

FOCUS ON...

with Design
Section

Volume I No. 1

THE RAW MATERIALS



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Something new ...

You are currently browsing the first issue of the thematic publications of the Pack-Market Portal. The aim of these digital magazines is to combine the form of traditional magazines with technology of the digital age, such as videos, active links and more.

Related to the topics of the Pack-Market Portal, each issue presents a different area of the printing and packaging industry, as well as related branches. Also fulfilling the role of the digital yearbook of the given sector, since each topic returns after a year only, so the published materials are continuously available for twelve months, and can even be found later among the archive materials.

Let's start at the beginning!

The first issue focuses on the history of packaging, and the raw materials, supplemented by a design column. Packaging with an attractive shape and an inviting color scheme is increasingly important since the product has to sell itself on the shelves of self-service stores or in webstores.

According to our intention, even in the midst of problems, we provide you useful, interesting and interactive content, that is available for anytime, anywhere, and free of charge.

I wish you a pleasant browsing and reading.

Laszlo Csaba
editor-in-chief



What is the Packaging?

Packaging is a solution that protects the product inside, allowing it to reach the customer in the most hygienic and safest conditions, as well as facilitating transport and storage. However, packaging does more than that: it attracts customers, helps to identify the product and provides information about the product's properties, use and content.

Let's see some definitions from the literature to define packaging

- an activity, as a result of which the product to be packaged receives a temporary protective cover suitable for protecting the goods from mechanical and climatic stresses occurring during the logistics (transportation, storage and handling) processes;
- a solution produced by the combined use of packaging means, the basic purpose to protect the product.

Packaging means: collective term of packaging material, packaging device and related auxiliary materials. - The preform used for the production of PET bottles cannot be considered a packaging means.

Packaging material: a structural material that can be used directly for the production of packaging (temporary protective cover).

For example plastic films, papers, cardboard sheets, steel plates, or lumbered wooden, etc.

Packaging means help protecting the product using a container to protect it and aid its distribution, identification, and storage.

For example bags, pouches, boxes, bottles, wooden crates, etc.

Ancillary packaging: a component that cannot perform a packaging function independently, but without which, at the same time, packaging cannot be created.

For example: labels, caps, carrying handles, strap tapes, vapor barrier materials, cushioning elements, compartments, adhesive tapes, closing elements, etc.



Homogeneous packaging material, or mono-material, which is at least ninety-five percent of one type of material, in this case should be considered as belonging to the material flow according to the main component.

AE.g. the polyethylene-polyethylene plastic, formed from the same monomer can be treated as a homogeneous material.

If the packaging contains not only plastic but also aluminum foil and the proportion of metal by weight more than 5%, we can no longer speak of a homogenous material, because it is already considered as composite packaging material.

Composite packaging material: a material structure created by combining two or more packaging materials with different packaging technical characteristics (lamination, co-extrusion, etc.), where the components cannot be removed from each other by hand or with simple tools.

The best-known example of these materials the "Tetra Pak" boxes.

Combination packaging: a packaging system that typically consists of components of different materials that can be separated from each other.

Its best-known form is the "bag-in-box" pack-

aging, which consists of an outer box made of corrugated paper and an inner bag of composite material.

The packaging protects the goods from damage and contamination. It prevents physical impacts, scratches and breaks, and helps preserve the freshness and quality of products.

Packaging Functions (functional units):

- **consumer or primary packaging:** a form of packaging that typically forms a sales unit for consumer goods, contains the product, but does not necessarily contact with it (e.g. gift box for drinks in glass bottles).

This category mostly includes gift, multi-pack and promotional packaging.

- **collective packaging (or secondary packaging):** a packaging solution that consolidates several consumer packaging into a larger unit and facilitates registration and handling.

Such e.g. the shrink-wrapped packaging that encloses the six mineral water bottles as a unit, or the shrink-wrapped packaging of 24 beer cans in a tray of corrugated paper.

- **transport (or tertiary packaging):** a form of packaging from unpackaged products, consumer and collective packaging, typically suitable for machine handling, representing a transport and storage unit. A special form of transport packaging is the palletized unit load.

An interesting situation when the packaging fulfills several functions. Such e.g. the packaging of the refrigerator, which fulfills all the criteria of transport packaging, but at the same time forms a sales unit in stores, so it can also be considered as consumer packaging.

Group packaging: larger unit consumer packaging that contains several consumer packaging sold individually, for example soft drink 4-pack in shrink wrap.

Advantages of Packaging

Packaging is also known as the "silent salesperson" and has been included in the marketing literature as the 5Ps "Product, Price, Promotion, Place, and People".

Proper packaging helps the efficient delivery of goods and logistics processes. Durable and appropriately sized packaging makes it easier to store, load, move and transport products from the manufacturer to retailers and finally to customers.

The packaging can inform the consumer about the properties of the product. With the development of the modern age, the reduction of families and the increase in the number of single households, the production of packages containing smaller portions increased. Many people prefer packaged goods because people have limited time to eat, drink and shop in today's fast-paced world and such goods are easy to use and transport. That is why packaging material consumption is higher in developed and developing countries than in less developed countries.

Marketing and prestige: Packaging provides an opportunity to display the product and communicate its brand. A well-designed and attractive packaging attracts customers' attention on the shelves and contributes to the perception of the product's value and quality.

In short, packaging is a part of our lives, may we can say it is a "clothing of the product".

Sustainability

Just as we "recycle" used clothes during washing, we should also recycle product packaging.

Switching to environmentally friendly packaging is an important step towards a sustainable future. Recyclable materials, bio-based and biodegradable packaging, minimalist packaging solutions and much more can all contribute to reducing the environmental burden.

The packaging of goods is an art that combines protection, information and attraction. The packaging serves to deliver the products safely and efficiently from the manufacturer to the customers. However, for a sustainable future, it is critical to look for packaging solutions that have less environmental impact, but provide adequate protection and informations.

The History of Packaging, in a Nutshell

The need to store and transport of materials has existed since the dawn of humanity. However, over the past centuries or even millennia, packaging has turned from satisfying simple needs into an integral part of conveying brand messages and creating a consumer experience.

Let's step back in time and observe the major technological advances throughout history that have shaped the packaging industry into what it is today.

Early Packaging

Packaging grew out of the basic need to store, and transport food from one place to another since the beginning of human society.

Although we have not information of when the earliest packaging materials were used, historians believe that during the time of nomadic hunters/gatherers, materials such as leaves, animal skins, nuts, or gourds were used to store and transport of foods.

Ancient Packaging

Egypt

In ancient Egypt, glass was expensive and usually available to the pharaoh and his court, only. But this ancient glass was not transparent - had to wait another 500 years for that.

China

Ancient China had the invention of flexible packaging, due to their innovations in the field of paper development. - This is the oldest known example of flexible packaging.

Historians believe, in the first or second century, the Chinese began using treated mulberry bark for food packaging. In later centuries, as they perfected their papermaking techniques, paper began to be used to package items such as medicines and tea.

Packaging of the Middle Ages

In the Middle Ages, the use of wooden barrels and wooden boxes and crates as a means of storage and transport increased. Barrels were used not only on land, but in the Age of Discovery, they were also used for traveling on seas and oceans to store and transport dried foods and fresh water, or even rum.

Packaging of the Age of the Industrial Revolution

This era (from about 1760 to 1840) gave way to significant technological development, along with which the demand for better quality packaging also increased. Quality expectations were fueled by a sudden surge of new products that were now available to the masses. However, it should be noted that many of the packaging materials created during this era were quite expensive. Which means that these materials were typically used to store and transport luxury goods.

Some notable packaging developments that occurred during this period:

Napoleon's Food Preservation Award (1795)

In 1795, Napoleon Bonaparte offered a reward of 12,000 francs to anyone who could invent a good method of preserving food. - This drive for innovation was due to Napoleon having to find a way to feed his army in the middle of the war.



However, it was another 15 years before a man named Nicolas Appert received this award in 1810, personally from Napoleon. Nicolas Appert is also known as the father of canning, he invented a method to preserve food for a longer period of time. The essence of the idea was that "he kept various foods in tightly closed, thick-walled glass bottles in a boiling water bath for longer or shorter periods of time." - This method is still used for cans today!

The Rise of the Can (1810)

In 1810, the Englishman Peter Durand patented tin-coated iron boxes - instead of bottles - for preserving food. He passed the patent on to two entrepreneurs, Bryan Donkin and John Hall, who in 1813 opened their first serious factory in history, producing cans similar to today's cans. Over the next 20 years, it became one of the most popular packaging materials for things like biscuits and tobacco.

The First Cardboard Box (1817)

Although cardboard was invented hundreds of years earlier in China, the first cardboard box was created in 1817 by Sir Malcolm Thornhill. - This is not corrugated board yet, it was not invented until 1871.

Packaging late 1800s - early 1900s

The first paper bag making machine (1852)

A few years after the first commercial paper bags were created in 1844, Francis Wolle invented a machine that capable of mass-producing of them. - At that time, paper bags did not look exactly as we know them today, they looked more like large envelopes.

The first cereal box (1906)

The Kellogg brothers, known for inventing cornflakes in 1877, began using cardboard to market their cereal as early as 1906. Initially, the cereal was in bulk in the box. Later a bag was placed inside the box to store and protect the cornflakes.



Invention of Cellophane (1908)

Swiss chemist Jacques E. Brandenberger is credited with the invention of cellophane. Its original formula was created using wood cellulose. In 1912, Brandenberger built a machine for the production of cellophane film.

Cellophane had a big impact on the packaging industry, as its transparency made it a popular choice for packaging in the 1950s and 1960s. In the following years, cellophane also laid the foundations for plastic packaging.

Invention of Saran Wrap (PVDC) (1933)

Polyvinylidene chloride (PVDC), from which Saran resins and films have made, has accidentally discovered by Ralph Wiley in 1933. Wiley was a Dow Chemical lab worker responsible for cleaning the lab's glassware. An evening, Wiley came across a vial that he couldn't clean. He originally called the material Eonite, but the name has changed to Saran by Dow Chemical researchers, who then transformed this material into a dark green foil. This early version of Saran has sprayed on military aircraft to protect them from the elements. Later, researchers managed to remove its green color, which allowed it to be approved as a food packaging material after World War II.





Packaging of modern times

The Beginnings of Bubble Wrap (1957)

Bubble wrap was invented in 1957 by the founders of Sealed Air, Alfred Fielding and Marc Chavannes, but it was not used first as the protective packaging material we know today. Initially, Fielding and Cavannes tried to create textured wallpaper by sealed two shower curtains together to form air bubbles – but this interior design trend failed. Later, they decided to market the material as greenhouse insulation, but this also proved unsuccessful.

As a packaging material, Bubble Wrap's first client was IBM, which used the product to protect the IBM 1401 computer during shipment. Fielding and Chavannes were inducted into the New Jersey Inventors Hall of Fame in 1993. Sealed Air celebrated Bubble Wrap's 50th birthday in January 2010.

Easy-open Can (1959)

In 1959, an American man, Ermal Fraze devised the can-opening method, the pull-tab. This inven-

tion had a huge impact on the popularity of cans as containers for beverages as it brought a new level of convenience to the consumer. The ring-pull eliminated the need for a separate opener tool.

Invention of PET-bottles (1973)

Polyethylene terephthalate (PET) bottles were first patented in 1973 by chemist Nathaniel Wyeth. At the time, these were the first plastic bottles into which carbonated drinks could be filled and soon became the material of choice for manufacturers looking for a cheaper alternative to glass.

Packaging Today

As sustainability has become a major concern in recent years, today's innovators are constantly coming up with new ways to reduce the impact of the packaging industry on the environment. Recently published environmentally friendly innovations, such as biodegradable or edible packaging, not only reflect the current state of our society, but also demonstrate that the packaging industry is able to adapt to the constantly changing needs and concerns of consumers.



Paper and Cardboard

- Sustainable Packaging in Our Lives

Paper and cardboard are one of mankind's most ancient and important inventions, which still play an essential role in many fields today. Their application is also outstanding in the field of packaging, which plays a significant role both from an environmental and economic point of view. In this article, we focus on packaging made from paper and cardboard, highlighting their sustainability benefits and the important role they play in our everyday lives.

Natural and Sustainable Raw Material

Paper and cardboard are produced from natural fiber raw materials, such as wood cellulose. But we can also find alternative materials, such as reed, hemp, or grass. Thanks to sustainable forest management, the paper industry now manages forest resources responsibly. So they are renewed and serve as a sustainable resource in the long term. And the growth of replanted trees helps sequester carbon dioxide, thus contributing to the fight against climate change.

Recycled paper and cardboard also play an important role in protecting the environment. Through recycling, we can reduce the burden resulting from the extraction of new raw materials, as well as reduce the amount of waste, which helps preserve natural resources and biodiversity.

Versatile Packaging Materials

Paper and cardboard are excellent packaging materials that can be found in many areas due to their versatility. They are used in the packaging of many products, from food to electronics and household goods.

These food packaging are often biodegradable, meaning that they do not pollute the environment if handled properly.

When packaging electronic products, paper and cardboard are usually a safe and easily recyclable alternative to plastic packaging. Designed to protect electronic devices from damage and shocks during transport.

Paper and cardboard and corrugated boxes are



also popular in the packaging of household products. They are easy to handle, and reduce the amount of plastic waste in households.

The Importance of Sustainable Packaging

Sustainable packaging is the key to the future, leading us towards a more environmentally conscious society. The advantages of paper and cardboard packaging materials clearly show that these materials can be an excellent alternative.

The production of recycled paper and cardboard requires much less energy and puts less of a burden on the environment than if it were produced from new raw materials. In addition, with proper waste collection and processing, we can use these materials even more efficiently.

The role of consumers is also highlighted in the promotion of sustainable packaging. Conscious consumers who prefer environmentally friendly packaging can encourage companies to invest more in sustainable technologies and reduce their ecological footprint.

Visit in Europe's Largest Paper Museum

The Hungarian Paper Museum is located in Dunaújváros, on the second floor of the visitor center of Hamburger Hungária Kft., where the permanent exhibition - the Adventure of Paper History - is displayed in 30 thematic rooms, covering 1.000 m². There are more than a thousand of original objects, and many old paper items. Each of the museum's 77 windows has a watermark.

The aim of the Hungarian Paper Museum Foundation, which created and operates the museum, is to interactively present the material, cultural and intellectual heritage of Hungarian paper and watermark history, paper making and production, paper processing and trade. Its curators are constantly working on compiling and uploading the database of the Digital Hungarian Watermark Database to the free international database "memoryofpaper".

We would like to say thanks to dr. Julianna Katalin Buncsák for the president of the Foundation for the Hungarian Paper Museum and also to Mr. Jenő Pelbárt for the director of the Hungarian Paper Museum, to introduced us the museum.

The exhibition rooms of the museum are named after notable figures in the history of paper and watermarks. Celebrities of many nations can be recognized in this way: the Chinese Cai Lun, the Italian Cardinal Gentilis, but also Hungarian celebrities such as Róbert Károly or Gáspár Heltai.



The presents of the most important events and material memories of the universal history of paper begins in the Cai Lun room. Here you can marvel at the "wasp paper", many types of ancient Chinese paper, related inventions, the "soul-money", freehand paper cutouts from the old days, papier-mache masks, and military costumes made of paper. But here we also seen interesting copies of the first Chinese paper money and banknotes.

The First Paper Memorial in Hungary

In the first two hundred years of Hungarian paper use, paper came to Hungary from abroad. The first paper relic in Hungary is more than 700 years old and dates from 1310, the paper of which was produced in Fabriano, Italy.

This was the first document issued by Cardinal Gentilis de Monteflorum, papal legate, on May 2, 1310, in Pozsony (Bratislava). - In the spring of 1308, Pope Clement V sent the cardinal, who was blessed with extraordinary diplomatic skills, to Hungary as his personal envoy to resolve the protracted Hungarian throne dispute and to effectively support Róbert Károly. Papal legate Gentilis' activity in Hungary and this document issued by him in Hungary facilitated very important state law events. He put an end to the ten-year war of succession and the strife of the Hungarian oligarchs, contributed to the restoration of the country's stability, consolidated church discipline and facilitated the establishment of central royal power.



Papermaking in Hungary

In historical Hungary, at the beginning of the 16th century, papermaking began in the county of Szepes. The first paper mill was established north of the city of Lőcse. We do not know the exact date of its foundation, but it probably started operating before 1515. The first reliable data from this period is about the destruction of the paper mill. According to the first domestic paper history manuscript, this paper mill burned down on November 24, 1530.

Moving on, in the Spillenberg room, a huge interactive map recalls 200 Hungarian paper mills of the past half a thousand years. In the same place, there is a large waterwheel paper mill model from the 18th century. On this working model, which was made to scale based on the original technical drawings and tool lists, you can study the structure of the workshops of the historic Hungarian paper mills.



As the director Jenő Pelbárt said, this model shows the equipment and operation of the paper mill in Sólly. Its ruins can still be found today in Veszprém county, on the border of the village of Sólly, on the banks of the Séd stream. The wall on the side of the stream still stands up to the first floor level, but elsewhere only traces of the walls are visible.



Memories of Modern Times

The first Hungarian paper mill was founded by Smith and Meynier in Fiume in 1827, called M. Kir. Szab. Első Fiumei Géppapírgyár. After that, on the one hand, the mechanization and conversion of the larger Hungarian paper mills into factory began, and on the other hand, the construction of many new paper mills. After the signing of the Trianon Peace Treaty in Paris in 1920, the Hungarian paper industry gradually revived from 1923. A number of new paper mills were founded in joint-stock and other corporate forms.

Numerous paper testing tools and equipments from the past of the Hungarian paper industry can also be viewed at the exhibition. For example, immersion screens, watermark cylinders of Diósgyőr Paper Factory. In the room showing the former paper factories of the Papíripari Vállalat, you can see the memories of the industry and the 17 factories between 1963 and 1993.

But messages from members of the Digital Literary Academy, poets and writers can also be seen on the walls to the people of the 21st century, about what paper means for them.



Playful Learning in the Museum

In the education room of the museum, children's toys, exercise books, stationery, old cards await students and playful adults.

Paper folding and cutting, dry stamp printing, watermark drawing and painting are also available here. The content of the sessions is also related to several school subjects (environmental studies, technology, geography, history, drawing, visual culture, religion, ethics).

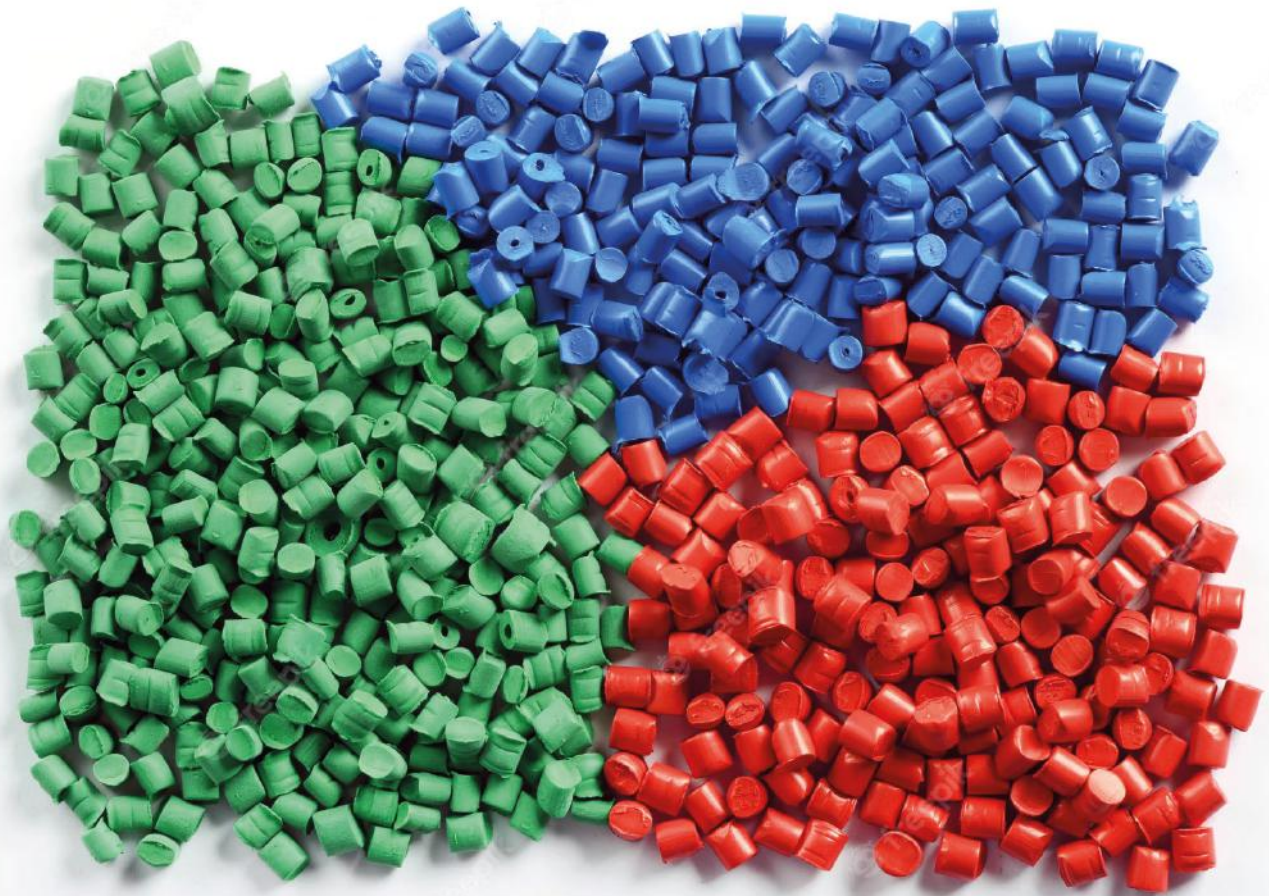
One of the most exciting locations of the guided tour is the paper dipping workshop and paper machine room, where visitors can try the paper dipping. They can choose a water-marked immersion screen and take home the hand-dipped paper after drying.

When and Where Can the Exhibitions be Viewed?

The permanent and temporary exhibitions can be visited throughout the year from Monday to Friday between 8 a.m. and 4 p.m. at Papírgyári út 42-46. in Dunaújváros, Hungary. We have asked Dr. Katalin Julianna Buncsák and she said, after a registration the museum is also open on Saturdays for groups.

More informations available on the website of the Hungarian Paper Museum <https://magyarpapirmuzeum.webnode.hu/>





The World of Plastics

Natural Polymers

Organic polymers play a crucial role in living organisms, providing essential structural materials and participating in vital life processes. For example, the solid parts of all plants are composed of polymers. These include cellulose, lignin and various resins. Cellulose is a polysaccharide, a polymer made up of sugar molecules. It consists of a complex three-dimensional network of lignin polymers. Resins are polymers of a simple hydrocarbon, isoprene. - Another known isoprene polymer is rubber.

Artificial Materials

Alexander Parkes presented the world's first artificial plastic at the London International Exhibition in 1862. "Parkesine," as it was called, was marketed as an alternative to ivory and horn. Although the product was not a commercial success, Parkesine represented an important first step in the development of artificial plastics. It wasn't until John Wesley Hyatt in Albany, New York discovered an improved version of Parkesine, celluloid, that the material really began to show its potential value and variety of uses.

While Parkesine was created from organic compounds, particularly cellulose, Dr. Leo Bakeland created the world's first fully synthetic plastic in 1907, called Bakelite. - This marked the beginning of the modern plastics industry.

In 1920, Hermann Staudinger proved the existence of what we know today as polymers. Plastics are just a subset of polymers, which can be used to describe any plastic, as well as many other naturally occurring organic compounds. - In fact, even our own DNA is a polymer.

A lot of plastics and chemical innovations appeared in the period around World War II

Polyethylene (PE) was created in UK in 1933 and was a state secret because the lightweight plastic was used to insulate radar cables, reducing their weight enough to be placed on aircraft and giving British aircraft a significant advantage.

Polystyrene (PS) became a substitute for rubber in the copolymer of polystyrene and butadiene, styrene-butadiene rubber.



Nylon was launched by DuPont around 1939 and was in extremely high demand in the United States, with up to 4 million pairs of stockings bought in one day. During World War II, nylon was used extensively for parachutes and other war materials, such as airplane cords and ropes.

A Dow chemist accidentally created expanded polystyrene (EPS) in 1941, and this strong, lightweight plastic became a useful insulator and shock absorber.

After World War II, plastic manufacturers turned to the production of consumer goods, finding a market for the materials developed during the war. Polyester was introduced in the 1950s and polypropylene, now one of the most widely used polymers in the world, started in 1954 and has become a very useful polymer due to its adaptability.

During this period was developed the high-density PE (HDPE), which is used today to make many plastic products. Although it initially showed promise in creating strong, chemical-resistant plastic products such as bottles and pipes. But the HDPE's future was uncertain because initial production batches were not as uniform as samples made in the laboratory. The warehouses were full of unsold, non-specific HDPE until the hula hoop craze of the late 1950s, which required such a huge amount of plastic that the demand for the toys consumed the accumulated stock in the warehouses in six months. This gave manufacturers time to fix problems with the material and make it more reliable for different applications.

The Nobel Prize in Chemistry in 1963 was jointly awarded to Karl Ziegler and Giulio Natta "for their discoveries in the chemistry and technology of polymers". For example, for the creation of the catalyst bearing their name, which enables the

production of polypropylene.

The polysulfone family of thermoplastics, introduced in 1965, was best seen on the gold foil visors of Apollo-era spacesuits.

Para-aramid synthetic fiber, commonly known as Kevlar, was also introduced in 1965. It was first used in the field of car racing to replace steel in tires, and has since found many other modern uses, such as in bulletproof vests.

Oil embargoes in the 1970s led consumers and companies to focus on bio-based and biodegradable plastics, both for environmental protection and economic necessity.

In the late 1980s and early 1990s, bioplastics provided a direct response to these concerns, but, like the rubber craze of the 1830s, the excitement surrounding them died down when the products failed to fully meet consumer expectations.

Research and development has continued and bioplastics have been revived to meet the renewed interest of consumers and brand owners in sustainable polymers.

Today, plastics are renowned for their sustainability, strength and design flexibility, finding unique and innovative applications in sectors such as health and medicine, automotive, aerospace, construction and, of course, packaging.

The Power of Plastics

Few materials in human history have been as versatile as plastic. Researchers in this industry are working to find new ways to adjust the properties of these materials, including reuse, recycle, thus finding the way for a safer, healthier and more sustainable future.

Before Plastics, Instead of Plastics

You can reduce the use of plastic bags, reuse old plastic cups and recycle plastic drink bottles, but nowadays it will be difficult to completely avoid plastic when buying food and drinks.

This has not always. At one time, foods have produced and consumed locally. If no one in the area kept a pig, there was no way to have bacon for breakfast. With the Industrial Revolution, foods spread farther and faster and had to be transported in some form of packaging. This is how food packaging was born.

In the early days, packaging was limited to high-end products. Cans were expensive and cardboard and paper could not withstand rain or moisture. In 1898, Nabisco pioneered consumer packaging when they placed their Uneeda brand of biscuits in

waxed paper and then in a tray-like cardboard box.

By the 1920s, packaging had become more than a simple means of transporting food. Historically, grocery stores weighed the products to customers, but that changed in 1916 with the opening of the first Piggly Wiggly as the very first self-service grocery store in Memphis, Tennessee, USA. Prices were kept down by having customers serve themselves. In this way, the food had to "sell" itself.

Plastics slowly entered grocery stores after the World War II. It was cheaper and less prone to breaking than glass, and became the bottle of choice for liquids in the 1960s. Today, a diet limited to foods that have never come into contact with plastics is quite difficult to achieve.

Here's what it was like before plastic took over the grocery stores

Milk

It was available in glass bottles that were sterilized and reused.

exchanged them for pocket money or bought sweets.

- No one bought bottled drinking water.

Carbonated soft drinks, beer and other drinks

These drinks could be purchased in glass bottles. Children often took them back to the store and

Fresh products

Fresh products were typically limited to local, seasonal products. Exceptions to this were bananas, citrus or other durable products that could withstand long and even sea transport.





Frozen products

Out-of-season fruits and vegetables were only available in cans or glass containers. In the countryside, many people had canned goods for the colder months in their cellars. Single-dose packages would have been unthinkable.

Meats

The meat was selected at the butcher's counter and the required amount was wrapped in paper for the journey home.

- Cheese was sold similarly.

Portable food storage

Workers and school children packed their lunches in fabric or leather bags or metal food boxes. To minimize drying out of the bread, the sandwiches were wrapped in waxed paper or sometimes in slightly moistened cloth.

Snacks

Candies, cookies, crackers, and other treats were often sold in bulk and served in paper bags. Tins with lids were often repurposed to store food or other household items.

Bread

Those who did not make it themselves bought it

fresh from the bakery and stored it in a bread box at home.

Cleaning products

Household and laundry cleaners were usually powdered and sold in cardboard boxes. Liquids were sold in glass bottles.

Personal hygiene products

Soap was only available in solid form and was usually sold in paper packaging, as it is still available today. Shampoo and other liquid hair care products were available in glass containers.

Pasta and other dry foods

Rice, pasta, dried beans, dried fruit, nuts, and other dried foods were available for purchase in bulk and by weight. They put it in a paper bag or a container brought from home.

Home delivery

Fresh produce was often carried in woven bags, which could become dirty, as the food was not washed before sale. The rest of the food would be placed in baskets, boxes or canvas bags for the journey home. It was common, in the absence of home refrigerators, to buy only the items needed for the day.

Biodegradable and Bioplastics - Materials of a Sustainable Future?

Biodegradable and bioplastics are innovative materials that can contribute to a sustainable future and environmental protection. They have properties that allow them to decompose faster and reduce their ecological footprint. Let's take a closer look at the history, types and areas of application of biodegradable and bioplastics.

History and Development

The demand for plastics that are more environmentally friendly and break down faster has grown stronger over the decades. The first biodegradable plastic, polyhydroxyalkanoate (PHA), was discovered in the 1920s, but its commercial production has only become significant in recent years.

The development of bioplastics gained momentum in the second half of the 20th century, when researchers began to produce plastics from alternative sources such as vegetable oils, cellulose or corn starch. These bioplastics are partially or completely derived from renewable sources.

- Although there is a polemy about whether they really have a lower carbon footprint over their entire life cycle than traditional plastics.

Some Biodegradable and Bio-plastics

Polylactic acid (PLA): Polylactic acid is often produced from corn starch or sugar cane. It has a wide range of uses, including food packaging, single-use containers and biomedical applications.

Polyhydroxyalkanoates (PHA): PHA bioplastics are polymers produced by microorganisms that are biodegradable. They can be used as packaging material, especially for food products, in agricultural applications and also in the medical field, for example as absorbable suture material.

Natural fiber-based polymers: These bioplastics are made from plant materials such as wood or cellulose. It is used in packaging, construction applications and textiles.

Similarly, mycelium packaging made from



mushroom filaments provides a sustainable alternative due to its biodegradable and versatility.



Environmental Benefits

The big advantage of biodegradable plastics is that they can reduce the environmental burden compared to traditional plastics. For example, the pressure on landfills and the use of fossil resources. The use of some alternative raw materials relies on biomass sources, which are renewable resources, thus reducing greenhouse gas emissions and climate change.

Biodegradable and bioplastics can be important building blocks of a sustainable future. Through research and innovation, newer and more efficient bioplastics can be created, which burden the environment even less. However, in addition to progress, further efforts are needed to build adequate waste management and recycling infrastructure to maximize the potential of biodegradable and bioplastics for a sustainable future.

Circular Economy

The change away from plastic packaging requires a multilateral approach that includes consumer choices, industry practices and government regulations. Important aspects such as product compatibility, durability and environmental impact must be considered when choosing alternative packaging materials.

In addition, efforts should be directed towards reducing all packaging waste, promoting

recycling and reuse, and adopting circular economy principles. This requires the design of packaging that can be recycled, the introduction of efficient recycling systems and the encouragement of sustainable consumer choices. Just as we must not forget that packaging waste does not scatter itself. It is important to clearly inform and educate consumers for environmentally responsible behavior.



Green Packaging Innovations - to the Sustainable Future

Sustainability and environmental protection are increasingly coming to our daily lives and in the activities of companies. Within this, innovations in the field of packaging play a key role in reducing our ecological footprint and preserving environmental resources. Green packaging innovations are developments that prioritize sustainability while meeting the essential functions of packaging. In this article, we present some of the outstanding green packaging innovations that may point the way to a sustainable future.



Biodegradable Packaging

One of the most promising green packaging solutions is the development of biodegradable packaging. Many of these materials are based on biopolymers that degrade in the environment or in industrial composting facilities. In this way, they do not leave behind waste that pollutes the environment. For example, bio-based packaging materials made from corn or other plant sources can have significant benefits in terms of waste reduction and help reduce plastic pollution.

Thinner Packaging Materials

Green packaging innovations also include developments that minimize the use of packaging materials. New technologies make it possible to provide the same protection and functionality, but with much thinner materials. In this way, the use of raw materials can be reduced, and their production also requires less energy.

Use of Recycled Materials

Crucial to reduce the amount of waste and promote recycling from the point of view of environmental protection. The use of recycled materials in packaging can significantly contribute to sustainability. For example, recycled paper and cardboard packaging has a much smaller environmental impact, as it is made from existing raw materials. The same is true for packaging based on recycled plastics and other waste materials.

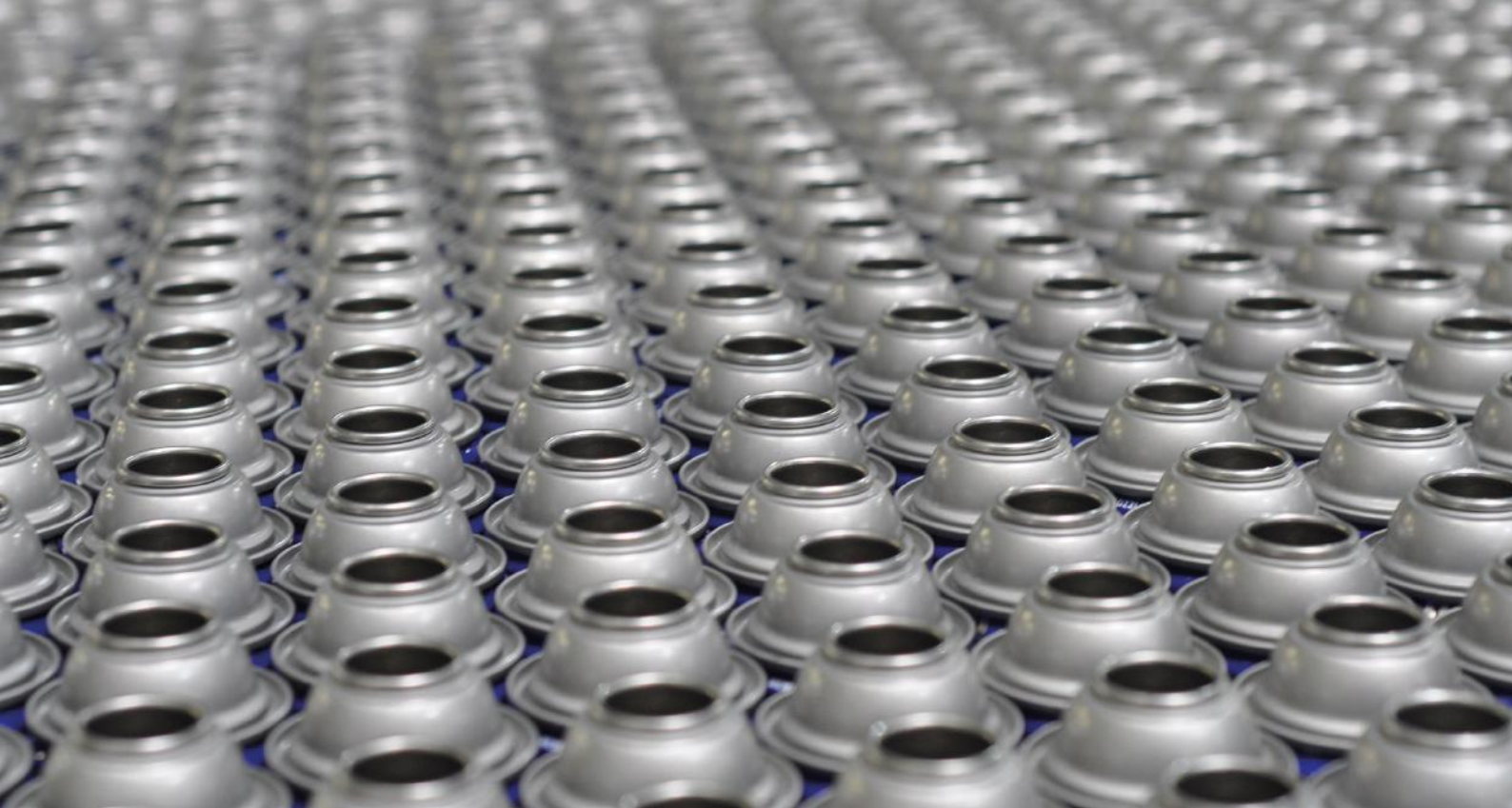
Water-soluble and Edible Packaging

One of the most innovative and daring green packaging developments is the development of water-soluble and edible packaging materials. These materials allow the packaging not to be removed from the product, but to simply melt or be consumed. For example, a water-soluble packaging that dissolves in a drink significantly reduces waste while providing a convenient and efficient packaging solution.

Conclusion

Green packaging innovations offer many exciting opportunities in the field of sustainability and environmental protection. The use of recycled materials, biodegradable packaging, more thinner and thinner materials or reuse are solutions that help reduce the environmental footprint of packaging. The development and application of environmentally friendly packaging is beneficial to whole society and helps create a more sustainable future.





Metal Packaging: Sustainability and Functionality

Packaging has become an integral part of our lives, and metal packaging plays a prominent role in this area. People have been using metal packaging for various purposes for centuries, and today these packaging materials are essential in our modern society. Due to their essential properties, sustainability and functional advantages, metal packaging has become a widely used solution.

One of the main advantages of metal packaging is their strength and durability. Metal packaging, such as boxes made of aluminum or sheet steel, protects products from external environmental influences such as shocks or changes in temperature. They are also resistant during transport and prevent damage or deterioration of the products. This not only increases customer satisfaction, but also contributes to sustainability by reducing product waste.

Another important advantage of metal packaging is their ability to maintain the quality of products in the long term. Their insulating effect against oxygen and moisture allows the products to remain fresh and safe for longer. This is especially important when storing food, as it prevents the

deterioration of materials and the growth of bacteria or molds.

Sustainability is one of the most important aspects when designing modern packaging solutions, and metal packaging is outstanding in this area as well. Due to their recyclability, metal packaging minimizes the amount of waste and contributes to environmental protection. Recycling aluminum and steel sheets offers both economic and environmental benefits. Recycling metal is more energy efficient than mining and producing new materials, thus reducing greenhouse gas emissions and depletion of natural resources.

In addition, metal packaging is also extremely versatile, it can be easily shaped, so it offers an ideal packaging solution for many products. For example package of medicines, beverages, cosmetics and many other products. In addition, they can be printed and decorated, allowing for a creative approach to product branding.

Of course, metal packaging also has its limitations and challenges. Energy-intensive processes are required during material production and processing, and the collection and recycling of

metal waste also requires organized infrastructure and investments. Issues of price and weight also matter, as metal packaging can be heavier, compared to other packaging materials and can affect product shipping costs.

A New Life Cycle Assessment of Metal Packaging

Metal Packaging Europe, the association of European manufacturers of rigid metal packaging, has carried out a new Life Cycle Assessment (LCA) for metal packaging, including aluminum beverage cans, aluminum and steel cans, steel aerosol cans, steel general and special packaging and steel closures.

Compared to previous LCAs, this study, which covers the life cycle of metal packaging manufactured in Europe, from raw material mining to production to end of life, records a significant reduction in greenhouse gas emissions.

The main factors that have made this development possible are:

- reducing the weight of the box by, for example, 2% for aluminum beverage cans and 1% for steel cans;
- and an increase in the recycling rate of aluminum and steel packaging, the recycling rate of beverage cans is currently 76%, and of steel packaging reaches 85.5%



In addition to the remarkable results achieved in the last few years, the European tin (tin-plated steel sheet) industry has achieved a further 8% reduction in greenhouse gas emissions.

Metal packaging perfectly fits with the circular economy. Both aluminum and steel can be recycled again and again without losing their properties, allowing the material to remain in the economy and reducing the need for primary raw materials.

From an environmental perspective, recycling metal packaging reduces greenhouse gas emissions associated with steel and aluminum production by approximately 50% and 60%.





Steel Recycling

Steel from cans and other sources is one of the most recycled packaging materials. Most cans are recycled at smelters, but consumers also directly recycle cans in a variety of ways, such as keeping little things in their garage.

Steel can be considered a closed-loop material: post-consumer waste can be collected, recycled and used to produce new boxes or other products. Every ton of recycled steel scrap saves 1.5 tons of CO₂, 1.4 tons of iron ore and 740 kg of carbon.

By recycling a single box, you can save energy equivalent to washing a load of laundry, watching TV for 1 hour or lighting for 24 hours (10 W LED bulb).

Smaller Carbon Footprint

That fact, all steel packaging causes CO₂ emissions at all stages of the manufacturing process, from raw material extraction, processing and manufacturing to recycling. However,

steel boxes are ecologically superior because the boxes are completely recyclable. The steel industry needs the used cans and uses them in the production of new steel products. By recycling the boxes and closing the circle, CO₂ emissions are significantly reduced. Global steel recycling rates may continue to increase as consumers become more aware of the benefits.

The CO₂ emissions of standard steel boxes are 30% lower today than 15 years ago and the use of recycled steel also results in 70% energy savings.

Overall, metal packaging offers significant benefits in terms of sustainability, functionality and durability. These packaging materials contribute to food safety, enable long-term storage of products, and thus reduce food waste. Due to their recyclability and versatility, metal packaging plays an important role in sustainable packaging solutions. Thanks to evolving technologies and continuous innovation, metal packaging continues to play a leading role in the modern packaging industry and contribute to a more sustainable future.

Packaging Design

Packaging as a marketing medium

Consider for a moment the design of the ring box. This traditional form of packaging creates the "stage" that presents the product to the (hopeful) bride. The design of the box is simple, understated, but elegant and pleasing to the eye.

This is a perfect example of how design and packaging work together to enhance the experience.

Product packaging fulfills many roles, such as recognition, marketing and protection of goods during transport.



In this article, we examine the relationship between physical packaging and packaging design

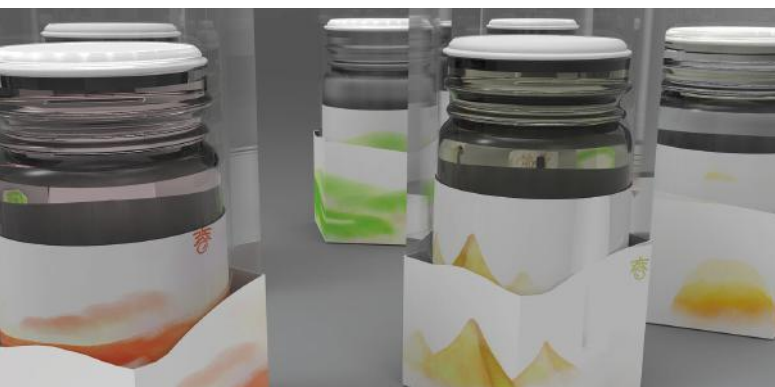
- What is packaging design?
- How to choose the best packaging for the product?
- How to design packaging for the brand?

First, let's clarify the definition.

What is Packaging Design?

The process of designing packaging so that the product can be identified, stored and transported safely.

Whether it's McDonald's hamburger boxes, Apple's iPhone packaging, the box for the new refrigerator or soft drink bottles, almost every product has packaging.



Designing the Packaging of Goods and Products

Designing product packaging is a bit more complicated than sticking a label on a cardboard box. First, must be defined the packaging. Does the product require flexible packaging or a rigid box?

- Designing graphic design and physical packaging
- Marketing and design

These are define design in a different way. Understanding these various aspects can help to find the best packaging for the product.

Graphic Design and Packaging

From a graphic designer's point of view, design is how the brand appears on product packaging.

In this sense, the design concept should attract the customer's attention, but also provide information about the product. The packaging graphics should also take into account the design and motifs of the brand and show it on the packaging.



The most extravagant design idea can be born, but if the packaging cannot be manufactured, it remains just an idea.

Marketing and Design

The use of packaging as a form of marketing, sometimes referred to as 'packvertising' (package advertising), is a key and often overlooked part of packaging design.

„Packaging design is the connection of form, structure, materials, colour, imagery, typography, and regulatory information with ancillary design elements to make a product suitable for marketing.“

- O'Reilly.

So, the packaging is an element of the marketing strategy, and need the following:

- Tell the brand's message to a well-defined ideal customer (buyer persona).
- The packaging should promote the product at the point of sale
- It communicates the brand's identity, since consumers will buy the products if the brand makes them feel something.

Physical Packaging

Another area to consider is the physical design limitations of product packaging. It is not only important how individual the packaging is, it must also preserve the safety of the product.

The best way to get an idea of what is actually available is to look at the packaging, shape, material and other aspects of competitors. It can be a good springboard to take the standard packaging solutions of the given industry as a basis and innovate on them.

Other factors to consider:

- Packaging materials that best suit the client's needs
- Available printing solutions
- Durability and weight of the finished packaging
- Finishing, such as embossing, UV varnishing, etc.

Emotions is the Key

Packaging is the most natural way to draw customers' attention to a product they haven't bought yet.

A unique shape, pattern or color can set the brand apart from the competition it sits next to on the shelf. Once it has the customer's attention, the smaller elements take over. For example, the images and the form of communication that created the connection and trust between the product and the customer.

We will continue this topic in the next issue of Focus ON magazine.

In the meantime, let us know what you think on packmarket@packmarket.net

The History of Glass

The history of glass is a fascinating journey that reflects the evolution of human abilities and technology. Based on the principles of continuous innovation and sustainability, glass remains an outstanding material that contributes to the improvement of human quality of life and industrial development.

Every glass bottle that we open is part of a tradition spanning thousands of years. Glass is one of the oldest materials closely intertwined with cultural history. Glass is used in art and architecture, as well as for food preservation and packaging. Every glass bottle is also a forward-thinking decision, because it protects the environment and conserves our resources due to the full recyclability of glass.

LET'S LOOK BACK IN TIME AT THE HISTORY OF GLASS

7000-1600 BC

Naturally occurring glass, especially the volcanic glass as fulgurite, obsidian and tektite has been used by many Neolithic Age societies, around 7000 BC, across the globe for the production of sharp cutting tools. This kind of natural glasses formed when quartz sand melts at extremely high temperatures and then the molten mass cools down. "Solidified liquid", this is the glass. Lightning creates such high temperatures, but so do volcanic eruptions and meteorite impacts.

The earliest evidence of glass in South Asia from the Indus Valley civilization is a glass bead found at Harappa, dating to 1700 BC. From the late Bronze Age 1600 BC, was discovered also glass beads during the explorations in Northwest Iran.

1500 BC

Around 1500 BC, the Egyptians produced the first hollow glass vessels used for ointments and oils. Glass was considered a luxury item and was reserved for the upper classes. Earliest works in the collections, which we can marvel at in museums, such as a pendant cast in the shape of a fertile woman, and a portrait of Pharaoh Akhenaten, in the Corning Museum of Glass, NY, USA and a fine goblet made of pale blue glass in State Egyptian Art Collection in Munich, Germany, exemplify these early efforts of glass-making.

658 BC

The library of the Assyrian king Ashurbanipal contains the first recorded recipe for making glass: "Take 60 parts of sand, 180 parts of the ashes of sea plants, and five parts of chalk." This is the formula that dates back to 658 BC and has been unmatched for two and a half thousand years.



300 BC

Beginning in the third century B.C., during the Hellenistic period, a new method, the mosaic glass became popular. Roman glassmaking developed from Hellenistic technical traditions. Glass objects have been found all over the territory of the Roman Empire. Glass was mainly used to make vessels.

100 AD

In the 1st century AD, there were a rapid technical development, resulting in the introduction of glassblowing and the dominance of colorless glass. By the end of this century the large-scale production resulted in the establishment of glass-houses, for example in Alexandria.

11th century

Let's take a big step back in time! From the 11th century, Venice became the center of glass production in the Western world. Especially in the production of pure crystal glass.

12th century

In the 12th century, stained glass – glass with metal added for coloring – spread and became an important medium in Gothic art. It was that brought light to the castles and cathedrals of the Gothic era. The crown glass process was used until the middle of the 19th century.

1688

Mirrors are born.

According to some sources, glass mirrors were being produced in Islamic Spain by the 11th century. But the fact in 1688 in Saint Gobain, France the glassmakers firstly produced glass sheets that was all the same thickness. That was ideal for making mirrors for decorate the palaces.

1867 - 1898

In 1867, Friedrich Siemens successfully converted an old furnace into a continuous, cross-fired furnace equipped with regenerators. Because the tile stoves equipped with the regenerator only consumed about one-tenth of the fuel of the old stoves. The furnace had three chambers – smelting, refining, and working – separated by partitions.

In 1898, Pilkington invented Wired Cast glass, where the glass incorporates a strong steel-wire mesh for safety and security.

1903

The American Michael J. Owens invented the fully automatic bottle blowing machine. A suction and blowing process was used, that is, the glass drops are sucked into the metal mold and cut off automatically. This "miracle machine" could produce 2,500 bottles per hour.

1925

In 1925, the engineers Ingle and Smith registered the patent for the IS machine. This produces hollow glass using the blow-and-blow technique, a production method that is still used to this day. A gob is pre-blown in a metal mould, then the pre-shaped gob is delivered into a second mould where blowing is completed.

Present age

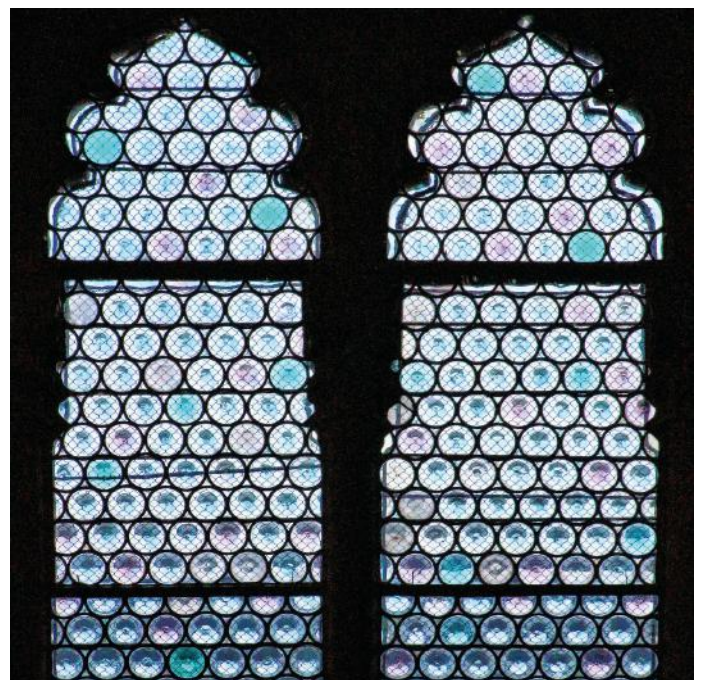
In the second half of the 20th century, it was pri-

marily the introduction of electronically controlled machines that increased the production volume for glass manufacturers. New processes for making lightweight glass help protect the environment and preserve our energy sources. Glass is an integral part of our lives. It is used in research, communications technology, architecture and solar systems. Glass is the ideal packaging material for drinks, food and cosmetics.

Glass packaging for food preservation has been growing ever since and has reached millions of homes. We use it every day, but what makes it so reliable? Glass is a non-reactive material, which means that almost anything it comes into contact with will not react with it. When it comes to food preservation, this is the key. If a glass container or storage container is sealed well, air cannot get in or out, so the food and drink remains perfectly healthy and edible. In the modern age, glass packaging is recognized by consumers as one of the most recyclable and environmentally friendly packaging materials.

How does the long tradition of glass contribute to modern packaging?

Glass is an ancient material with a rich cultural heritage, but it is just as important in modern life. Nowadays, glass packaging fulfills many tasks. It serves important sectors such as the food, beverage and pharmaceutical industries, as well as the perfumery and cosmetics sectors. It is a healthy, reusable and infinitely recyclable packaging material and supports circular economy efforts.



A Brief History of Glass Bottles

Glass was rarely used to make bottles or jars until the mid-1800s. Before that, earthenware and ceramic containers were the most popular storage containers, but during the Industrial Revolution, blown glass bottles became the containers of choice. During the Victorian era, people were concerned about a range of diseases, and pests carrying many diseases were a major health problem. These have made local pharmacies important players in the fight against disease.

As the food industry grew and provided more and more food for the population, interest began to focus on chemicals to kill insects and eliminate plant diseases. In the Victorian era, almost everything was seen as some kind of disease that could be controlled and cured with various chemicals and remedies.

According to the documents, medicine bottles were the largest and most varied glass bottles produced from the late 1800s to the 20th century. During this time, many thousands of brands and variants were produced. Before Thomas Edison invented the electric light, large letters began to appear on the front of bottles. In the days of candlelight and gaslights, there were many cases of someone choosing the wrong bottle and poisoning themselves or someone else. The use of large paper labels with skull and crossbones was another way early glass bottles were marked to indicate their contents. Most of the early medical bottles can be recognized by their size and color. For example, dark green or cobalt blue bottles with large mouth openings.

Paper labels were introduced much later and were used to advertise the product in the bottle. Early glass bottles had the name of the pharmacy or company on the front or side of the bottle, but did not include the name of the drug it was filled with.

Bottles without labels or relief lettering can be a bit of a challenge to identify, but many products consistently used certain types of bottles. One of the early brands to appear on restaurant tables was the famous Tabasco from Avery Island, Louisiana, in its signature small-necked bottle. Today, Tabasco is still the only bottle that quite a few five-star restaurants allow on their table. Around 1880, several large glass factories opened and began making bottles for various sauces and other food products.



And by the late 1880s, glass bottles had become a common household item used to preserve food.

With the increase in production, the variety of shapes and sizes of glass bottles and jars also increased

One of the main milestones in the spread of glass bottles was the rise in popularity of soda water and then carbonated soft drinks. By the late 1880s, almost every drugstore had a specialty soft drink, but none were as successful as Coca-Cola. In 1889, according to company documents, two lawyers from Chattanooga, Tennessee, USA, traveled to Atlanta to meet John Pemberton, the inventor of Coke. The meeting discussed expanding the business and setting up bottling plants in the United States. This included plans to develop a specially shaped bottle to help develop the Coca-Cola brand. It was perhaps one of the first times a bottle was designed to be a major selling point of the product. The rest is history, as the Coca-Cola bottle is known worldwide.

How does environmental pollution begin?

Packaging made of recyclable materials must be recycled after the end of its life cycle. At this stage, society must act conscientiously and not treat used packaging as garbage. If society does not act conscientiously, then environmental pollution begins.

Packaging has been of great benefit to humans since ancient times, and it is up to us to make sure that it does not harm the environment.

Packaging waste is by no means garbage. It often happens that the packaging of the fruit juice, food or the new computer you bought is thrown into the same garbage container as household waste. However, packaging waste is an important material that can be used as a secondary raw material in many sectors. If we are not aware of the

importance of packaging, we destroy our world's natural resources every day with our own hands. A more sustainable solution must be found, given that landfills are rapidly filling up with household waste. If all waste is processed correctly, there will be no garbage.

We can use almost all waste, not just packaging waste. The methods can be listed as follows:

Reuse: In this case the packaging can be used for the same purpose, in the same form or refilled, without having to be subjected to any process other than collection and cleaning, until it becomes impossible to reuse it within its own life cycle.

Recycling: According to the terminology, recycling is the processing of waste materials after use with certain physical and chemical processes, and then returning them to the production processes as raw materials. For materials that we know are made using recyclable materials, recycling is an appropriate disposal method.

Energy recovery: The process of burning combustible (certain calorific value) waste by itself or with other waste in specially designed facilities for the production of heat and electricity.

Composting: (organic recycling) Composting is the biological breakdown of organic matter under controlled conditions. During composting, certain organic materials break down into carbon dioxide and water. This process in industrial method takes place through specially designed stages, where 80–90% humidity and a temperature of around 60–65°C are required. After the process, the waste looks like a dark, humus-like soil.

With this method, compostable waste can be used as an energy source instead of fertilizer.

Wastes that cannot be treated with the above methods for technological and/or economic reasons, as well as wastes left after applying the above methods, have placed in structured storage. Over time, unsanitary landfills (wild dumps) will have to be closed and a full transition to a structured storage system is expected. However, the high cost of putting these facilities into operation and the difficulty of placing structured storage facilities, as well as the protection of our environment, make it desirable to recycle as much waste as possible.





Recycling

- Investing to the Future

Recycling, as a terminology, is the use of waste materials after they have been processed by certain physical and chemical processes and then reintroduced as raw materials into manufacturing processes. It is an essential part of sustainable development and environmental protection. It allows materials to be recycled and sold instead of being treated as waste and thrown away immediately. It plays a key role in conserving resources, saving energy and reducing greenhouse gas emissions.

Let's take a closer look at why recycling is so important

Resource conservation: Recycling allows us to reuse materials and resources instead of having to produce them again. For example, recycling paper reduces deforestation and the energy used to produce paper. Recycling reduces the extraction of raw materials, the use of water and the consumption of mineral resources.

Energy savings: Recycled materials often require less energy to process than new materials. For example, recycling aluminum requires about 95% less energy than producing it from bauxite. Saving energy contributes to reducing the use of fossil fuels

and thus reducing carbon dioxide emissions.

Recycling reduces the amount going to landfills, which can cause environmental problems in the long term. It also mitigates the environmental impacts associated with the production of new materials, such as water and air pollution or erosion.

Economic benefits: Recycling can also bring economic benefits. Recycled materials can be sold and used to make other products. This creates jobs and opens up new economic opportunities.

The meaning of the recycling symbols on the packaging

The symbols show what material the packaging is made of.

- The recycling symbol "1" indicates packaging material made of **Polyethylene Terephthalate (PET)**.
- "2" is the designation of packaging made of **high-density polyethylene (HDPE)** material.
- "3" indicates packaging material made of **Polyvinyl Chloride (PVC)**.
- "4" indicates the packaging material made of **low-density polyethylene (LDPE)**.
- The "5" in the recycling symbol indicates packaging material made of **Polypropylene (PP)**.
- The "6" in the recycling symbol indicates packaging material made from **Polystyrene (PS)**.
- The "7" in the recycling symbol indicates packaging material that is made from **a material other than the plastics listed above**.
- The recycling symbol "20, 21, 22...39" indicates that it is made of **paper/cardboard**.
- "40, 41...49" indicates that it is made from **metal**.



Responsible Use of Resources

Recycling is a key step, an investment to the future. Natural resources are not infinite and we will run out if we are not careful. They are rapidly decreasing as the world's population grows and industry advances. Therefore, recycling is one of the smartest things to do to protect and efficiently use our natural resources. Which can be an effective economic investment in the long term. The reduction of available raw materials and natural resources can cause economic problems, and recycling can have a positive effect on the economy at this point. It can create new employment opportunities and enable future generations to use the remaining natural resources.

We all have a responsibility to actively participate in recycling processes and support recycling in our daily lives. Small steps like selective waste collection and product recycling can help protect our environment and promote sustainability. With the help of recycling, we have an opportunity to make our world a better place.



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K Hand Coaters for easy, fast and accurate printing test



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Printing Today

With today's printing techniques, printing can be done in several ways, such as lithography, letterpress, flexography, gravure and screen printing, as well as the increasingly widespread digital printing. All of these printing techniques use simple mechanisms to quickly apply inks to media such as paper or plastic so that original images and texts can be distributed in large numbers.

Several colors can be printed on the printing

machine in one run. Spot color printing uses individually mixed inks to reproduce specific colors and is widely used in packaging printing, where large areas of solid color are common. Process printing uses four transparent inks – Cyan, Magenta, Yellow and Black (K) – by applying separate layers in small dots. Later, the hexachrome and heptachrome color systems were developed for the printing of extended color spaces, which complement the possibilities of CMYK with special colors.

A Brief History of Screen Printing

Screen printing dates back to the Song Dynasty (960-1279 AD), making it one of the world's oldest industries as a way of transferring designs onto fabrics. After that, it was adapted by other Asian countries, such as Japan, and further developed by new methods. Screen printing was largely introduced from Asia to Western Europe sometime in the late 18th century. Although technology has evolved exponentially over the years, the techniques and fundamentals adopted have remained the same.

The Printers' National Environmental Assistance Center says:

"Screen printing is arguably the most versatile of all printing processes." Since rudimentary screen printing materials are so affordable and readily available, it has been used frequently in underground settings and subcultures, and the non-professional look of such DIY culture screen prints have become a significant cultural aesthetic seen on movie posters, record album covers, flyers, T-shirts, commercial fonts in advertising, in artwork and elsewhere."

Screen inks have many advantages:

Creativity: They allow you to create unique and creative patterns, graphics and designs.

Universality: Screen inks can be used to print on almost any material and surface, including textiles, paper, plastic, wooden and metal surfaces, and glass.

Durability: Screen inks produce highly durable prints that can last a long time.

A variety of water-based, solvent-based or UV-cured screen inks produce vivid and rich colors that create an attractive and spectacular effect.



Lithography

The basic principles of lithography were defined at the end of the 18th century by Alois Senefelder, who experimented with the methods of producing limestone letterpress surfaces by acid etching. Senefelder found that a wet limestone surface repels oil-based printing ink, and an image drawn on the surface with a greasy pencil repels water and attracts the ink. Any drawing on the stone surface can be reproduced by bringing a wet sheet of paper into contact with the freshly painted image. This cycle could be repeated hundreds of times before the drawing could no longer be faithfully reproduced.

The process, which Senefelder called chemical printing, quickly became a popular art medium because it allowed artists to make multiple copies of freehand drawings. Inks had to be modified and mixed more thoroughly to successfully resist water. However, they were still based on linseed oil and



resin, with the addition of wax and other additives to improve print quality. The emulsion properties and water release of inks have become very important.

Offset Printing and Inks

Offset printing is one of the most widespread and important printing processes in the world. It is widely used in the production of newspapers, magazines, advertising materials, catalogs and many other printed products. This technology makes it possible to economically and efficiently make many copies of the same printed content without losing quality.

The function of the original stone surfaces is now fulfilled by thin aluminum plates. The plates are placed on the circumference of the pressure cylinder and are in direct contact with the rubber sheet. Rubber rollers transport the ink and water to the surface of the plate. The ink is applied first to the rubber sheet and then to the paper.

What is Offset Ink?

Offset inks are based on mineral and vegetable oils, resins and pigments. Traditional offset inks drying by oxidation, but modern developments have created inks that curables under the influence of UV light or electron beam (EB).

Advantages:

- Offset inks produce high-quality prints. Vivid colors and sharp details enable accurate reproduction of various graphic content.
- They are available in a wide range, not only in the CMYK color range, but also according to other color systems (SVOP etc.) and direct colors. Thus enabling printers to meet different printing needs and suit different color schemes.
- They are economical, which is an important aspect, especially at long run jobs.
- Environmentally friendly types of offset inks are becoming more and more common. Due to the low VOC (Volatile Organic Compound) content, negative effects on the environment are reduced.
- They are suitable for printing on various materials, such as paper, cardboard, plastic and metal surfaces.

Challenges and Limitations: Some challenges and limitations arise in connection with offset inks:

- **Drying time:** Although offset inks dry quickly, the time it takes for the ink layer to completely dry can be longer, which can make it difficult to process immediately.
- **Paper quality:** In order for offset inks to work effectively, it is necessary to use the appropriate quality paper or other support material. Poor quality or poorly prepared paper can significantly reduce the quality of the print.
- **Limited Flexibility:** Offset inks are great for high-volume, long-run printing projects. However, for smaller quantities or unique customized prints, other printing technologies such as screen printing or digital printing may be more suitable.

Offset inks are widespread and popular in the printing industry. The continuous development of technology and materials may bring additional benefits and improved properties in the future, making this important printing method even more efficient and environmentally friendly.

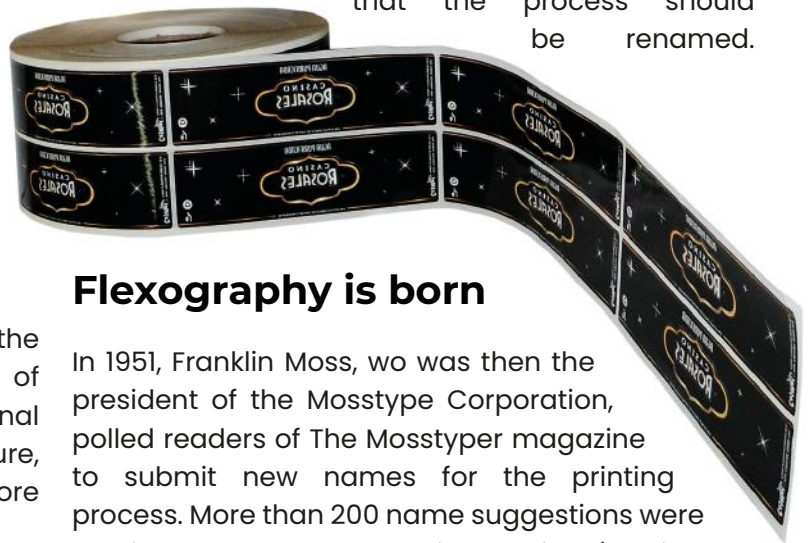
Flexography

Flexography (often abbreviated to flexo) is a printing process that uses a flexible printing form. Essentially a modern version of letterpress, developed with a high-speed rotary function, it can be used on almost any type of media, including paper, plastic films and aluminum foil. It is widely used for printing both on porous and non-porous substrates for various food packaging (also excellent for large-area single-color printing).

History

In 1890, the first such patented press was built in Liverpool, England by Bibby, Baron and Sons. The water-based paint smeared easily, so the device became known as "Bibby's Folly". In the early 1900s, other European machines were developed with rubber printing plates and aniline-based inks. This led to the process being called "aniline printing". By the 1920s, most of these machines were manufactured in Germany, where the process was called "gummidruck" or rubber printing. This name for the process can still be found in Germany today.

At the beginning of the 20th century, this technique was widely used for food packaging in the United States as well. However, in the 1940s, the Food and Drug Administration classified aniline dyes as unsuitable for food packaging. Print sales fell. Individual companies tried new names for the process, such as "Lustro Printing" and "Transglo Printing", with limited success. Even after the Food and Drug Administration approved the "aniline process" in 1949 using new, safe dyes, sales continued to decline as some food manufacturers still rejected aniline printing. Concerned about the image of the industry, packaging representatives decided that the process should be renamed.



Flexography is born

In 1951, Franklin Moss, who was then the president of the Mosstyper Corporation, polled readers of The Mosstyper magazine to submit new names for the printing process. More than 200 name suggestions were received, and the Packaging Institute's Printed Packaging Committee narrowed it down to three options: "permatone process," "rotopake process," and "flexographic process." The vast majority of postal votes cast by readers of The Mosstyper chose the last of these, the 'flexographic process'.

Evolution

At the beginning the flexography was not so high quality. However, thanks to continuous development, great progress has been made in the quality of flexographic printing machines, printing plates, inking systems and printing inks.

One of the biggest advances in flexographic printing has been in the field of photopolymer printing plates, including the development of the plate material and the method of plate making.

Digital "direct to plate" systems have recently undergone significant development in the industry. Companies such as DuPont, Kodak and Esko pioneered the latest technologies with the development of fast washout and the latest dot area technology.

Laser-engraved ceramic anilox cylinders, doctor blade and chamber inking systems also played a role in improving print quality. Photo quality printing is now possible, and some of the finer prints available today, combined with the skill of an operator, allow for quality that rivals the gravure printing process.

Flexographic inks

The requirements of the printing process, as well as the application of the printed product, determine the basic properties expected of the flexographic ink.

Flexographic printing inks are primarily designed to remain compatible with the wide variety of media used in the process. Each component of the product fulfills a special function separately, and the ratio and composition vary depending on the printing medium and substrate.

Today, **five types** of ink are most commonly used in flexography:

- Solvent-based inks,
- Water-based inks,
- UV-curable inks,
- Electron beam (EB) curing inks,
- Two-component, chemically curing inks.

The beginnings of inkjet printing

Inkjet printer technology was pioneered by Ichiro Endo in the 1950s, but inkjet printers did not become readily available until the 1970s. There has been speculation as to which company pioneered inkjet technology; however, it is difficult to say exactly who created this technology. Ichiro Endo worked with Canon in the 1950s, so some say that Canon was the founding company.

With the development of technology over the years, companies such as HP and Epson also played a significant role in the innovation of inkjet printers as we know them today. Water-based, solvent-based (Solvent and Ecosolvent) and UV-curable digital printing inks have been developed to suit different print heads.

Many people say it was a team effort, but companies may not feel that way. Instead, they chose to compete with ink cartridges. Perhaps that is why branded ink cartridges have become so expensive. There is no doubt that these produce excellent prints, however, they are often overpriced.

The Pack-Market does not agree that ink cartridges need to reset the bank account. Therefore, the Trading & Consulting division also offers discounted, high-quality digital inks from the EU. Which are made according to the same quality standards as the original manufacturers. That the best products are available to your customers. Buy inks that match your digital press, from our wide range of inks, see how much you can save on your printing costs, with prints of the same quality.



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Digital Printing and its Inks: The revolution of technology in the world of printing

The digital printing revolution has transformed the printing industry, enabling fast, high-quality and customized printing in many areas. The special feature of digital printing lies in the diversity of inks and their application possibilities. Take a look at our brief overview of digital printing and its inks.

Advantages of Digital Printing

Digital printing is a technology that allows computer files to be transferred directly to a printer without the need for a printing plates or traditional printing processes. As a result, digital printing offers many advantages:

Customizability: Digital printing enables the creation of uniquely designed and personalized prints, personalized messages, and the easy reproduction of images and graphics.

Speed: Digital printing enables immediate printing, as there is no need for lengthy preparations such as preparing a printing plate or making lot of adjustments. This is particularly beneficial for short deadlines or when printing small quantities.

Quality: Although there were bumps in the beginning, digital printing today provides high-quality prints with rich colors, fine details, and smooth transitions. The fine ink droplets of the process result in precise and detailed printing.

Flexibility: Digital printing can be used on a wide range of materials, including papers, cardboards, films, textiles and other different media. This en-

ables a versatile application from office printing to advertising graphics, from packaging to interior decoration.

Inks for Digital Printing

Inks for digital printing are available in different types, that fits for the specific printing technology and application.

Pigment inks: Pigment inks result in long-lasting and high-quality prints. These inks consist of particles that are firmly fixed on the printed surface, thus resisting water, fading, etc.

Sublimation inks: Sublimation dyes can be used for example on textiles with special printing technology. When the dye turns into a gas under the influence of heat, it passes through the fibers of the textile and is finally fixed in the fabric.

Transparent inks: These inks are specially made for large format printing, they are translucent, allowing the printing of light-transmitting materials such as glass or acrylic panels.

UV-inks: UV-reactive inks cure quickly under the influence of the radiation emitted by the UV tube or LED panel and provide extremely durable prints. This type of inks is great for outdoor and indoor applications including posters, labels and advertising graphics.



Digital printing and its inks have brought a real revolution in the printing world. The technology enables fast, customized and high-quality printing in a wide range of applications. A wide range of different types of inks ensures that we can find a solution to meet the needs of almost every project and material. Future developments and innovations are expected to further refine the performance and versatility of digital printing and inks.

Hall of Fame

Ms. Katalin Orgován

She is a printing industry engineer, at the suggestion of her mother, who was a printer, she graduated at the Könnnyüipari Műszaki Főiskola in '96. After that she worked as a foreign trader in printing houses, thus she was able to use her English and German language skills. After that, she held the position of technical director at Műszaki Könyvkiadó, and after the retirement of the managing director, she became his successor. Here, as part of a multinational group of companies, textbooks were published until the textbook market was nationalized. Then, the owners sold the publishing house.

After that, she became the CEO of Pátria Printing House Co., 9 years ago. – With a short detour, because her husband went to work at the embassy in Beijing and she accompanied him. She spent a year and a half in China, when her successor, who succeeded her as CEO, resigned due to health problems. Then the owner called her back from China. Although she had already worked at Canon China, she accepted the invitation and came back.

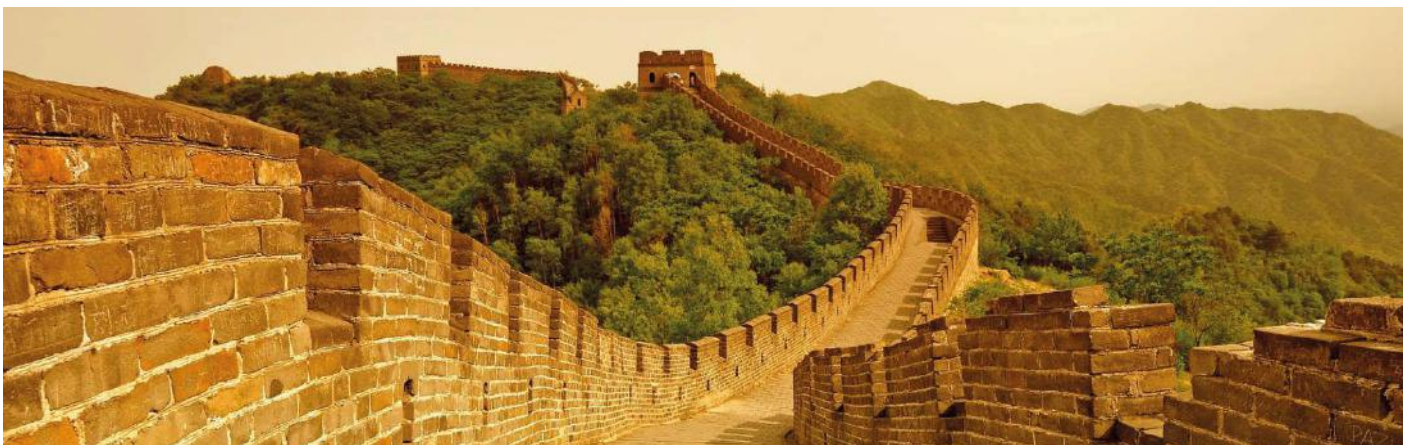
According to her own admission, she learned a lot from it, it also contributed greatly to her becoming the person she is today. In the meantime, she obtained an MBA degree at the Technical University. She also obtained a diploma in innovation and change management in UK, as well as studied marketing in postgraduate course. Her strengths are company management and people management. She especially likes Pátria that it is so complex, that there is a printing, commerce, stationery, retail and wholesale shops, and so on. That everything is connected to everything.



Ms. Katalin Orgován is the CEO of Pátria Printing House Co. and the President of the Hungarian Printing and Paper Industry Association

Since 2008, she has been a leader for fifteen years. She gladly imparts her knowledge, gives lectures on the above topics, and has also taught at the Metropolitan University.

In addition to various management and leadership issues, her favorite topic the women leaders and how to get a woman to the top? Because a lot of people have great careers, but few actually make it to the top. What is the obstacle of it, why does it happen, or how can they break through this glass ceiling?



Mr. Miklós Nagy

In 1977, he got his diploma as printing industry engineer from the Könnyűipari Műszaki Főiskola. But he was lured by the packaging industry before he graduated from college. The Material Handling and Packaging Institute (ACSI) was looking for an apprentice with a higher degree in printing for the cooperation with Kner Printing House, which was still in its infancy at the time. So, he entered the field of packaging technology, while has a connection with printing.

He worked for ACSI until the spring of 1993, during worked on his way up the ranks. He started as a designer, primarily in the field of paper-based consumer, collection and transport packaging systems. In addition to his initial design jobs, from 1982 he has got the position of the secretary of the HUNGAROPACK Hungarian Packaging Competition organizing committee. And from 1985 he became the head of the Packaging Advisory Service, created by the Packaging Section of the Hungarian Chamber of Commerce, considered the predecessor of CSAOSZ, and operated by ACSI. In 1988, he was assigned the position of head of department, and in 1990, as chief engineer, thus becoming the head of the packaging design area at ACSI.

In 1993, he became a business partner responsible for the packaging field at B&B Grafikai Stúdió Kft. Among the company's packaging tasks, in addition to counter displays and gift boxes, was important the printing preparation of graphic designs to the requirements of flexographic technology. Was a good feeling for him to see realized versions of their work in stores. Their company was a member of CSAOSZ, and he starts became the deputy of Kálmán Magyar in the Small and Medium Enterprises Department. In the fall of 2006, Dr. Béla Kertész, general secretary, invite him and began his third and current employment relationship with CSAOSZ.

His job for the Hungarian Material Handling and Packaging Association (CSAOSZ) was a completely different than previous ones. He tried to implement the observations that he experienced in relation to the association as a member company. He began to shape his work, as a service provider, to give useful informations for member companies. He and his colleagues began to organize technical courses and conferences, and publish the Hungarian Packaging Yearbook. In the summer of 2010, a few days



after the 20th anniversary of the founding of CSAOSZ, he was take over the functions of secretary general from the retiring Dr. Béla Kertész.

Almost at the same time as his appointment, the full transformation of Hungarian environmental protection regulations began, which is taking new turns again and again. As he says the Environmental Protection Product Fee Regulation could be made operational based on the professional arguments of CSAOSZ. It was an important feedback that the legislator accepts well-developed arguments and proposals.

Over the past ten years, CSAOSZ courses and professional conferences have become an integral part of their lives. They also developed their foreign relations. In 2014 and 2017 and after the pandemy in 2023 they had a community booth to introduce the Hungarian packaging industry at perhaps the world's most significant packaging exhibition, the Interpack in Düsseldorf. But also participated in Anuga FoodTec in Cologne in 2018 and in Nuremberg at Fachpack in 2019.

In 2016, the World Packaging Association had the spring meeting in Hungary. So, they not only held an international conference, but also organized the gala evening of the WorldStar Packaging Competition. That is still serves as a model.

The number of CSAOSZ members growing year by year, the professional community is expanding with valuable new companies and they look forward to the 35th anniversary of the Hungarian Material Handling and Packaging Association.

We have talked with Ms. Rita Pástyán graphic designer

Please share some thoughts about the world of graphic design. Could we start with how do you got into graphic design?

Few people can say they are as lucky as I am to have known as a child what they wanted to do in the future. This happened in my case as well, who always wanted to be a graphic designer, but after I was 40 years old only did I get the opportunity to work with graphics.

Even as a child, I loved to draw. The love of drawing accompanied me throughout my life. I am lucky because my job is my hobby, I can do what I like.

Really seems that you follow this path with passion. In the field of graphic design, what do you think is the most important thing to success?

This requires a number of factors. First, creativity and visual sense are extremely important. In addition, however, good communication skills are essential, as you often have to collaborate with clients in order to convey the right message and emotions through design.

Could you tell us something about the challenges in your daily work?

One of the biggest challenges is to always come up with new and original ideas. While also taking into account the expectations of the customers and the goals of the projects. In addition, technology and trends in the field are constantly changing, so it is important to constantly learn and improve myself.

Do you have a project that was especially memorable for you? And why?

Quite difficult to highlight a specific project because there is something special in every job. One of my favorites was designing a logo, where an initial idea was eventually developed into a whole visual identity. During the creative process, I was happy to see how the idea becomes a reality.

How do you can help to our readers needs in graphic design?

I can create unique illustrations for example for poetry books, family or friend events, weddings, anniversaries, but one thing is common in all of them, the work done with heart and soul, which makes each illustration a thoughtful and heartfelt gift.

I can create illustrations for practically any occasion, whether it's for a wedding, birth of a baby, a birthday, but I have also been commissioned to work for graduations and retirement parties.

Thank you for sharing your thoughts and experiences in the field of graphic design. I'm sure you can help to our readers with your creative ideas. We pleasure recommend the graphic services of Rita Pástyán, her clients will surely be satisfied!

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