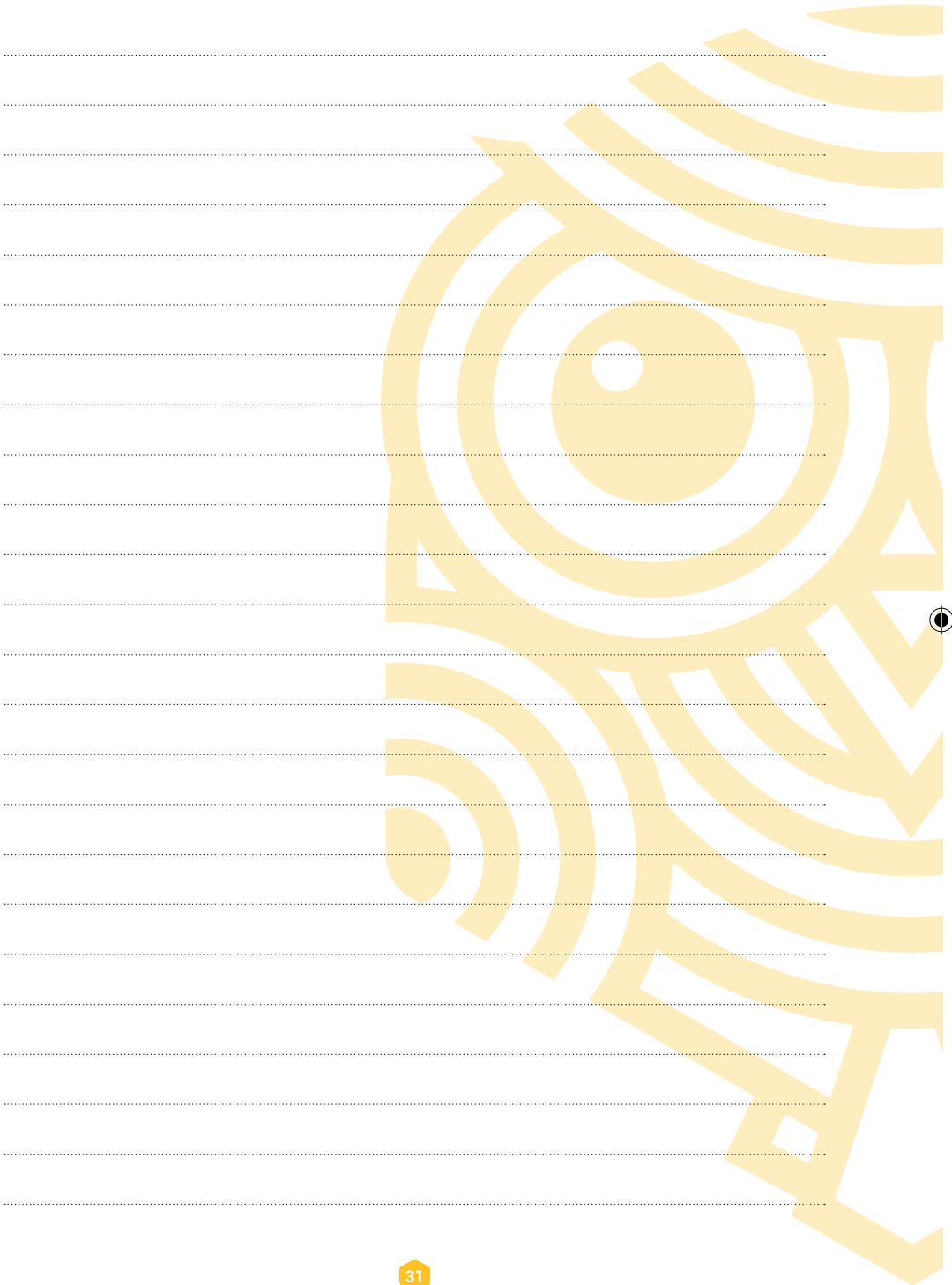
*Great packaging starts with
great understanding - of materials,
process, and purpose.*



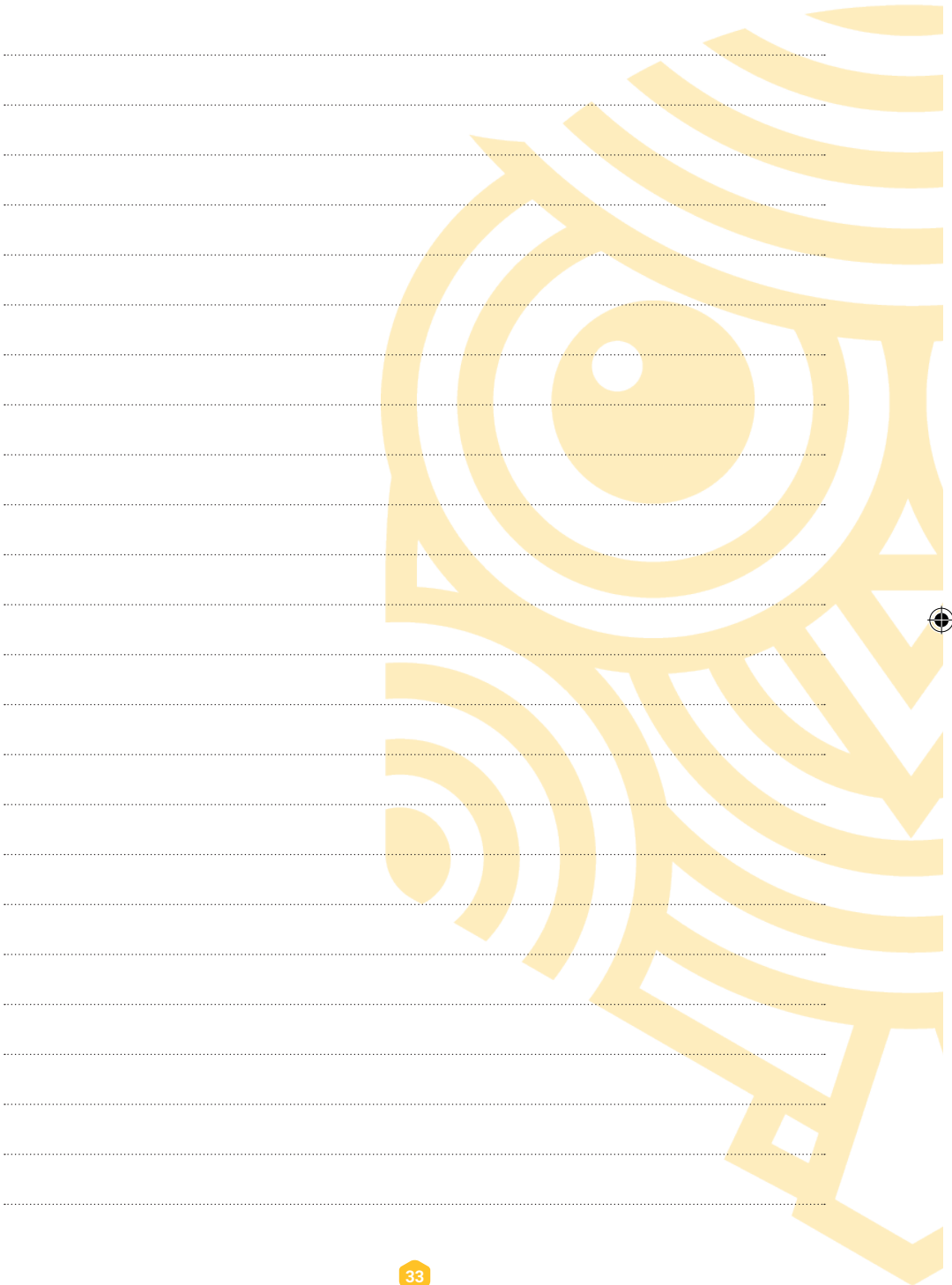
jamnik.si/en/packlab.html













Handwriting practice area with 20 horizontal dotted lines.





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