Packaging: the development of consumption patterns and distribution channels
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From digital to e-commerce, consumption patterns are constantly changing at a fast pace. A top manager of a multinational company leader in its market was recently telling me that “consumption has developed more for the past 3 years than for the previous 30 years!” Another manager was explaining how 90% of their business’ products were pre-selected online before they potentially reach the shop. Alibaba in China has just sold 11 billion dollars worth of merchandise and services in one day!

Besides, codes and habits are being so disrupted that this quick development could easily be considered as a revolution.

On the other hand, the final consumer will always need to eat, dress and take care of his/her physical appearance. The products will always be available but the physical as well as the virtual relationship between the Brand that manufactures the product, the Distributor that provides it (they are sometimes mingled!) and their consumer will change. The information channel is changing, the supply chain is changing, the products themselves are changing. This evidently involves a product packaging that adapts to this new situation and it is obviously just the very beginning.

The aim of this new working group is to put forward the main challenges regarding the packaging within this development, some of which have already been identified and faced while the others are still to come.

Michel Fontaine
Chairman of CNE
Summary

For the past few years, the link between the product and its consumer/user has been developing rapidly; whether it regards production, distribution or consumption/use, the changes mentioned in this document lead those involved in the packaged product to think about the best way to design the most suitable packaging.

The advent of the internet in this system deeply alters the different patterns linking the consumer and his/her product, as well as the various distribution channels: from now on, the consumer wants any product at any possible location he/she chooses and at any time.

In collaboration with ASLOG, a survey was carried out amongst actors of the supply chain: results have showed, once again, the importance of packaging. The latter should be able to include these rapid changes by responding to the different functions assigned to it (logistics, protection, information, use, environment, etc.).

This document therefore proposes good practices - according to the expected functions - that take these changes into account:

- **Product’s protection**: many tools are at the actor's disposal, whether they are used to simulate palletising or test the transport – their use allows for various packaging options to be tested in order to deliver an undamaged product.

- **Information**: this function is usually linked to regulations; however, the packaging can facilitate this function to the logistics actors, in terms of assisting stock management or shelving, as well as to the customers, in terms of simplifying their purchases. This function can also be investigated in an e-commerce distribution framework, where consumers expect an experience that reminds the brand when they receive the package.

- **Use**: whatever the distribution channel may be, the consumer expects a product that is easy to open without recurring to cutting tools – opening tricks are being developed to meet this requirement. Regarding the e-commerce, delivery packaging with a re-use option is essential for the consumer that is not satisfied for various reasons. E-traders together with packaging producers propose other options.

- **Integration of the environmental protection**: eco-design is part of a packaging’s development. Packagings are designed in terms of optimisation of the materials use as well as in terms of end-of-life/new life by ensuring that the packaging components can be recycled.
1. Objectives/Context/Limits

1.1. The objectives
This document is addressed to those who wish to know more about:
- The expectations of the consumer who, by rebound effect, expect traders to think about a well-designed product/packaging unit
- Consumption trends
- Distribution channels

The Conseil National de l’Emballage (CNE) presents the developments in consumption patterns in France and the associated distribution channels. The CNE provides some sociological factors of this consumption. It emphasises the importance of the packaging when a product is to be made available, from its production site to the location of its consumption, following the supply chain. It identifies the functionalities that are necessary for the packaging to be distributed in a physical store as well as the specific functionalities of the packaging in “new” distribution channels, such as e-commerce. Some distributors sometimes include both of these channels.

It stresses the importance of considering an eco-design of the product/packaging unit from the start of the product development, whilst taking into account the constraints of the logistics channels.

In that respect, the CNE reminds that prevention by source reduction, one of the purposes of eco-design, can be identified by using key indicators for prevention, which are defined in the so-called document1. The actors will thus be able to use the entire information of the packaging system, such as the ratio of contents/container volume, the palletisation ratio or any other indicators that allow the performance to be measured, as well as the continuous improvement of any activity regarding the packaged product.

Thus, the results of these indicators show that the palletisations, the packaging formats and the nature of the packaging can develop along with consumption patterns (nomadism, for example). The document sheds new light on best practices.

1.2. The context
Consumption in France has been developing for many years and the supply and production chains have been adapting accordingly. Packaging of consumer goods, whether it may be transport packaging or household packaging should constantly integrate the needs/constraints that could arise.

Thus, the rise of internet purchases (e-commerce) highlights the issues that the packaging should solve: being able to face logistics for a distribution in physical stores but also integrating the constraints that the new channels of distance selling involve.

Will the packaging be specific to every distribution channel or will it be “polymorphic” and adaptable? Either way, it should include the functionalities that every actor expects from it, such as protection, transport, information, etc.

1.3. The limits
This document is instantly valid whenever it is distributed and should be updated: the subject at hand is, in fact, constantly changing along with the continuous availability of new offers, whether it regards products, consumption methods or product distribution means. The same holds true for the regulatory aspects that follow these trends.

This document proposes good practices according to the function of the packaging; however, it cannot offer an ideal solution nor comparative Life Cycle Analyses.

2. Consumption patterns and distribution channels

2.1 Development of consumption patterns
Consumption patterns are developing at a fast pace and the CNE provides some examples below (non-exhaustive):
Whatever the production or distribution method may be, in whatever way the product may be used, the latter should have a packaging system that is able to fulfil different functions that allow transportation from its production site to its place of use without any defect. The functions carried out by the packaging system will depend on the expected main functions such as protection, transport, use, etc. This document puts forward some good practices identified as such by the working group participants.

2.1.1. Out-of-home catering industry
The CNE reminds that the out-of-home catering industry\(^2\) is defined as the economic sector that allows consumers to eat out of home. This sector includes traditional restaurants, fast food outlets, cafeterias, cafés (beverages offered in situ), leisure areas, canteens and catering services.
Commercial catering can be divided into two parts:
- Traditional catering (table service included) which, besides, makes use of home delivery services or deliveries to the workplace by partnering with companies such as Deliveroo, Foodora, etc.
- Fast food (take-away service, self-service)

France has 175 000 restaurants: fast food now accounts for 37% of restaurants established in France.

The fast food sector is particularly dynamic: its turnover has grown on average by 5% per year during the 2000s. This growth has been accompanied by an increase in the number of establishments: in 1993, there was one fast food outlet against six traditional restaurants, compared to one fast food outlet against three traditional restaurants in 2009.

This development of the very nature of the food service industry affects the type of the associated packaging; from packagings destined to the restaurant owner, we have moved to the development of packagings dedicated to the fast food industry (packets, containers, etc.). Similarly, as part of the fight against food waste, initiatives such as Gourmet Bag\(^3\) have emerged, allowing restaurant guests to take away their unfinished meal. For this purpose, innovative packagings are proposed, especially for the CNEs Emballé 3.0\(^3\) contest.

The study carried out by ADEME-Eco-Emballages\(^4\) assesses the packagings’ deposit of products for out-of-home consumption.
"The deposit of household packagings consumed out of home comes to 693 000 tons (excluding returnable glass containers). With 257 000 tonnes, table service catering accounts for over a third of this amount; because of a significant consumption of glass bottled beverages."
The study especially includes figures for:
- sodas: 65 800 tons,
- pizzas: 18 000 tons,
- burgers: 12 000 tons,
- salads: 15 000 tons.

\(^2\) Source: commercial catering: economic data DGCCRF ECO no. 28 July 2014.
\(^3\) Dossier « c’était bien bon » (« It was really good ») - Anne Poggenpohl- ENSCI- Les ateliers- Paris.
2.1.2 On-the-go product consumption
In the context of travelling or in daily life, the product/packaging unit adapts to the consumer’s needs. This is the case, for example, of:

- Food products:
  - snacking products: the turnover for this sector is estimated at 47.11 billion euros in 2015 (+1.44% compared to 2014).  
  - 2.26 billion sandwiches\(^5\) were sold in 2015, with a rise of 3.2% in one year (for a turnover of 7.77 billion euros).  
  - All networks combined\(^6\): bakeries alone account for 10% of lunch purchases during the week and mass distribution reaching 5%.  
  - In comparison, 1.19 billion hamburgers and 819 million pizzas were consumed in 2015.  
  - Pre-cooked meals\(^7\): 161 000 tons in 2016

- Cosmetic products referred to as “Beauty to Go”; products are adapted to nomadism (smaller products, unidoses, easy "On the Go" application, etc.).

2.1.3 Internet use: E-commerce\(^8\)
With the advent of the internet and online shopping sites, the consumer increasingly becomes an e-buyer\(^9\) or even an m-buyer\(^10\).

- The e-commerce turnover amounted to 64.9 billion euros in 2015: it is considered that 5 to 7% of it refer to mass consumption products.
- The number of online consumers in France is rising: more than 850 000 additional buyers in one year.
  - 35.5 million people in France buy over the internet from their computers
  - 6.6 million people in France have already made a purchase from their mobile phones.

In 2015, an estimated 450 million packages were delivered via internet consumption/distribution.

The products’ transport brought about by the e-commerce involves consideration of careful choices regarding the packaging used for the parcel.

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\(^5\) Source: Gira Conseil, Sandwich & Snack Show, April 2016.  
\(^6\) Source: LSA, December 2014.  
\(^7\) Source: Prodimarques.  
\(^8\) Source: Key figures 2016 FEVAD.  
\(^9\) E-buyer: consumer that purchases over the internet via a computer or tablet.  
\(^10\) M-buyer: consumer that purchases over the internet via a mobile device (mobile phone or tablet).
2.1 Development of distribution channels
This section summarises the various product distribution methods and points out the main functions that the packaging system should fulfil.

Depending on the distribution circuit, different actors are responsible for the integrity of the product throughout the last logistics stage. For example, a consumer in a physical store is ultimately responsible for the safe transport of the packaged products, whereas in e-commerce, the responsibility of the products integrity is delegated to another actor (or several others). The e-consumer simply checks the state of the packaged product once it is delivered (whatever the place).

The customer’s experience (the way in which he/she will order/buy his/her product, the place where he/she wants his/her product to be available) will guide the developments of the product’s distribution.

Henceforth, we refer to the omni-channel design of the product/packaging unit insofar as this design should respond to every distribution method of the product and its possible return.

2.2.1 Distribution to physical stores
The distribution of mass consumption products is mostly done to date, according to the diagram\textsuperscript{11} below; using different modes of transport with packaged products in palletised units. The consumer goes to the physical store in order to buy his/her goods and then take them home.

Every logistical special feature related to the product is not reproduced here (refrigerated transport, rail transport, river transport, etc.).

Note: this diagram does not include distant export or import flows.

\textsuperscript{11} Source: French Institute for Trade/French National Packaging Council (CNE)
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Distribution of pre-packaged products – distribution of bulk products?

Products have always been offered for sale in bulk and the emergence of marketing modes such as mass distribution has seen the development of pre-packaged products that meet various needs and demands.

Currently at a crossroads between sustainable development methods, CSR (Corporate Social Responsibility) and search for the meaning of the citizens’ consumption needs, commercial propositions for bulk products are constantly emerging. For traders as well as customers, bulk is sometimes offered as an economic (cheaper product) and ecological solution (disappearance of primary packaging and therefore no packaging waste for the consumer to manage).

Let us recall what we should exactly understand by “bulk”.

In fact, as soon as a product is transported from its production site to its consumption location, it is necessarily packaged. For example, fresh fruits and vegetables are mostly sold in bulk but they are packaged before they reach the stalls.

It must be borne in mind that the distribution methods of bulk products should be analysed by considering the entire packaging system and not just the primary packaging.

This analysis should examine the answers provided to the various functions assigned to the entire packaging system and its associated product, namely:

- The product’s protection
- The coordination with the packaging process
- Logistics (including transport, storage and handling)
- The presentation and marketing of the product
- The consumer’s/user’s acceptability
- The requirements in terms of information
- The compliance with hygiene and safety regulations

In-store physical distribution or distance selling distribution?

The growth of the distance selling market (e-commerce) reconsiders the model of physical stores according to the distribution actors. For example, “the format of hypermarkets12 is questioned and we speak about “reinvention” or "re-enchantment". The relative proportion of hypermarkets in the distribution turnover will progressively decrease, especially due to the easy ordering from smartphones at any time and location as well as to the virtual near-completeness of online offers (for example, Amazon and its 300 million references, compared to 100 000 in average in a hypermarket). In China, the emerging consumer could move from traditional markets to e-commerce without going to a physical hypermarket.”

The co-existence of physical stores and e-commerce leads the actors to think about the packaging that can adapt to all types of distribution.

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2.2.2 Distribution for online orders

The diagram below concerns all types of mass consumption products; however, the various possible options have not been included.

According to a study carried out by the Fevad\textsuperscript{13}, the delivery location (in % of buyers\textsuperscript{14}) is:
- Home delivery: 86%
- Pick up at a drop-off point: 68%
- Pick up in store: 25%
- Post Office: 25%
- Place of work: 12%
- Deposits: 8%

The diversity of distribution channels and the associated logistics circuits (including the product’s return) affect the definition of the entire packaging system because it should be designed in order to meet specific needs: the following section sheds light on the packaging’s functions and good practices that allow them to be met.

\textsuperscript{13} Observatoire du consommateur connecté Fevad (The observatory of the connected consumer Fevad)/ Médiamétrie June 2016.

\textsuperscript{14} Multiple answers allowed
3. Functions of packagings within the supply chain

Introduction

The CNE has asked ASLOG\textsuperscript{15} to carry out a survey with its partner members (traders such as Vente privée, Blédina, Crown, Solvay, etc. or service providers such as FM Logistics, Viapost, etc.).

Jean-Michel Guarneri, Chairman of ASLOG, presents the survey:
"The products’ packagings must fulfil various functions (protection, information, promotion, use, etc.).
The regulations and standards have already changed packaging with the goal of always doing better with less.
There is still room for improvement and the CNE, after consideration and thanks to its guides to good practice, exists so that the actors integrate the aspects of Sustainable Development in their design of the packaged product, especially in view of the evolution of the consumption and distribution modes.
That is why ASLOG chose to cooperate with the CNE by participating in its working groups.

The advent of online business and now omni-channel commerce together with their transport and associated returns issues, the necessity to adopt sustainable and responsible development plans for their activities, thus leads the manufacturers to reconsider their packing and packaging strategies and put their primary functions back at the top of the agenda:

\textbf{Protecting the product in the different contexts} in which it is now evolving, from its design phase until it reaches the final customer, sold by any type of distribution channel, also by integrating the operations of reverse logistics.

This primary function is massively brought to the fore by the results of our ASLOG survey, well ahead of its marketing function and its cost.

Despite everything, this survey questions us on the last position occupied by its impact as regards sustainable development, and we strongly bet that these issues will have a more important place among manufacturers in the years to come."

In order to consolidate the essential and major functions identified by the working group of the CNE, the following questions were asked:

- What are the top 3 functions that you expect from a packaging in your business sector?
- What are the good practices that you have implemented in order to meet these functions?

The summarised results provided by the 42 respondants’ answers reflect the following functions in descending order of importance:

- Product’s protection/safety of goods
- Adaptibility to transport and storage
- Marketing and client information
- Economic cost/cost reduction
- Ecology/recyclability

These functions reflect high expectations and deep reflections carried out by the actors in order to find adequate technical solutions.

\textsuperscript{15} ASLOG : Association française de la Supply chain et de la LOGistique (French Association of Supply chain and LOGistics), \url{https://www.aslog.org/fr/index.php}
As regards the good practices, these are inspired by:
- The importance of collaboration between actors within the supply chain
- The continuous optimization of the distribution model from an economic and environmental point of view
- The innovation in the supply chain (in terms of logistics as well as packaging)
- The importance of defining the needs between actors thanks to a functional specification.

The rest of the chapter thus makes up the description of these essential functions and the practices identified by the working group that can provide an answer.
3.1 Products contents protection

- **Protecting the products integrity**
  It is an essential function of the packaging which provides a solution to any mechanisation and any constraint/request undergone by the product-packaging unit. A specification must be established between the various actors so that the contained product and its packaging remain intact at the end of the logistic circuit.

**The case of delivery**

In the event of home delivery, what is the success rate of the carrier’s first visit? All sectors combined, it amounts to 83%. This means that, in 17% of cases, the parcel does not reach the consumer at the first delivery: this implies a second visit or a provision in another place. In this case, packaging plays a significant role because it must absorb the constraints of this second “journey”.

Nevertheless, the parcel sometimes happens not to be delivered (or not recovered) and is returned to the trader. All sectors combined, the rate of parcels not delivered and returned to the shipper amounts to 0.61%.

There are many tools that allow to best calculate the packaging’s technical need in terms of:
- resistance to vertical compression in palletised loads,
- fall from a certain height,
- vibrations, shocks simulating the convoys in a logistics centre or the logistics course in the truck, for example, etc.,
- impact by tools and objects of handling or others
- need for wise blocking,
- etc.

Packaging suppliers have developed a know-how on this subject: they have adapted their tools according to the development of the distribution channels, and have even developed methods of specific simulations of the logistics path.

In the same way, there are expert palletisation softwares which allow for different approaches of packaging choices and optimised palletizing patterns.

Lastly, laboratories can carry out tests to validate the packagings.

- **The fight against thefts**
  The packaging provides security and protection against robberies throughout the course of the parcel. In the case of cardboard parcels, for example, it is appropriate to implement locking solutions for shipping containers with security breach detectors. Indeed, the consumer should be assured that the products quality and security are guaranteed throughout the logistics circuit.

**Example of practice**

In order to fight against thefts, an automatic bottom box made of cardboard has been redesigned.

By means of a tear strip, the automatic bottom is made tamper-proof by a lock.

This case received an Oscar de l’emballage in 2016.

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16: The Fevad analyses the logistical performances of French e-traders, JDN, 22 September 2015.
17: For example, the test protocol DISCS by DS Smith, specific to e-commerce.
18: Source: Smurfit Kappa

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3.2 Information (for consumers and logisticians)

- **Information on the contents of the logistics unit**
  Packaging helps logisticians to prepare the orders by immediately recognising the contents of a logistics unit.

**Example of good practice**

Immediate recognition of a logistics unit’s contents by its transport case. The secondary packaging should be able to allow a quick identification of the contents regarding the identification criteria:
- Brand, product,
- Variety of the product,
- Number of consumer sales units (U.C)
- Weight/volume by U.C
- Etc.

The pictures below show the collaborative work between the needs of the logistics distribution centres and the trader’s desire to emphasise the attributes of the product and the brand.

**Information about shelf use**

Packaging helps the staff of distribution stores to stack the shelves.

**Example of best practice**

When filling a shelf with a product contained in a Shelf-Ready Package (SRP), one understands faster how to open this transport box and the way it should be positioned on the shelves thanks to a diagram of easy opening and indications about its placement on the shelves.

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19 Source : Mars Petcare.
20 Source : Lesieur.
• **Information about the product**

The packaging allows us to immediately recognise the product contained in a SRP: the communication, for some SRPs, can be summarized as the identification of the product by the consumer.

**Example of good practice**

The simplification of the information carried by the transport cases “Shelf Ready Packages” containing bin bags\(^{21}\): the consumer, when purchasing, wishes to be able to easily identify the volume and the bin bag’s closing system (photo below on the right, characteristics of the bags circled in red).

![](image)

• **Information on the end-of-life management of packaging**

The consumer must be able to be informed on how to manage the packaging once it has been emptied of its contents, especially thanks to instructions concerning the sorting of packagings.

**Example of good practice**

Eco-Emballages provides the companies with an awareness message ready to be affixed on any type of packaging. This message, “Info Tri Point Vert”, informs and helps consumers to sort the packagings in a precise and reliable way.

Therefore,

- All of the elements composing the packaging are detailed in order to give complete information.
- The materials are mentioned in order to facilitate the understanding of the instruction.
- The information focuses on the purpose of the gesture – to recycle or to throw away – to allow the consumer to appropriate the instruction.

The use of these pictograms is subject to a user’s guide and a detailed graphic charter, available on the website of Eco-Emballages.

\[ \text{Recycle ! Let’s reduce together the environmental impact of packagings} \]

\[ \text{Container and plastic wrapping – to throw away} \]

\[ \text{Cardboard case – to recycle} \]

\(^{21}\) Source: Carrefour.
3.3  Packaging use: the consumer’s experience

- **Easy access to the contents (easy-opening)**
The consumer must be able to easily access, in an intuitive way, the contents of his/her parcel without having to use cutting tools (thus protecting himself against any accident and preserving the contents from deterioration) and without having to read tedious instructions.

**Example of practice**

Whatever the shipping packaging may be, there are easy-opening solutions proposed by packaging manufacturers:
- Pre-cut tear strip
- Tear strip opening
- Other

- **Communication of the brand through packaging**
When consumers receive their product in a parcel, user experience should be taken into account by E-traders because it is important to find coherence between their own values and those pertaining to the brand and consumer’s perception of packaging upon receipt.

**Example of practice**

One of the approaches that can be used to anchor the consumer to the product is to print on the inside of the box (examples below)

22 Source: DSSMITH.
• **Reuse of packaging: management of E-commerce returns**

Every year, 15% of products sold are returned or produced in excess, and several retailers do not have the adequate systems for managing this stream of returned articles. Management of returns is a long and complicated process.

**The delivery packaging should be, as far as possible, the packaging which makes it possible to return the product to the seller.**

**Example of practice**

Zalando’s cardboard parcels:
For instance, consumers can have different sizes of the same pair of shoes delivered, return the sizes that do not suit them and keep only the right size.
This box is devised in terms of product protection, traceability and ease of use so as to make it possible to return the products without any problems.

**Example of an idea by the students taking part in the CNE competition EMBALLÉ 3.0**

A flexible plastic packaging for textile products
In the case of returns of the textile product, the packaging may be used for delivery to the E-trader.
Furthermore, the packaging can be returned empty in view of its reuse by the trader. This kind of consumer behaviour can be encouraged by reduction coupons and can promote customer loyalty.

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23 Fevad Newsletter December 2016.
24 Focus Fevad November 2016.
25 Projet Tisséco nominee at the competition EMBALLÉ 3.0-2016 – PEC-IUT Chambéry.
3.4 Integration of the environnement

The key players should design a product/packaging duo which can respond to the development of consumption and of distribution channels by incorporating environmental constraints and relevant regulations. Companies’ priority is not the environment yet, however all the initial signs show that this concern is increasingly becoming a criteria of consumer expectation. Although price continues to be a priority purchasing criteria, packaging recyclability also influences purchasing for a quarter of French consumers. Just as 86% of French people do not consider packaging that has been thrown away to be waste. They believe it is a resource which can be used to manufacture another product.

Examples of remote selling
Remote selling and especially E-commerce is a rapidly expanding multi-channel sector. With a growth rate of around 5% between 2009 and 2012, the household packaging deposit of this sector is estimated at 65000 tons. In the framework of online selling associated with home delivery, packaging is an important brand image vector for the vendor. Delivery packaging is actually the first physical contact of the buyer with the brand or logo. Sometimes the packaging is oversized compared to the shipped product (cf. photo).

Therefore, E-commerce companies strive to find solutions for shipping packaging tailored to the size of the parcel's content (i.e. several different products for the same delivery).

However, the choice of the size of the shipping parcel is sometimes made difficult by the great diversity of shipped products and by the variation in the number of articles which make up every order, especially for general E-commerce vendors.

Shipping packaging can be:
- **standard format** which requires managing a stock with a few references that could accept different size products. It is then necessary to protect the product through clamping, while avoiding the client's perception of emptiness when opening the parcel.
  
  In order to make the assembly of parcels in logistic centres easier, adaptable clamping solutions have been designed.

- **adaptable formats** which make different degrees of parcel optimisation possible (height only adjustment or three-dimension adjustment). This makes it possible not to "transport emptiness" without, however, making the supply of consumables difficult for the E-vendor, as the optimised parcel is manufactured with a small number of references or of continuous corrugated cardboard. And lastly, the adaptation of the parcel size to the size of the content makes it possible to reduce the final volume of the parcel.

This enables economic gains through the reduction of shipping expenses by optimising the freight, through the eventual reduction of the packaging material used according to the technology applied.

- This **adaptability** can be **manual**: packaging manufacturers have worked out solutions which can be adapted to the products by the operators (easy to tear flaps, preformed folding...), while maintaining an easy implementation.

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Or by a **mechanisation, through which the packaging is manufactured on demand** at the logistic centre. For several years there has been a development of mechanisation, which enables an adjustment of the sizes of shipping parcels to their content.

This kind of mechanisation has a cost of investment but can lead to significant productivity gains. It can also lead to flexibility in handling activity peaks, whether it is over one day or a certain period of the season. Environmental gain must be analysed via an environmental assessment of this kind of mechanisation, because it is indispensable to consider all the material used and the handling of losses due to cutting.

**Example**²⁸: comparison of mechanisation solutions for packaging

Here are two solutions for the mechanised adjustment of cardboard packaging as closest to the products as possible.

The first solution (B+) is an adjustment of preformed crates for one content dimension only, namely height.

The second solution (Néopost shipping) is made from flat corrugated cardboard, adjustment is implemented for the three dimensions.

The numbers in every column correspond to the characteristics of every machine used and the products of the E-trader quoted hereafter. They do not have general value.

<table>
<thead>
<tr>
<th></th>
<th><strong>B+ Equipment</strong></th>
<th><strong>Neopost Shipping</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Equipment (height adjustment)</strong></td>
<td>40 x 30 x 20 cm format</td>
<td>CVP500 (3D adjustment) width 60cm</td>
</tr>
<tr>
<td>Average cardboard surface gain per parcel (m²)</td>
<td>-15 %</td>
<td>-30 %</td>
</tr>
<tr>
<td>Average emptiness in the parcel (m³)</td>
<td>NC²⁹</td>
<td>-30 %</td>
</tr>
<tr>
<td>Average loss of cardboard during packaging (m²)</td>
<td>around 0 %</td>
<td>40 %</td>
</tr>
<tr>
<td>Average ace of packaging (parcel/h)</td>
<td>+ 35 %</td>
<td>40 %</td>
</tr>
<tr>
<td>Consumables</td>
<td>Glue</td>
<td>Adhesive tape</td>
</tr>
</tbody>
</table>

²⁸ Loss of cardboard during implementation, 98% of which is the reused in the recycling chain for DIB cardboard. Consider that the recycling rate of household packaging cardboard amounts to 67%.

These two solutions show that it is possible to optimise the volumetric container-content relation (CNE³⁰, Key Prevention Indicator). This enables the optimisation of truck shipping volumes.

Likewise, three dimension optimisation of the size of parcels makes it possible to reduce the quantity of cardboard used in the parcel for a certain content.

In this 3D adjustment example, the diversified size of the products and the web width used leads to a loss of 30% of cardboard. The quantity of losses during cutting is actually directly linked to the size and mix of products packaged on the machine. For example, small cardboards have to be manufactured for small products and this leads to a certain quantity of losses.

What you should remember from this example:

There is no single solution which can make it possible to meet economic demands (reduction of the consumption of packaging material, productivity, just in time delivery) and environmental requirements (prevention by reduction at source and volume optimisation).

A mix of different packaging solutions (mechanised or manual) is still the best way to strike the balance between the lowest environmental impact and economic optimisation. Especially given the numerous products and logistical channels.

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²⁸ Source: CDISCOUNT (based on 400.000 parcels).
²⁹ NC: non disclosed.
³⁰ Key prevention indicators CNE, December 2010.
4. Regulation

4.1. Eco-design packaging

- Prevention through reduction at source

The parcel packaging of the products sold via distance selling have to comply with eco-design requirements. This is true for all packages which are placed on the European Union market.

European Directive 2008/98\(^\text{31}\) defines a hierarchy of waste disposal methods, and considers prevention as the best possible measure to take:

- prevention,
- preparation with a view to reusing,
- chemical, mechanical or organic recycling,
- other repurposing, especially energetic,
- elimination

Article R543-44 of the Environment Code establishes that the packaging should be designed and manufactured so as to limit its volume and its bulk to the absolute minimum necessary to ensure a satisfying level of security, hygiene and acceptability and to enable its repurposing.

- Prevention through reduction at source must comply with its « acceptability » as far as logistic requirements are concerned

The French National Packaging Council (CNE) has recalled in its research « The acceptability of packaging\(^\text{32}\) » that acceptability is a legal criterion. It is established by the European Directive 94/62 and the French environment code.

Therefore, one of the European eco-design norms reiterates this legal criterion a performance criteria to be respected: EN 13428 – Specific requirements for manufacturing and composition - Prevention through reduction at source.

These requirements should make it possible to specify the characteristics which are strictly indispensable for packaging design (resistance...). They should be recorded via the CNE\(^\text{33}\) document.

The EN 13428 norm lists the performance criteria, which should be kept in mind when designing packaging, whatever the distribution channel used to reach the consumer of the product is.

Source: CNE

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\(^{32}\) The acceptability of packaging for the product, the consumer and the user CNE October 2010.

The Principle of Extended Producer Responsibility (EPR)
In France, the principle of handling all or part of waste management by economic key players, manufacturers, distributors, who place on the market products which generate waste, exists under article L. 541-10 of the environment code: "In application of the principle of extended producer responsibility, it can be compulsory for producers, importers and distributors of the products or elements and materials that they manufacture to provide for or to contribute to the management of waste derived".
Extended producer responsibility is a way to support the designing and manufacturing of products according to processes, which fully consider and facilitate an effective use of resources throughout their life cycle, including repair, reuse, disassembly and recycling, without compromising the free movement of goods within the domestic market.

The environment code under article R543-54 defines packaging as all kinds of containers or support used to contain a product, facilitate transport or display for sale. In the case of distance selling where the shipping parcel is addressed to the consumer, the packaging of the parcel is included in the regulatory definition of household packaging, and, as such, should meet all the relevant obligations, namely:
• essential requirements specified under article R543-44 of the environment code. It establishes that packaging should be designed and manufactured so as to limit its volume and bulk to the absolute minimum necessary to ensure a satisfying level of security, hygiene and acceptability, and to enable its repurposing,
• the obligation of contributing or providing for the handling of all packaging waste (articles R543-56 & 57 of the environment code) in order to hit the target of recycling 75% of packaging. For this purpose, they can implement an individual system or subscribe to a licensed company, such as Eco-Emballages.

EPR packaging was founded in 1992. It made it possible to implement sorting for the French population as a whole and to go from 28% to 68% of domestic package recycling in 25 years. In the same lapse of time, the actions of companies made it possible to decouple the growth of consumption and the use of material, whose tonnage has increased less rapidly particularly because packaging was made lighter. In this case the changes in consumption modalities and distribution channels have a direct effect on the devices for disposal, sorting and recycling, which must adapt to a more on-the-go kind of consumption and individual, smaller, lighter packaging. The licensed companies in the EPR network of household packaging are ready to face these changing trends.
4.2. Contract entered into at a distance and return of the product bought

These are the contracts that are usually called « remote selling ».

4.2.1 Legal delivery deadlines and selling annulment right

The professional should deliver the product by a deadline established by the consumer. In the absence of indications in the order, the professional delivers the merchandise with no unjustified delay and at the latest thirty days after the end of the contract (article L216-1 of the consumption code).

Delivery which frees the professional from this obligation is defined as the transfer to the consumer of the physical possession or the control of the goods.

In the event of a breach of the obligation to deliver by the professional, the consumer can cancel the contract, via registered mail with return receipt or via an electronic document on another sustainable support, after an unsuccessful formal demand (article L216-1 of the consumption code).

4.2.2 Return packaging

Consumers who buy a product via remote selling have the right to change their minds about the purchase. It is the right to withdraw which is applied without penalty or justification (article L221-18 of the consumption code).

The deadline is 14 clear days. It starts on the day after the reception of the bought product. If it expires on a Saturday, Sunday or on a bank holiday, it is extended until the next working day (article L221-19 of the consumption code).

Once the consumers have notified their right of withdrawal, they dispose of a new deadline of 14 days to return the product to the seller (article L221-23 of the consumption code).

If the professional has not specified whether they will cover the return expenses, the consumption code establishes that the professional must pay for the direct return expenses (articles L221-5 et L221-6 of the consumption code). Very often the general selling conditions require the consumer to reuse the shipping packaging. If this packaging has not been devised to be reused easily for return, the consumer can use another one. They have the responsibility of providing a packaging which effectively protects the product (article L221-23 of the consumption code).

When postal return is not possible, the professional should, prior to entering into the selling contract, inform the consumer of the cost of returning the goods.
4.3. Difficult working conditions and risks linked to handling

The distribution channel via distance selling and the "drive" one involve handling expenses during parcel preparation and handling up to delivery to the consumer.

Articles R.4541-5 and R.4541-6 of the labour code require the employer to assess the risks incurred for the health and security of workers due to the handling operations, keeping in mind the characteristics of the task and the physical effort required.

A decree from 29 January 1993 under these two articles of the labour code lists the factors to be kept in mind throughout manual handling of loads involving risks, particularly dorsal-lumbar.

In this decree, the word « load » refers to container/content as a whole. The decree aims at a certain number of factors where packaging plays an important role:

- the load is cumbersome or difficult to seize;
- the load is in an unstable balance or its content risks moving;
- the load must be held or handled at a distance from the trunk or with trunk bending or trunk torsion;
- the load is susceptible, because of its outer appearance and/or its consistency, of injuring the worker, especially in case of collisions.

The 1993 decree is still in force in January 2017 and should be taken into account within the more general framework of regulation on difficult working conditions.

- Load weight

The labour code provides for maximum loads, which minors and pregnant women cannot exceed. Maximum loads are assessed for adults by an occupational health doctor.

Example of recommendations for load weight at the cashier's desk in a physical store:

The National Technical Commission for Food Services, Stores and Industries « CTN D » has adopted the Recommendation\(^{34}\) relating to the assessment of risks linked to the manual handling of loads at the cashier's desk in hypermarkets and supermarkets: practical limits enabling a reduction of risks derived from manual handling.

"In a hypermarket or a supermarket, the person working at the cashier's desk handles a great number of products in order to scan them and move them from the top belt to the bottom one. Some of these objects are heavy or cumbersome. Others are difficult to seize. And lastly, the handling rapidity required often prevents the person from working in a good posture. [...]"

When we refer to manual handling we mean every transport load support operation, therefore any lifting, placing, pushing, traction, carrying or moving, which involve the physical effort of one or more workers. [...]

**Recommendation:**

8 kg is the acceptable limit value for manual carrying of loads by a person working at the cashier's desk in a hypermarket or supermarket. [...]”.

This recommendation applies to hypermarkets whose selling surface exceeds 2500 m\(^2\) and to supermarkets whose selling surface is below 2500 m\(^2\) but exceeds 400 m\(^2\).

A lighter packaging more resistant to the same load is an advantage for the company: fewer occupational diseases, greater rapidity in handling, etc.

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\(^{34}\) Recommendation by CNAMTS n° 440 released by the circular 44/2008 of 20 August 2008 after its adoption on 30 June 2008 by the CTN D of Services, Commerces et industries de l'Alimentation (SCIAL).
5. Bibliography

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6. Appendix

6.1. Functions of packaging

To contain and protect content
It is about protecting:
- The external environment of the contained product (by limiting the risks of leaks, blocking solvent evaporation so as to protect the health of the user, prohibiting hazardous use for children, etc.), while maintaining the intrinsic properties of the packaged products.
- The content of external containers (by limiting deterioration due to mechanical shocks, reducing the transfers of parasite taste and smell, protecting from air and oxygen alteration, preventing any germ, insect or unwanted product interference, preventing theft or content consumption before purchase, optimising the shelf life of perishable products, etc.).

To facilitate use in complete safety
The use of the product goes together with its packaging, indeed they are often inseparable:
- Easy or facilitated opening for different groups of consumers (seniors, children, on-the-go teenagers, sporty people, etc.),
- Reclosing mechanism in view of postponed consumption of the product,
- Multi-portions in view of fractioned consumption (for ex. on-the-go consumption),
- Easy-to-grasp product ergonomics ensuring an ideal balance between weight, size, shape, and frequency of use,
- Dosage tailored to needs in order to limit waste,
- Product return: empty as much as possible the content of packaging,
- Use the container/content duo for all conservation modes (for ex. freezing) or preparation modes (cooking in a traditional oven, a microwave oven, a bain-marie, etc.).
- Regarding hazardous blends provided to the general public, no shape or aesthetics which could attract or intrigue children or mislead consumers.

To inform
- Provide legal and general information (expiry date, stocking temperature, instructions for use, posology/unit dosage, composition, allergen content, price, quantity, weight, etc.),
- Provide information on the production conditions (Ecolabel, red Label, fair-trade, designation of origin, etc.),
- Spread the information linked to the specific characteristics of the product within its marketing environment (brand, claims regarding nutrition and/or health, recipes, cooking instructions, history of the product, etc.).

To regroup
- Reunite several consumption units in view of adapting the consumption of products to the frequency of the act of purchase (yogurt packs, beer bottle packs),
- Assemble the products in manageable units (packets with different biscuits) so as to take into account the different consumption modes (on-the-go, etc.),
- Cater for product offers (special offers),
- Enable carrying and transport of products by consumers,
- Facilitate shelving or any other manual handling by the operators.
• **To transport/Stock**
  - Ensure a damage-less delivery from the production site to the selling point (protection against mechanical damaging of the product/packaging duo), via wooden pallets, corrugated cardboard jackets, corner iron, metal or plastic links, stretchable or retractable films, etc.,
  - Protect against any ill-will,
  - Inform logistic centres on the content of transport cranes (logo, brand, content, barcode, etc.),
  - Ensure transportability of the products to the consumer's house.
  - Give storage options at the consumer's house,
  - Enable secure stocking at the consumer's house (security lock for children, etc.)

• **To facilitate product packaging**
  - Comply with mechanisations,
  - Guarantee the security of employees working in package manufacturing and packaging of products,
  - Resistance to unit packaging operations (shock, heat, speed, vibration, closing, hygiene...).

• **To make the product visible and convey the values of the product and/or of the brand, of the company**
  - Facilitate the act of purchasing via the packaging, which stands out in a shelf-display (the consumers just spends a few seconds in their act of purchase), because of a certain colour of reference, of the shape of the packaged product, the graphics and typography for the immediate recognition of the product,
  - Convey the assets and the values of the brand, of the company (corporate social responsibility),
  - Guarantee acceptability for the consumer, during the product purchasing and consumption stages[^35].

[^35]: « The acceptability of packaging for the product, the consumer and the user », CNE, October 2010.
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