

**SYNTEGON**

PROCESSING & PACKAGING

# Every cookie and cracker counts.

Trends and challenges in packaging technologies for fragile products.



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# Executive summary

03 | Even cookies and cracker counts | 2025

SYNTEGON

Cookies, crackers, biscuits and the like are a delight for consumers around the world – and a challenge for manufacturers everywhere. Offering different shapes and sizes no longer suffices in the battle to win over ever more demanding clientele. Instead, baked goods producers have to keep an eye on various market and consumption tendencies. Taking these trends seriously and adjusting product portfolios and equipment accordingly are key to sustained economic success, and to securing a strong foothold in a market that hardly ever stands still.

This whitepaper focuses on the trends that shape this highly dynamic market, such as consumption habits and dietary choices, and on the challenges and implications that arise for cookie and cracker producers in the long term. Besides providing an in-depth analysis of these drivers and the corresponding requirements, the whitepaper compiles successful customer case studies from around the globe. They demonstrate how manufacturers respond to these challenges in different production environments, for highly specific products and at varying levels of automatization, with a focus on handling and infeed technology.

## MARKET SITUATION AND DRIVERS

In the cookie and cracker market, growth is as multi-faceted as the products themselves, with cookies accounting for 42 percent of the global market, followed by crackers at 25 percent.<sup>1</sup> Double-layer cookies with filling (sandwich-style cookies) are in third place at 13 percent,<sup>1</sup> while specialty products and artisanal creations show low single-digit growth rates. Growth further varies by country, with a particularly strong development in South Asia and Southeast nations: the highest annual growth (8.6 percent) is in India, the Philippines (4.4 percent) and Indonesia (4.1 percent).<sup>2</sup>

Although highly diverse, consumers around the world share several concerns and habits that ultimately have an impact on demand: Health aspects, premiumization, individualization, sustainability and convenience factors are among the most notable market drivers. Besides asking for products and ingredients with a clear health benefit, consumers opt for cookies and crackers that make a difference on the shelf, that speak to their personal preferences and ensure sustainable production, e.g. via the use of less traditional sugars or oils. Single-serve packs and longer shelf lives have been on the rise ever since the COVID-19 outbreak, adding a twist to the already booming convenience market.

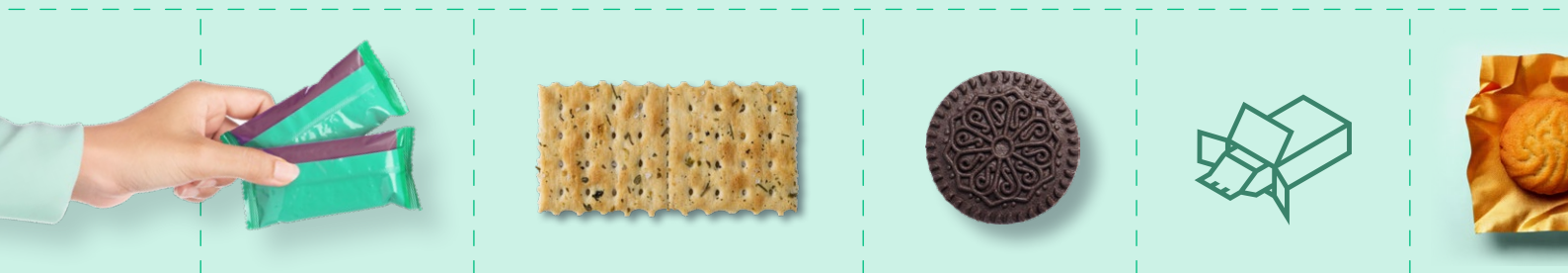
## HANDLING AND INFEEED SOLUTIONS

Given the highly specific nature of cookies and crackers, no two handling or infeed solutions are the same. Producers require customized solutions that meet their requirements exactly. For the most common handling styles, flat and on-edge, this whitepaper provides an overview of selected reference systems that not only span continents, but also products and pack styles, from classic crackers in Asia to donut-shaped goods at a local Portuguese bakery. These case studies cover the most pressing manufacturing issues, including overall equipment effectiveness (OEE), cleaning, format changes and footprint, each example offering easy-to-read summaries of customer challenges and benefits.

# Introduction.

## THE COOKIES AND CRACKERS WORLD AT A GLANCE

No other food segment is quite as diverse as the cookies and crackers market. Whether round, square or oval; sweet or savory; with a chocolate coating or jam filling; with crispy nuts and chocolate pieces; made from wheat, oats or whole grain – the choices are endless. While this huge product variety is delightful for consumers, for manufacturers it poses the challenge of finding the right packaging technology for their products.



### MARKET TRENDS

Understanding these market trends and their impact upon production, handling and packaging is crucial. The following trends determine flavor, appearance, ingredients and packaging:

- Health aspects and dietary requirements
- Consumers looking for premium products
- Individualization thanks to tech innovations and personalized marketing
- Demand for organic ingredients and sustainable packaging
- Growth of convenience products and home cooking
- Shortage of qualified labor

### HANDLING: THE STAKES ARE HIGH

When it comes to long-term production flexibility, future-proof handling and infeed solutions play a key role in cookie and cracker manufacturing. The technology has to offer high overall equipment effectiveness (OEE). Key features that manufacturers are looking for are buffer capacity, quick cleaning and format changes as well a gentle handling to avoid expensive waste. Depending on the desired pack style and the product consistency, cookies and crackers may be packaged on-edge or flat, with or without trays.

It is essential to work with a trusted partner who fully understands the needs and product requirements of the cookies and crackers industry. A company with a broad portfolio will be able to consult manufacturers and develop together the best turnkey system solution for the given project.

### THE WHITEPAPER

The cookies and crackers market holds a number of challenges for manufacturers. This whitepaper introduces the current market trends and provides an overview of handling and infeed technology using practical case studies to illustrate the different solutions.

The whitepaper addresses cookie and cracker manufacturers in general. More specifically, it is geared towards those who are looking for new handling and infeed solutions to help them address market trends flexibly and to reach their growth targets.

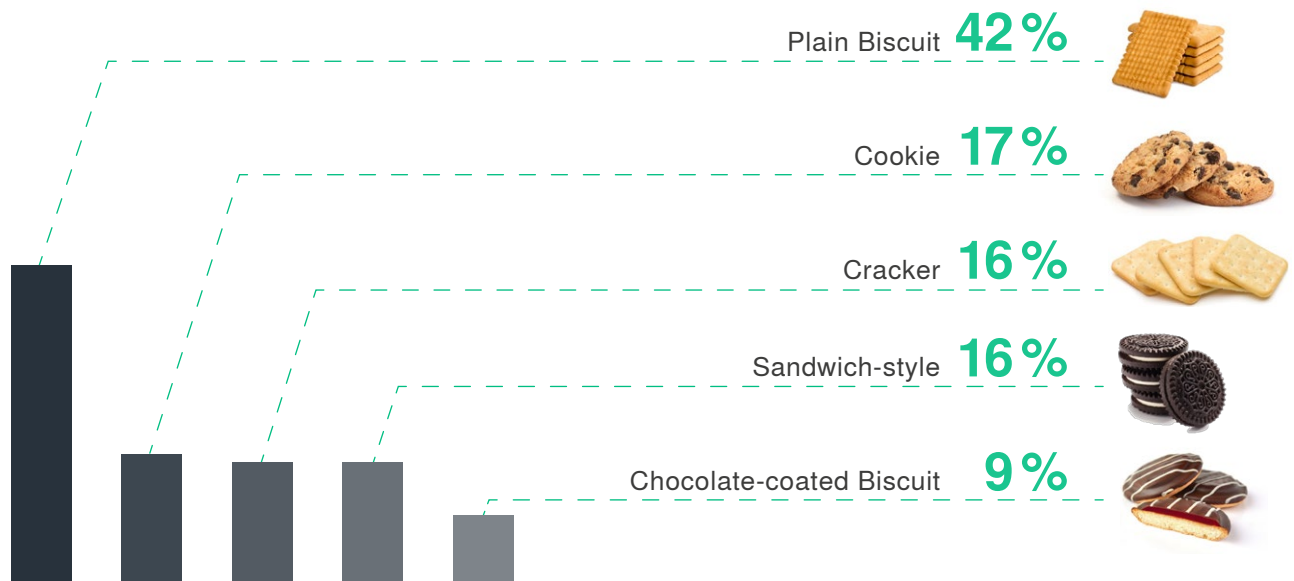
### THE WHITEPAPER EXAMINES THE FOLLOWING QUESTIONS

- Which trends are currently relevant within the cookies and crackers market? How do these impact on handling and infeed solutions in the packaging process?
- Which handling and infeed solutions are best suited for different products? What are the advantages of on-edge and flat handling, respectively?
- What handling and infeed solutions have other manufacturers selected based on their individual situations? What are the benefits of these solutions?
- How can I unlock the full potential of my production?

# The future market for cookies and crackers.

Cookies and crackers win over consumers with their enormous range of shapes and flavors. As a result, these creations cater to a broad range of tastes and preferences. And there is no end in sight: By constantly rolling out new products, manufacturers are doing their best to keep curious consumers loyal to their brands. Doing so calls for flexible production, which allows manufacturers to quickly respond to the needs of diverse customers. The following pages offer an overview of the most important figures and trends in the market.

Allocation of biscuits, cookies and crackers globally



Source: GlobalData Database, 2021

## NOT ALL COOKIES ARE CREATED EQUAL

The market segments for the different types of cookies and crackers vary considerably. According to data gathered in 2024, plain biscuits account for 42 percent of the global market, followed by cookies at 17 percent and crackers at 16 percent.<sup>1</sup> Double-layer cookies with filling (sandwich-style cookies) are in fourth place at 16 percent.<sup>3</sup> Variants with a chocolate coating make up 9 percent. The remainder of the market consists of specialty cookies and crackers with novelty shapes (e.g. hearts, Christmas trees) and hand-made products (artisanal cookies).<sup>2</sup>

Further, not only are there significant differences between the product types, the same is true for geographic regions (see graphic below). The Indian cookie and cracker market is largest by volume, followed by China and Brazil.<sup>2</sup> All of these markets are still growing. Today's consumers are more likely to treat themselves to healthy treats. In this respect, the premium segment with small pack sizes plays a key role. Nevertheless, the trend should be taken with a grain of salt, since many consumers are also trying to keep their sugar and carbohydrate intake low.<sup>4</sup>



Bedtime cookies with chamomile or lavender have become more and more popular.

## HEALTHY, INDIVIDUAL AND SUSTAINABLE – A MARKET IN FLUX

The variety of individual products now available is matched by the diversity of consumer and market trends that shape the global cookie and cracker market: Health aspects, premiumization, individualization, sustainability, convenience factors and the labor market all have an effect on product flavors, appearance, ingredients and packaging.

These developments demand a high degree of flexibility on the part of manufacturers. Thanks to its long years of experience, Syntegon is no stranger to the challenges

facing brand owners – and offers suitable flexible solutions (see Chapter 4).

Manufacturers who want to capitalize on the latest trends can begin with a comparatively small portfolio and gradually expand production alongside their traditional product range. Packaging solutions that offer high flexibility and compatibility with a wide range of cookies and crackers are especially well suited to brand owners who want to rapidly respond to consumer trends.



### TREND IMPACTS

- ▣ The need for consultation in the search of the ideal packaging machine is growing, as customers increasingly require flexible solutions. Syntegon recognizes and assesses the requirements in sales conversations and thrives for implementation in the technical concept phase.
- ▣ Products have varying dimensions due to their individuality, so the machine must be able to handle higher tolerances or offer easy format changes. Syntegon strives to provide technologies that allow for quick changeovers.
- ▣ Strong market growth in South-East Asia has led to increased demand for production automation. Syntegon has been offering different levels of automated system solutions in that geographic region for many years.



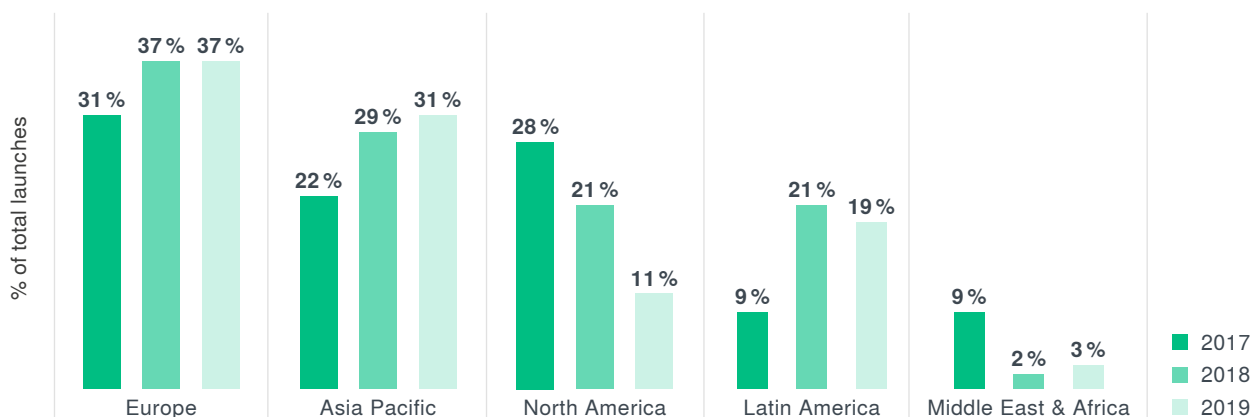
## HEALTHY SNACKING

Many consumers purchase certain products for their perceived health benefits: Functional products, characterized by ingredients that support the healthy functioning of the body, are especially popular among consumers.<sup>5</sup> According to Euromonitor, during the COVID-19 pandemic the health trend is exacerbated, as a large share of consumers focus on self-care and wellbeing and opt for products with corresponding claims.<sup>6</sup> These include health bars with trace elements for expectant mothers, gummy bears with added vitamins, fruit juices enriched with calcium, high-protein cookies and crackers for increased muscle mass, and bed-time snacks that care for a healthy sleep. In years to come, sales of cookie and cracker products with functional benefits will grow – adding botanicals such as chamomile

or lavender to bedtime cookies is one way of making late night snacking more permissible and achieve a calming and soothing effect.<sup>7</sup>

Food products with high protein content are especially popular with athletic and older consumer groups, since they satisfy their hunger longer and are conducive to muscle gain. These products increasingly contain plant protein to cater for the growing popularity of vegan diets. Traditionally, protein-rich cookies and crackers chiefly contain eggs and/or milk. Yet the market-wide trend toward using plant-based protein from e.g. rice, hemp or chia seeds can also be seen in the cookie and cracker segment.<sup>8</sup>

Percentage split of sweet biscuit/cookie launches with a high/added protein claim by region, Jan 2017–Dec 2019



Source: Mintel, The Future of Biscuits, Cookies and Crackers, 2020

After all, plant sources of protein are not only popular with vegetarians, but also with those who want to eat less meat without completely swearing off animal protein. According to a study by Innova Market Insights, 44 percent of all consumers in the USA now identify with this way of life.<sup>9</sup>

And proteins are not the only market aspect in flux. More and more consumers dislike the high sugar content of cookies – and are looking for low-calorie alternatives.

As a result, the demand for low-sugar and no-sugar products is on the rise. Especially in European countries, many governments and experts are considering the introduction of a sugar tax. In 2018, Great Britain took similar steps with soft drinks.<sup>10</sup> The market has responded and is slowly but surely expanding its product range. The current trend is toward more natural and fewer industrially processed ingredients, as well as fewer preservatives.

Consequently, brand owners face the challenge of offering consumers a healthier product without compromising on

taste and texture. Whether with artificial sweeteners, fruit extract or less conventional forms of sugar: manufacturers have to find a way to provide consumers with tasty alternatives.

Sugar is not the only ingredient consumers evaluate: more and more consumers are lactose-intolerant, and thus avoid products containing it. The same is true for protein adhesive gluten – forcing the manufacturers of products containing it to go back to the drawing board. In response to these trends, the market for “free-from” products is growing, consequently requiring an allergen-free, easy-to-clean production environment. In addition, cookies and crackers based on these new recipes are often more delicate, which led e.g. Nairn’s Oatcakes Ltd, a Scottish manufacturer of gluten-free oat crackers and cookies, to introduce advanced gentle handling and feeding systems for their gluten-free factory.

In addition, consumers expect these alternative cookies and crackers to offer a crispy consistency as well as a range of appealing flavors.

## TREND IMPACTS

- Gluten- and sugar-free products are more fragile and have special, sensitive surfaces, thus they must be processed with care. Syntegon machines process and package cookies and crackers gently and in continuous motion to avoid breakage.
- The use of products such as nuts or seeds requires allergen-free cleaning to avoid cross-contamination. Syntegon provides customers with new, easy-to-clean belt systems.



## INDIVIDUALIZATION

In addition, the trend toward self-optimization and personalized nutrition continues to gain momentum. It will be further strengthened by the use of DNA tests in nutritional consulting and diagnostics. In a study conducted by Mintel, 42 percent of the adults surveyed in Great Britain claimed they would be interested in personalizing their diets on the basis of genetic factors.<sup>11</sup> This approach allows trace elements to be dosed more precisely. This “hyper-personalization” will also be relevant in cookie and cracker production, calling on manufacturers to deliver maximum flexibility and cleanability following recipe changeovers.<sup>12</sup>

Other technological solutions from different sectors will impact the food processing industry and lead to a more pronounced individualization, e.g. using 3D printing.<sup>13</sup> Some manufacturers already offer 3D printed pasta, e.g. noodles in various shapes and colors. This approach allows them to flexibly adapt their production and deliver small batches tailored to their customers’ preferences. When they place an order, consumers select the shape of the product, portion size and ingredients – depending on their preferences regarding the flavor, combination of nutrients and trace elements, calorie count or fiber content.<sup>13</sup> In terms of manufacturing, batch sizes continue to shrink, while product and pack style ranges continue to grow.



Healthy choices are dominating snacking trends.

## TREND IMPACTS

- The demand for increased productivity while mass production becomes more and more individualized poses great challenges for cookie and cracker producers. Syntegon offers systems with with high OEE.
- A high variety of products leads to many different packaging styles and the increasing demand for assortment packs. When it comes to packaging, manufacturers therefore also need the option of quick processing and fast format changes, provided for example by the intelligent high-speed system XTS, which is based on linear motor technology.

## NEW SUSTAINABLE PACKAGING REGULATIONS

Consumers prefer organic and sustainably sourced ingredients as well as sustainable packaging. With the new European PPWR (Packaging and Packaging Waste Regulation) the switch to sustainable packaging is no longer an interesting option to attract consumers in the aisle, it is a must for all manufacturers. Solutions that are recyclable, biodegradable or made from recycled material are among the options. In flow wrapping in particular, paper and mono-material films have proven their value as sustainable and affordable solutions. In contrast to multi-layer films, packaging made of a single material can easily be recycled. However, this requires certain adaptations to existing packaging lines, e.g. lower sealing temperatures than those used in conventional heat sealing for cookies

and crackers in flow wraps. Syntegon is leading the way in paper and mono-material, in horizontal as well as vertical flow wrapping.

Consumers are increasingly concerned with environmental issues, including the carbon footprint of packaging.<sup>14</sup> Accordingly, in the future they will increasingly demand environmentally responsible behavior on the part of food manufacturers<sup>15</sup> – and will expect to have transparent, clear information included on their food packaging.<sup>2</sup> With regard to sustainability, manufacturers need to ensure that all packaging material types can be processed – ideally without compromising on speed – when selecting their packaging technology.

When it comes to the environment, however, the content of the pack is an important factor: Consumers are increasingly critical – for both health-related and ecological reasons. Particularly in the spotlight: products with healthy, fair-trade ingredients that are sold in environmentally friendly packaging. In response, numerous interest groups and brand owners are pursuing a range of new approaches, from sustainably grown raw materials and transparent supply chains, to offering alternatives to fats and oils. The use of synthetic ingredients will be especially important for the production of cookies and crackers, as they will become stickier and more difficult to handle.<sup>16</sup>

## THE CONVENIENCE FACTOR

More and more consumers are focusing on practicality – especially when it comes to packaging. Smaller pack sizes are on the rise as the number of single households grows year over year. In industrialized countries, single-serving packs are very popular; they are the ideal size for children's lunchboxes or a tasty snack on the go. At the same time, in emerging markets smaller packages offer an affordable choice for consumers with less disposable income. When the COVID-19 pandemic struck, the issue of shelf life received renewed attention in Germany, Great Britain and the US, which led to more demand for individually packed baked goods.<sup>17</sup>

In addition, many European consumers have enjoyed trying out new things and indulged in impulse buying, preferably in small quantities.<sup>17</sup> For manufacturers, these smaller pack sizes often translate into a need for higher production speeds, an aspect they should bear in mind when selecting their packaging system and automation level.



At the same time, consumers are increasingly using connected technologies – like voice-controlled assistants, smart pantries for automated product reorders, and intelligent refrigerators – to monitor their provisions and plan purchases.<sup>18</sup> In addition, intelligent packaging with RFID technology and interactive marketing campaigns using near-field communication are increasingly popular.<sup>19</sup> While this trend still comes at a cost, smart technology in food will remain an area to watch as it benefits the brand in addition to enhancing food safety and traceability.

## TREND IMPACTS

- Environmentally conscious manufacturers look for machines that use as little energy as possible. Syntegon strives for an efficient and low energy consumption of its machines.
- Minimizing product waste also contributes significantly to reduced carbon footprint. By avoiding product breakage through gentle handling, Syntegon helps manufacturers to reduce production waste and save food.
- Growing environmental concern and stringent regulative requirements lead to an increasing use of fully recyclable packaging. Mono-materials and paper impose high demands on the sealing technology, where the optimum interaction of the three sealing parameters is essential: pressure, temperature and time. Syntegon offers manufacturers form, fill and seal machines that can process sustainable polyolefin-based mono-materials as well as paper packaging for horizontal and vertical packaging.
- Sustainable technologies also affect secondary packaging: Syntegon's ACE carton former forms lock-or glue-style cartons on the same machine, offering manufacturers flexibility and a real sustainable option for their secondary packaging. Additionally, the ACE forms carton trays for cookies, thus replacing conventional plastics from cookie packaging.

## LABOR SHORTAGE

The lack of qualified operators has a direct impact on choosing the right packaging technology. While qualified employees were already hard to find for many years, the COVID-19 pandemic has lent new importance to this issue.

In countries like the US, there is a shortage of qualified employees, especially line operators and maintenance personnel. In many cases, employees with the necessary know-how are hard to come by; but increasingly, these jobs are not considered attractive enough.<sup>20</sup> In other countries, like India, manufacturing is dominated by high employee fluctuation rates.<sup>21</sup> As a result, the percentage of employees with mechanical know-how is on the decline, forcing many companies to acquire this expertise from the outside.

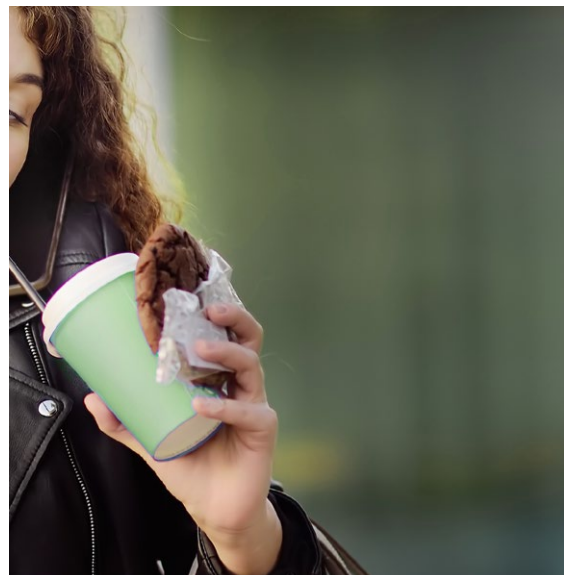
At the same time, many manufacturers are seeking to lower their labor costs.

As a result, the demand for innovative, automated handling and packaging solutions in the cookie, cracker and biscuit industry is constantly growing. The same goes for connectivity and digital solutions in manufacturing.

Fully and semi-automated packaging, as well as robot-based solutions, can help – both with labor shortages and in terms of cutting labor costs. Combining comprehensive expertise, a broad portfolio and digital solutions, system suppliers like Syntegon can provide the support needed to overcome these challenges.

### TREND IMPACTS

- Convenience and indulgence as trends are leading to smaller, more individual package sizes. For manufacturers, this means they need to switch quickly and easily between different packaging formats. Syntegon supports them with reduced numbers of format parts and easy conversion systems.
- Interactive packaging poses major challenges for manufacturers: if the packaging is to communicate with smartphones, it needs QR codes or RFID chips. Syntegon provides manufacturers with tailor-made solutions to make their packaging connectivity-ready, significantly enhancing product traceability and allowing the communication of key product information to consumers.



Consumers are looking for the right cookie and cracker for their every lifestyle.

### TREND IMPACTS

- Syntegon's comprehensive consulting and services portfolio encompasses the entire lifecycle of its machines. With the combined technical expertise of a global organization, Syntegon provides reliable service and maintenance support from a single source.
- Equipment effectiveness is not just about the machine, but the operator. As a leading provider Syntegon possesses unique knowledge and helps manufacturers in training their employees with tailored training programs.
- Service contracts are a key element of Syntegon's portfolio structure. Customers benefit from fixed conditions and guaranteed services (Read more on page 28).

# Handling and infeed solutions for cookies and crackers.

## OVERVIEW

After an in-depth look at the current trends driving the cookies and cracker market and the impact and implications they have for manufacturers, the next chapter takes a more detailed look at how Syntegon can help manufacturers stay ahead of the game.

When it comes to handling and packaging trend-driven products like cookies and crackers, packaging systems

have to fulfil several requirements to ensure future-proof production – a challenge and opportunity at the same time. To make sure products reach consumers in perfect condition, manufacturers need a reliable partner at their side – regardless of whether they are a multinational company, a medium-sized regional manufacturer, or an innovative start-up.



XTS intelligent transport system.

## PACK STYLE FLEXIBILITY

Consumers crave new tastes and textures, leading to a plethora of products of different shapes (e.g. sandwich, cream-filled, plain) and structures (solid vs. brittle). For changing the pack size or introducing an additional packstyle, maximum flexibility in the packaging technology is key – including short changeover times and a vertical start-up. Linear motor technology enables changes within the packaging line in no time. Flexible product infeed modules allow format and packstyle changes at the touch of a button, e.g. switching between pile packs of one, three or five cookies. For on-edge slug packs, manufacturers can choose between configurations with three, nine or more cookies.

## RAPID AND THOROUGH CLEANING

With sticky products such as chocolate cookies, residues easily accumulate in the machine or on the transport belts. Allergens like nuts and gluten represent a further challenge since they require allergen-free cleaning to avoid cross-contamination. Hygienic design, including low particle build-up and easy access and dismantling are important features. An edge-free design allows the machine to be easily cleaned by hand and dismantled without the need for tools. Depending on the product and the subsequent cleaning requirements, machines may be needed for wipe-down or wash-down.

## HIGH OEE (OVERALL EQUIPMENT EFFECTIVENESS)

Convenience food is on the rise, increasing the need for small-portion packaging that usually slows down the entire packaging process. Subsequently, manufacturers require high performance machines to achieve high production speeds and output rates. Specific solutions with minimal product handling impact ensure highly efficient packaging processes and a positive a positive OEE.

## AUTOMATED SYSTEM SOLUTIONS

Strong growth of individualized products and the lack of qualified operators lead to the need for more robotics and automation. This can mean step-by-step automation, where a machine only performs selected process steps, or semi- or fully automated solutions. Fully automated system solutions offer maximum efficiency. Seamlessly integrated machines work as one system, handling the product flow from product distribution to primary, secondary packaging and case packing.

## SUSTAINABILITY

Packaging makes sure that cookies or crackers are fresh and undamaged by the time they reach consumers. At the same time, sustainability regulations demand alternatives to composite materials. Mono-material recyclable films consist of a single type of plastic. Using a different material requires changes in terms of packaging technology since mono-material films are more sensitive to temperature. Sealing times and the sealing jaws on the flow wrapper need to be adjusted to the film properties – Syntegon therefore uses Amplified Heat Sealing technology (AHS) to protect cookies with tight seals.

With increasing environmental awareness, consumers prefer eco-friendly packaging over conventional plastics. Syntegon offers glue-free lock-style technology to form cartons and trays. This is an eco-friendly and brand-enhancing packaging option to replace conventional plastic trays for cookies.

## HANDLING

70 percent of cookies and 90 percent of crackers are handled on-edge and are packed into slug packs. Filled, gluten-free or chocolate-coated cookies and crackers are particularly sensitive and crumble easily. These fragile goods are transported flat and stacked on top of each other to form pile packs. Robotic solutions are particularly suitable for packaging irregularly shaped cookies and crackers: the use of grippers, suction cups and vacuum cushions enable fast product changes and offer the gentlest product handling possible without manual operator intervention. This increases the speed, quality and efficiency of the packaging system.



Sealing technology – the most underestimated success factor.



Biscuit on edge handling.



Biscuit flat handling.

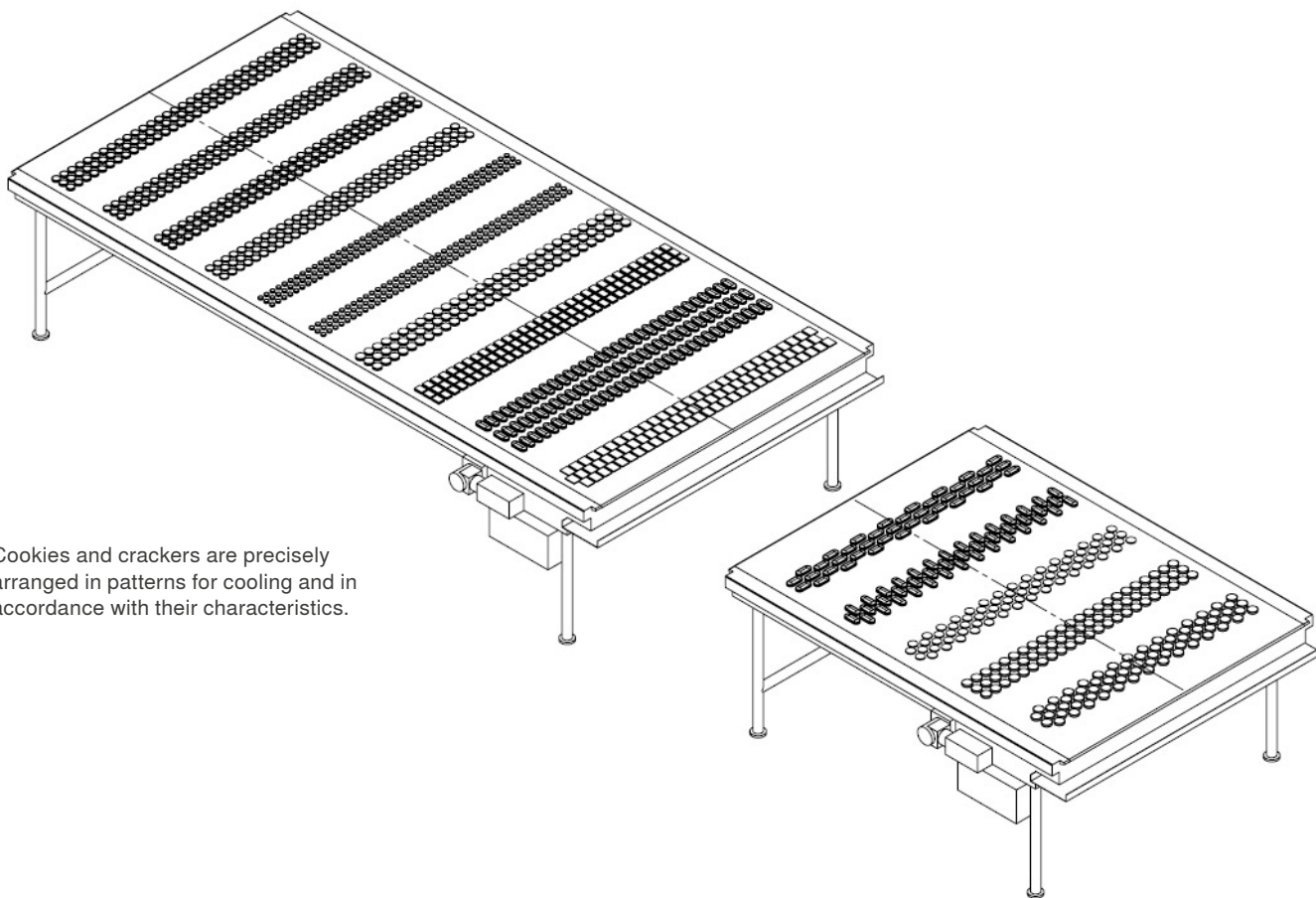
## PATTERN AND DISTRIBUTION

Since cookies and crackers come in different shapes and textures, transport patterns and distribution methods vary once the freshly baked goods leave the oven. They do so in precisely arranged patterns for cooling and in accordance with their characteristics, e.g. in regular rows, in offset rows or in lanes, with the long side or the short side first.

Product cooling occurs in dedicated cooling tunnels or with other cold air systems on conveyor belts that cover about 1.5 times the length of the oven. Although a necessary process step, cooling considerably affects the arranged patterns: they may deviate from their original set-up because of transitions between conveyor belts and/or product storage.

To ensure safe distribution to the machine branches and efficient packaging operations, the patterns must be restored. Product handling plays a major role, as it allows rows, lanes and lines to be established (or re-established) from randomly placed products or imprecise rows. Whether products are handled flat or on-edge, specific arrangements are required to ensure efficient and reliable packaging.

Syntegon has been addressing these process steps for decades with flexible systems that reflect the large product variety and recreate the most widely used patterns. These systems include direct row aligners, direct intelligent row aligners that rearrange imperfect rows, row aligners that combine with transversal stations to structure random patterns into rows, and lane distribution systems that feed product rows into packaging legs. The following chapters will cover these systems in greater detail, for both flat and on-edge handling.



Cookies and crackers are precisely arranged in patterns for cooling and in accordance with their characteristics.

## ON-EDGE HANDLING

Crackers and plain cookies are often transported through the respective packaging lines in an on-edge position. On-edge solutions are often compact since multiple columns run alongside each other during the feeding process, offering maximum storage capacities. Cookies and crackers transported on-edge are usually packed in slug packs but are also available stacked up as pile packs.

Vibratory channels are important in on-edge handling. They ensure safe product transport and offer a compact buffer solution at the same time. While each product calls for specific handling options, overall production flexibility, hygiene and operator safety must always be maintained. Syntegon's versatile vibratory channels are capable of transporting on-edge products, while ensuring minimal waste, easy cleaning and low overall noise levels.

## VIBRATORY CHANNELS OFFER MAJOR BENEFITS

### Drive efficiency

Syntegon vibratory channels feature one drive per section, which reduces the total amount of drives by 90 percent compared to other options on the market.

### Energy reduction

Given the reduced number of drives, the buffer system requires about 60 percent less energy than comparable systems.

### Noise level

The drive set-up minimizes the noise level of the Syntegon vibratory feeding system depending on product and speed.

### Solid structure

An innovative stainless-steel assembly makes sure that vibrations in the system's frame and the facility floor are kept low, ensuring smooth operations.

### Vertical startup

The construction of Syntegon vibratory channels allows a fast installation and vertical start-up due to its mechanical drive system.

### Easy clean

The complete frame is inclined and suitable for in-place cleaning without dismantling. Crumb trays easily collect and dispatch any product residue.



Vibratory channels ensure a safe transport and buffering of cookies and crackers on-edge. They enhance efficiency and reduce energy consumption at the same time.

## FLAT HANDLING

Filled, gluten-free or sandwich cookies are usually handled and fed into the flow wrapping machine lying flat. During production and packaging, they pose a great technological challenge due to their fragile and/or delicate structure. Flat handling solutions reduce mechanical friction and vibration to a minimum. Easy access and hygienic design facilitate fast and effective cleaning.

In contrast to on-edge feeding, flat handling has a rather limited performance, as no more than two columns can be formed. Cookies and crackers that are transported flat are usually packed in pile or slug packs. In this regard, Syntegon relies on its new belt platform.

Whether a cookie or cracker is transported on-edge or flat is determined by various criteria, including performance and final pack style.

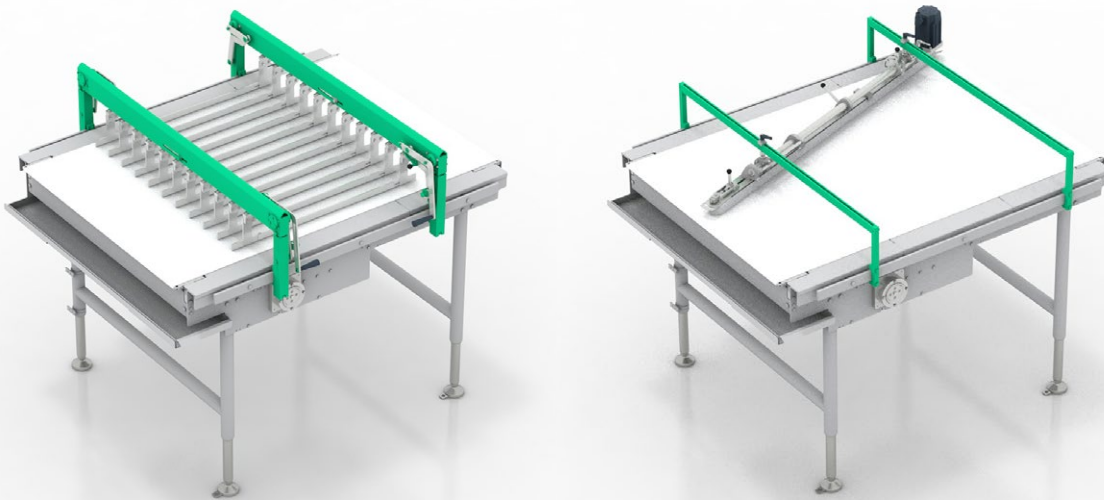
## THE NEW BELT PLATFORM OFFERS MAJOR BENEFITS

### Optimized belt tension

Thanks to the belt's self-tracking and automatic tension control function, wear is minimized and the lifetime of the belt extended. A central control system with automated retensioning gives manufacturers peace of mind. Additionally, operators benefit from easy reproducibility at the push of a button.

### Hygienic design

Easy installation and removal of components allows for fast and easy cleaning processes. Due to its easy and tool-free changeover concept, only one operator is needed to change over the machine. The chicanes can be swiveled up to facilitate easy access to the components for cleaning and maintenance.



For flat feeding of fragile cookies, Syntegon recommends its belt platform with improved belt tension. Thanks to its hygienic design, it is suitable for handling even crumbly products.

The following chapter presents selected reference systems and strategies to address some of the challenges mentioned above. These solutions, provided by Syntegon, are already in place and support customers around the globe in manufacturing the products consumers ask for. Their handling systems all cater to the various needs of different products: Since every cookie, cracker and sandwich is unique, handling and infeed solutions are designed accordingly.

# Case studies.

## Flat handling

### Case study I: Indian chocolate-filled cookie manufacturer

Gentle handling for premium products



### Case study II: British cracker manufacturer

Flexible flat handling



### Case study III: Scottish gluten-free plain cookie manufacturer

A question of capacity



### Case study IV: Forming and loading of paper trays

New robotic pick & place platform



### Case study V: Sustainable paper trays set to replace plastic

New sustainable packaging



## On-edge handling

### Case study VI: Indian plain cookie manufacturer

Fully automatic on-edge handling



### Case study VII: American cracker manufacturer

Thinking big



### Case study VIII: Asian cracker producer

Three cheers for small spaces



## Vertical handling

### Case study IX: Snack packs ready for retail

System solution for cracker snacks in small pouches and an open carton tray



### Case study X: Vertical bagging with product handling and endload cartoning

Economical bag-in-box packstyle



## CASE STUDY I

### INDIA



- Flat handling
- Pile packs
- Medium output range

# Indian chocolate-filled cookie manufacturer.

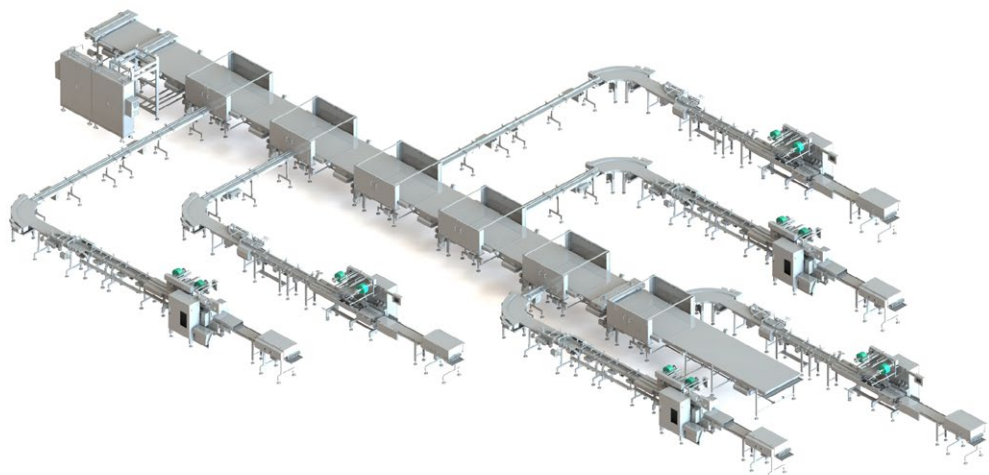
## GENTLE HANDLING FOR PREMIUM PRODUCTS

This Indian cookie manufacturer's portfolio includes a butter cookie range and a premium selection with chocolate filling. Accordingly, the manufacturer opted for a fully automated feeding and primary packaging solution that combines especially gentle handling with a high degree of flexibility for their premium chocolate-filled cookie.

### What is the process?

The cookies arrive from the cooling tunnels in rows and are then distributed to one of six packaging legs by perpendicular conveyors. In the event of a problem, the standby leg is activated. The conveyor chains on the individual packaging legs feature integrated product stacking collector units, which can feed the cookies to the flow wrapping machine individually or in piles of four to six cookies.

6-leg system for chocolate-filled cookies in piles,  
5 legs in production, 1 leg on standby



## THE BIGGEST CHALLENGES



### Increase OEE

Maximum output rates and flexibility combined with gentle handling



### Fragile products

The premium cookies are fragile and require a gentle handling solution, even at high speeds

## THE BENEFITS IN A NUTSHELL



### Automation level

Fully automated solution



### Minimal waste

Thanks to gentle handling and robust process



### High efficiency

Speeds of up to 400 packs per minute

## CASE STUDY II

### UNITED KINGDOM



- Flat handling
- Pile packs
- High output range

# British cracker manufacturer.

## FLEXIBLE FLAT HANDLING

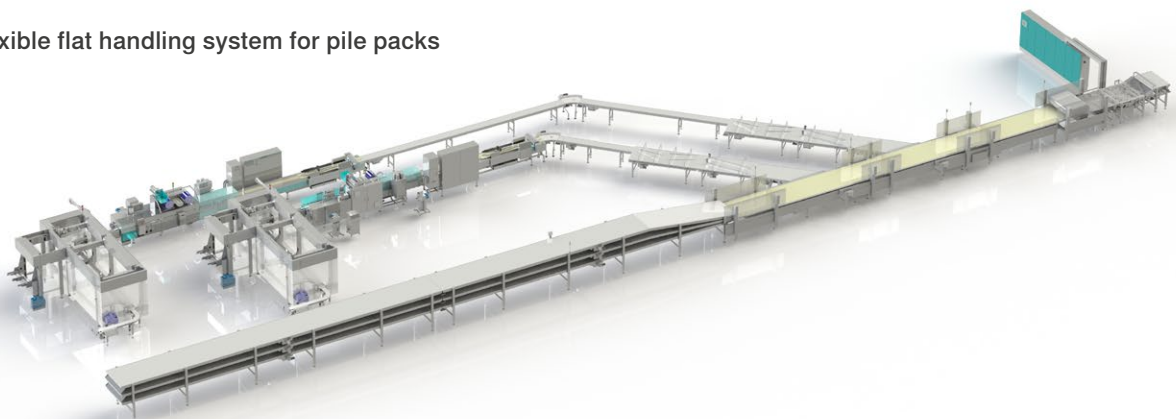
A traditional company with its finger on the pulse: that sums up up this UK-based brand. The company produces a broad range of cracker products with delectable flavors, including mixed seed, salt and pepper and smoked chili toppings.

### What is the process?

In order to efficiently and gently package its crackers, the company relies on a flexible and intelligent flat handling solution from Syntegon. The Syntegon alignment modules are at its heart. They arrange randomly distributed crackers into perfect rows. The Syntegon row alignment belts run at different speeds to the downstream transport belts and packaging processes, thus averting product jams. They provide micro buffering options.

The distribution station transfers batches of four rows onto the chicane conveyors, which create two separate streams of products that pass onto the dual-lane inline feeding system. This machine, in turn, uses linear motor technology to gently stack the crackers into piles of varying counts. The two streams of piles are merged into a single lane before entering the flow wrapper. Afterwards the flow packs are packed into cartons by Syntegon's efficient fully integrated topload cartoner. The system includes a 10-minute refeed buffer to reduce waste.

### Highly flexible flat handling system for pile packs



## THE BIGGEST CHALLENGES



### Fragile products

The snacks are crispy and thin, their fragile surfaces must not be damaged



### Many different products

Products of various sizes need to be arranged in different pile counts

## THE BENEFITS IN A NUTSHELL



### High efficiency

Linear motor technology decouples row alignment and distribution process from packaging legs



### Gentle handling and row formation

Flat handling and row building even from offset patterns; smooth product flow onto packaging legs via distribution station



### Easy operation

Common operating area provides good access to both packaging legs

## CASE STUDY III

### UNITED KINGDOM – SCOTLAND



# Scottish gluten-free plain cookie manufacturer.

## A QUESTION OF CAPACITY

The family-run Scottish business Nairn's Oatcakes Ltd. produces cookies, crackers and snacks – predominantly from oats. In response to the rapidly growing demand for gluten-free products, the company chose to expand its capacities with an additional line in their gluten-free factory.

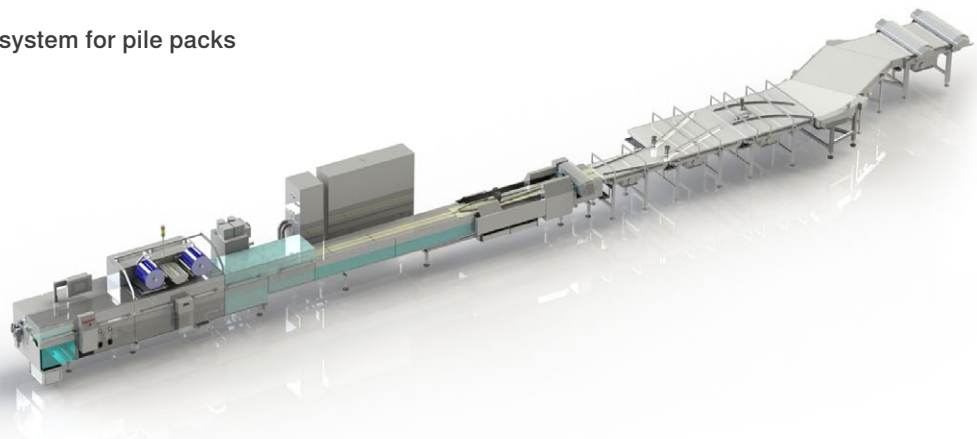
### What is the process?

Gluten-free products are very fragile and break easily, so require particularly gentle, flat handling. The packaging solution selected features Syntegon's intelligent system solution with linear motor technology, offering extra pack style flexibility and especially gentle handling.

The round oatcakes emerge from the oven in staggered rows – while the oval oatcakes come out in rows with their short side leading. The products are then transferred into a trombone buffer that can accommodate the entire oven capacity in the event of downtime. The oval products pass through two row aligners, arranging the products in regular rows. In the next step, curved chicane sweepers direct the diagonal rows into two different infeed streams.

These two streams pass onto the flexible product infeed, which counts and groups the products into piles before merging them into a single stream to feed the flow wrapping machine. The system can be modified to allow the customer to produce slugs of products in flow wrapped packs in the future.

### Highly flexible flat handling system for pile packs



## THE BIGGEST CHALLENGES



### Fragile products

Gentle transport and packaging technology needed



### Limited space

Possible addition of a further line

## THE BENEFITS IN A NUTSHELL



### Gentle handling

For delicate products



### Product flexibility and fast changeover

Thanks to linear motor technology, it offers handling and packaging for various counts and configuration with push button changeover



### Footprint

Compact design

## CASE STUDY IV UNITED STATES



- Flat handling
- Pile and slug packs
- High output range

# Forming and loading carton trays.

## ROBOTIC PICK & PLACE

### What is the process?

Syntegon's topload carton erector forms glue-free, fully sustainable carton trays and cartons. After picking flat blanks from the carton hopper, the machine's feeder transfers them to a holding station, then to a forming cavity where the blanks are driven through via a plunger to fold the trays. Next, the folded trays are positioned onto a special rotary mandrel device which forms the trays' dividers. Finally, a rotary device delivers the formed trays to an outfeed conveyor.

The transport belt feeds the trays to the robotic pick and place cell for loading of the products. The robotic pick & place (RPP) uses the counter-flow principle: while the trays enter the robotic cell from one side, the cookies do so from the opposite direction. Delta robots are equipped with matching end-of-arm tools and place the cookies flat or on-edge into the trays. Tool-free format changeovers and different gripper technologies allow manufacturers to process different products on the same line while keeping cross-contamination at bay. Hygienic picking and placing is further ensured by the platform's design, which is IP65 compliant with a stainless steel frame, no hollow spaces and self-draining sloped surfaces. The RPP is also available in a wash-down version.

The loaded trays reach the next packaging steps, which can be over-wrapping and/or cartoning.

### Kliklok ACE topload carton former + Syntegon RPP pick & place platform



## THE BIGGEST CHALLENGES



### Sustainability

Glue-free, sustainable carton trays formed with lock style technology



### Performance

Fast and flexible cookie placing (flat and/or on-edge)

## THE BENEFITS IN A NUTSHELL



### High efficiency

Up to three forming heads, producing up to three trays simultaneously



### Pack style flexibility

RPP delta robots for flat and/or on-edge cookie loading into various glue-free carton trays



### Fast changeovers

Pick & place platform with tool-free format changeovers for maximum flexibility and hygienic operations



### Automation level

Scalable levels of output for both machines

## CASE STUDY V

### UNITED STATES



- Carton former
- Carton tray
- Medium output range

# Sustainable carton trays set to replace plastic.

## SUSTAINABLE PACKAGING OPTIONS

### What is the process?

Carton trays are formed on the Syntegon toplevel carton former. The carton feeder first picks flat blanks from the carton hopper and transfers them first to a holding station, then to a forming cavity. A plunger subsequently drives the flat blanks through the cavity (which folds the trays) and onto a special rotary mandrel device (which forms the trays' dividers). Finally, a rotary device delivers the formed trays to an outfeed conveyor.

Kliklok ACE toplevel carton former



## THE BIGGEST CHALLENGES



### Fulfill PPWR Requirements

Replace plastic with recyclable carton trays



### Gentle handling

Precise forming process



### Pack style flexibility

Possible to form glue-free trays, glue-style trays and tri-seal cartons on the same machine

## THE BENEFITS IN A NUTSHELL



### Sustainability

Switch from plastic trays to sustainable carton trays



### Efficiency

Glue-free lock-forming reduces energy and consumables use



### System Provider

Integration with line solutions for flow-wrapping, cartoning and case packaging

CASE STUDY VI  
INDIA



- On-edge handling
- Slug packs
- Medium output range

# Indian cookie manufacturer.

## FULLY AUTOMATIC ON-EDGE HANDLING

This Indian cookie manufacturer is one of the country's largest consumer goods corporations. For one of their production sites, the company was seeking a fully automated packaging solution to eliminate manual processes and increase productivity. Additionally, the company planned to source a turnkey solution from a single provider – from feeding to primary packaging, all the way through to secondary packaging. Their aim was to harmonize maintenance, such as spare parts management, and to simplify the interfaces between different system components.

### What is the process?

To transport round cookies, the company chose to implement an on-edge handling solution with vibratory channels that provides a buffer capacity of up to one minute. The system consists of six packaging legs, one of which is a standby leg.

### THE BIGGEST CHALLENGES



#### Cost pressure

Savings through seamless, automated turnkey solution



#### High production volume

Increase in productivity and output



#### High OEE

Fully automated packaging process with built-in flexibility

### THE BENEFITS IN A NUTSHELL



#### Automation level

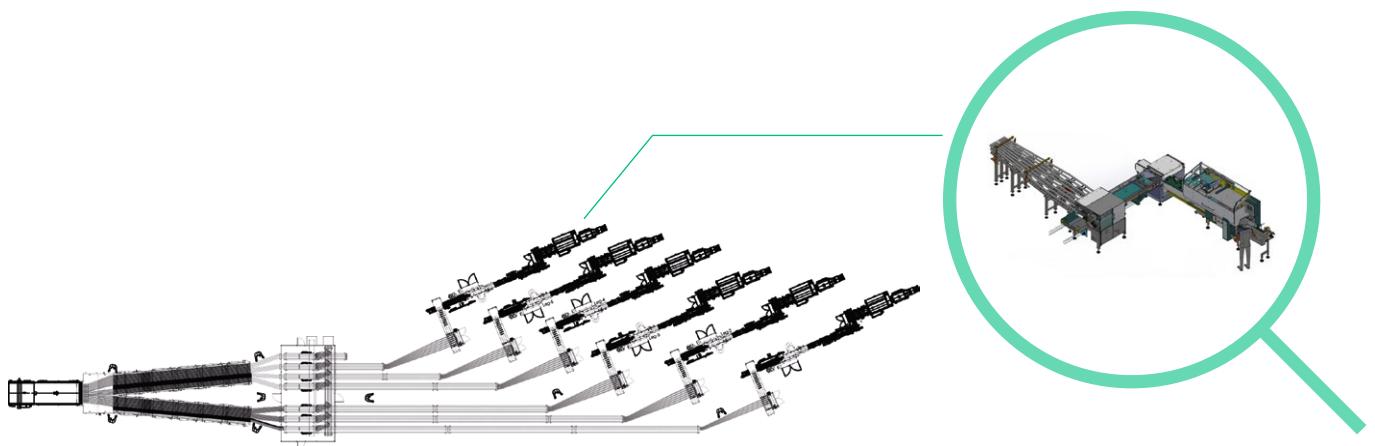
Fully automated handling and packaging with seamlessly integrated machine



#### Higher efficiency speed

200 packs per minute per packaging leg

On-edge solution for plain cookies



CASE STUDY VII  
UNITED STATES



- On-edge handling
- Slug packs
- High output range

# American cracker manufacturer.

## THINKING BIG

For one of their cracker brands sold in North America, this large cookie and cracker manufacturer relies on dedicated production lines per product with maximum output. Since the crackers are very thin and brittle, they require gentle handling while ensuring high processing and packaging speed.

### What is the process?

The cracker strips are moved over cooling belts and are transported to the feeding and packaging system. Next, a cracker breaker separates the strips into individual crackers. The products, arranged in columns, are then stacked, buffered and transported in vibratory channels.

The crackers are portioned by Syntegon's high performance feeding and measuring station. The high-speed variant delivers twice the throughput rate per minute compared to conventional solutions. This is especially advantageous for short slug packs. The machine is designed for very short changeover times. Its continuous forward motion reduces mechanical stress on the product. The intelligent feeding module transfers the portioned crackers to the flow wrapper using linear motor technology. This ensures a steady product flow and allows for push-button changeovers.

## THE BIGGEST CHALLENGES



### Limited space

Space constraints on the shop floor



### High output

Very high output rate per square meter production space



### Increase OEE

High product quality per pack at high speed

## THE BENEFITS IN A NUTSHELL



### Global service presence

Support close production site



### Pack style flexibility

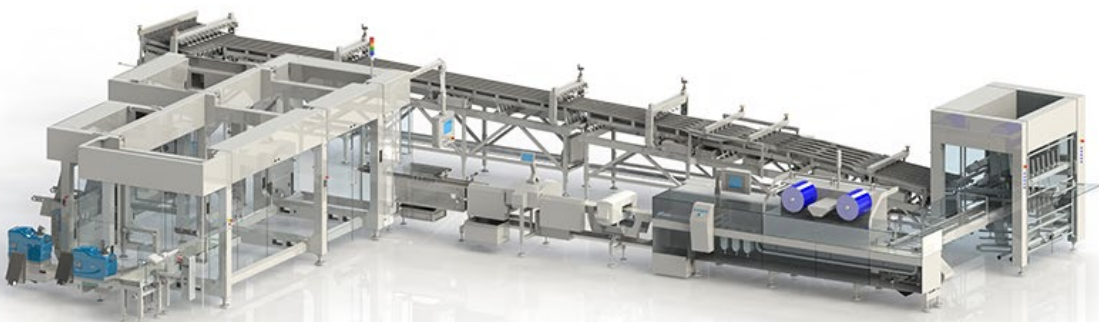
Fast changes between slug lengths



### Footprint

Compact system to fit into limited space

## High speed solution for crackers in slugs



## CASE STUDY VIII

### JAPAN



- On-edge handling
- Pile and slug packs
- High output range

# Asian cracker producer.

## THREE CHEERS FOR SMALL SPACES

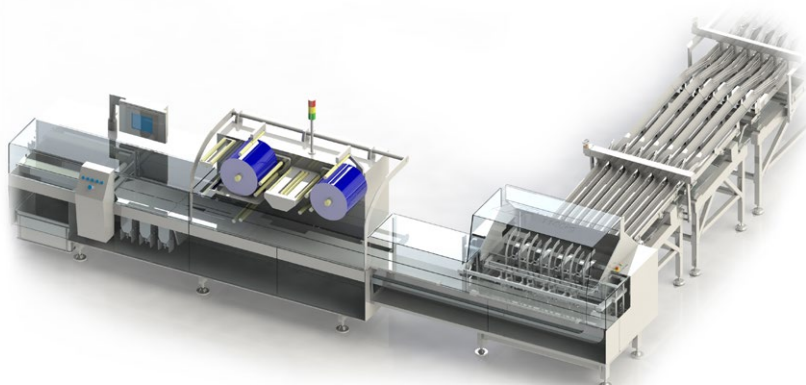
More flexibility thanks to the installation of on-edge vibratory channel handling equipment at an existing site: that was the goal set by a leading Asian cracker manufacturer in order to respond to customer request, and to secure new business. The company needed a flexible packaging process, which would guarantee a broader range of packaging options for pile and slug packs.

### What is the process?

The freshly baked products enter the Syntegon vibratory channels in an on-edge position and are transported to magazines. The high-speed magazines with dual-lane linear motor feeding systems are at the heart of the Syntegon solution, processing products of different shapes and sizes.

Thanks to a patented star-wheel mechanism, each magazine counts and places batches of crackers on the dual-lane conveyor belt in an overlapping configuration, not side-by-side, saving valuable space. The product infeed station merges two product lanes for slug and pile packs into one. Flexibility is a major asset of this two-in-one solution: depending on the product and pack style, operators can change between piles and slugs at the push of a button. Regardless of the required number of crackers per slug or pile, the flow wrapper wraps and hermetically seals each pack.

Compact and flexible solution for pile and slug pack styles with a high output range for crackers



## THE BIGGEST CHALLENGES



### Limited space

Upgrade existing equipment on limited production space



### Increase production volume

While maintaining high product quality



### Fragile products

Crackers require gentle handling



### Different pack styles

Slug and pile packs on the same line

## THE BENEFITS IN A NUTSHELL



### Pack style flexibility

Fast changeovers between slug and pile packs on the same line



### Gentle handling

Patented star-wheel mechanism ensures gentle product placement



### Footprint

Instead of two separate systems for pile and slug packs, both pack styles are handled on the same line

**CASE STUDY IX**  
UNITED STATES



- Vertical handling
- Pillow packs and carton trays
- High output range

# Snack packs ready for retail.

## SYSTEM SOLUTION FOR CRACKERS IN SMALL SNACK POUCHES AND AN OPEN CARTON TRAY

- Up to three 3 vertical baggers
- One fully integrated topload cartoning machine with delta robots

### Primary packaging

- Duplex machine design: highly compact machine producing up to 400 bags per minute
- Bag styles: pillow bags for this application
- Single lane operation possible for waste reduction
- Separate reels for different bag sizes and fillings
- Pneumatic air expellers control the air volume inside the bag

### Secondary packaging

- Flexible processing of products arriving from multiple vertical baggers
- Accommodates products arriving in random order and orientation
- Single product lines or various products can be packed as assortments or variety packs
- Flexibility to load products into cartons flat or on-edge. This example shows on-edge loading into retail trays
- Highest efficiency using counterflow loading concept
- Full carton control throughout the entire process
- Easy, fast, and repeatable tool-free changeover

### THE BIGGEST CHALLENGES



#### Compact solution

Loading pillow packs on-edge into retail-ready carton trays



#### System solution

Multiple baggers feed one integrated topload cartoner



#### Format range

Products to be loaded into the tray either flat or on-edge

### THE BENEFITS IN A NUTSHELL



#### High automation level

Seamless integration of multiple upstream primary packaging machines



#### Flexibility

Many possible variations available in primary and secondary packaging



#### Efficiency

Highest efficiency using counterflow loading concept



Primary packaging of various products on three vertical baggers

On-edge loading of retail-ready carton trays with either a single product line or as variety packs with various flavors

CASE STUDY X  
UNITED STATES



- Vertical handling
- Bag-in-box
- High output range

# Vertical packaging with product handling and endload cartoning.

## ECONOMICAL BAG-IN-BOX PACKSTYLE

### What is the process?

Products (crackers or cookies) are fed to a check weigher, which weighs and drops the product into the tube of the forming unit of the vertical bagger below.

The bagger forms and seals the bag around the product, then deposits the completed bags onto a conveyor.

A transport system takes the product bags to a Kliklok Interceptor, which feeds the bags into its rotary vane depositor. The device times the dropping of the bags into the pockets of the product infeed conveyor (PIC) of an endload cartoner. The PIC then carries the bags to the cartoner's inserter, which pushes the bags into endload cartons opened moments earlier by the cartoner. The cartoner then glues and seals the cartons closed before transferring them to the next packaging step.

### THE BIGGEST CHALLENGES



#### Changeover

Minimize downtime due to tool-free changeovers



#### Smooth operation

Unbalanced loads due to heavier products: in-line settling equipment required



#### Product accuracy

Dealing with multiple unit types on one line can lead to errors in product weights and cartoning

### THE BENEFITS IN A NUTSHELL



#### Economical packstyle

Cost-effective and eye-catching on-the-shelf marketing



#### Product integrity

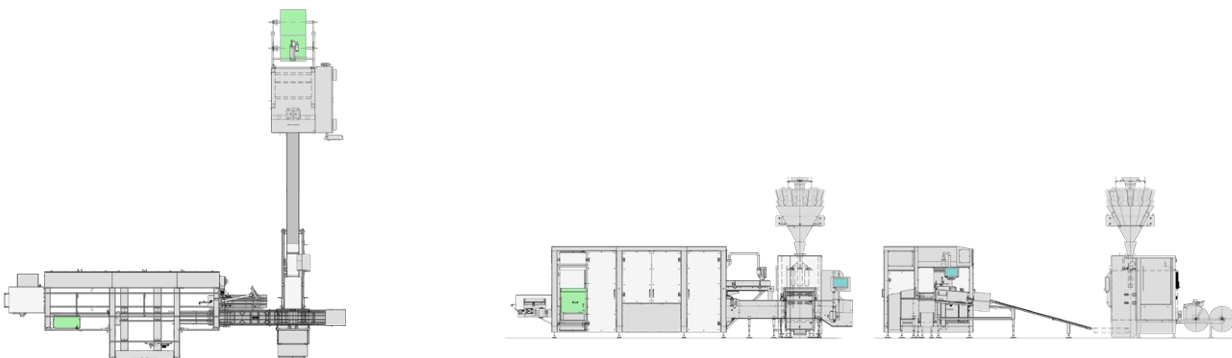
Minimal-height direct-drop PIC product loading for product integrity



#### Gentle product insertion

Overhead confiner ensures consistent bag shape during insertion

### Vertical + endload bag-in-box system



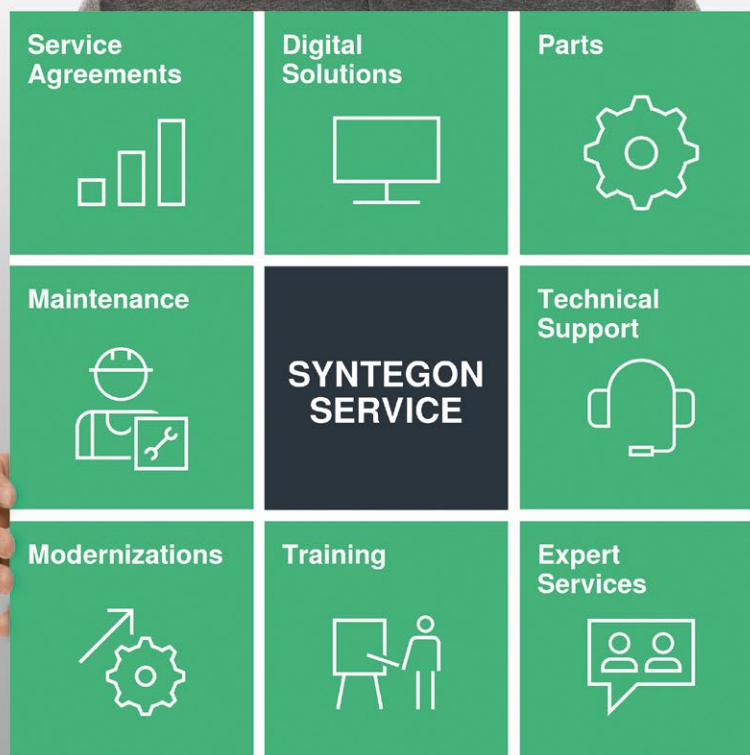
# Syntegon Service

## To secure your production.

A comprehensive service portfolio lays the foundation for smooth production processes. We at Syntegon support you throughout the entire machine life cycle, from spare parts management to digital line optimization. Service agreements are a key element of our portfolio structure. We minimize production risks and maximize the efficiency of your equipment by working with you as equal partners.

Together, we tailor our solutions to your individual needs. You benefit from fixed conditions and guaranteed services. Our global network of experts supports you with maintenance planning, technical support and modernizations, as well as operator training and expert services. With our digital solutions, you gain control over

your production processes and create transparency on product and machine data – anytime, anywhere. Whether you want to switch to sustainable materials or upgrade to automated technology, we can take the next steps towards the factory of the future together.





# Conclusion.

With their manifold shapes, sizes and ingredients, cookies and crackers reflect the complex, rapidly evolving society we live in. Not only do these products cater to consumption traditions, but increasingly also to individual dietary choices.

These drivers have an impact on markets and the products themselves, as well as the handling and packaging equipment used in production. Manufacturers are faced with as many challenges as there are trends, forcing them to adapt their equipment and production processes in order to maintain a competitive edge. From ingredients to flavors and packaging design, many roads lead to outstanding products.

In this highly dynamic context, increasing production speed or simply producing more of the same is no longer enough. Instead, manufacturers around the globe aim for flexibility on different levels, from handling to end-of-line solutions. In this context, modern equipment that truly reflects product diversity while ensuring safe operations is a major asset: it is the basis for long-term success, and a matter of close cooperation between brand owners and packaging solution providers. Cookie and cracker producers strongly rely on partners who empower them with a comprehensive technical portfolio, from entry-level to fully automated systems, as well as with valuable solutions. Strong partners are here to help shape the future of modern production, while keeping an eye on trends and constantly pushing technological boundaries.

Syntegon's support has allowed a diverse and multinational clientele reach those goals, each in their specific way. From hearty crackers and moist chocolate-chip cookies to rich marie biscuits, there is hardly a product type or pack style that cannot run through a Syntegon system. With its decades-long industry expertise, application know-how and global service presence, the company has proven – and will continue to prove – its robust standing as one of the industry's most reliable partners. If we haven't met before, it is about time we do so. We are ready to consult and help you.

In the meantime, you can find out more about our portfolio at [www.syntegon.com](http://www.syntegon.com)

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Link Website Topic:

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