



# COMPLETE PACKAGING LINES FOR FISH, SEAFOOD, AND SHELLFISH

Everything you need to know about processing and packaging fish, seafood and shellfish in all kinds of packaging and packaging materials on the right packaging lines.

 **JASA**  
PACKAGING SOLUTIONS

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# FOREWORD

This e-book has been prepared to provide insight into fish, seafood, and shellfish processing and packaging. To compile this book, the experiences of customers and suppliers have been combined. All advice in this e-book is intended as a guideline and not as a definitive solution. To find the right solution for your product, we recommend that you contact one of our experienced consultants at JASA Packaging Solutions.

(No rights can be derived from any advice described in this e-book.)



# 1. Fish, seafood and shellfish



The global demand for fish, seafood, and shellfish is on the rise.

A few facts:

- | In 2015, globally, 169 billion kilograms of fish were caught and cultivated
- | About 55% of all fish is caught in the wild
- | More than 45% comes from cultivation or aquaculture
- | The European Union, followed by the United States and Japan, were the largest importers of fish and fishery products in 2018
- | In the Americas, the main imports are shrimp, salmon, crab, lobster, and tuna.
- | Europe trades the most fish worldwide.

Gradually more Dutch people eat fish; in 2020, 62.7 million kilos of fish, seafood, and shellfish were consumed in the Netherlands. This trend is also visible in the rest of Europe, where tuna, cod, salmon, Alaska pollock, and shrimp prove most popular.



On average, Dutch people eat fish, seafood, and shellfish once a week, of which, 75% is consumed at home and the remaining 25% outdoors. Consumers are spending more and more money on this. The amount spent on fish, seafood, and shellfish is nowadays equivalent to a quarter of what consumers spend on meat.

Before all this fish, seafood and shellfish are hygienically packaged and delivered to the consumer, the restaurant, or other target groups, the product already traveled through machines, weighers, and robots. When it comes to packaging fish, seafood, and shellfish, hygiene is crucial. To guarantee hygiene, an appropriate packaging process and suitable packaging are required. The packaging of fish, seafood, and shellfish plays a significant role in:

- | Extending the shelf life
- | Guaranteeing quality
- | Presenting the product with an attractive appearance to the consumer

JASA Packaging Solutions is the expert for complete packaging lines for fish, seafood, and shellfish. In this e-book, we explain what the packaging process for these products involves and the process of selecting the right packaging line.

# 1.1 High-quality packaging lines and trends

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Fish, seafood, and shellfish are products that must be packaged in a hygienic environment to ensure food safety for consumers. This requires the right packaging, the right packaging line, and the right packaging process.

In addition, it is vital in the seafood industry to be able to keep up with any trends in packaging formats and materials. In recent years, the demand for sustainable packaging has increased, for example, in packaging with less packaging material and recyclable material.

In addition, a clear trend is emerging in retail for luxury fish to be packaged in a tray and thermoformed packaging with a stylish cardboard sleeve around it. The industry also continues to innovate and is constantly looking at new packaging solutions for fish, seafood, and shellfish.

In addition to taking into account the wishes of the consumer, a packaging line must be designed to meet the producer's wishes in terms of quality, speed, and flexibility. JASA notices an increasing demand for automation and robotization. This allows fish, seafood, and shellfish to be packed fully automatically, eliminating the need for human hands to touch the product throughout the packaging process. This saves personnel hours and contributes to the hygiene of the entire packaging process.

## 1.2 Packaging as a marketing tool

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Given the tough competition in the seafood market, packaging can serve as a marketing tool to appeal to consumers. The cardboard sleeves of the JASA Sleever lend themselves very well for this purpose. The sleeve can be used to create a suitable packaging design, making it the perfect way to present your products with clear branding. Thus creating a recognizable product on the shelf. Sleeves offer ample space for product information, a barcode, and extras such as preparation methods, recipes, or quality labels.

Sleeves offer stellar printing possibilities, allowing for higher resolutions and offering a lot of flexibility. Even the inside can be printed. This guarantees that your product will stand out on any shelf.



Image 1. Shrimp with sleeve packaging.



Branding can also be incorporated with vertical packaging by, for instance, choosing a full-color printed bag. This can be applied in various packaging styles, such as a pillow bag, doypack, or a bag with a side gusset.



Doypack



Pillowbag



Zij-invouw



Quatro pack



Block-bodem

Image 2. Packages.

## 2. The packaging process



The selection of the packaging line has a significant impact on the operation of a company. With the right line, a company can save on time and manual hours. The ROI on a packaging line is easy to calculate, and with today's speeds, will soon prove advantageous. And by choosing a flexible packaging line that can easily be changed in terms of packaging size and material, your company will be prepared for the future.

A complete weighing and packaging line consists of infeed the products, weighing, filling, and sealing the packages, robotized or not. Upstream and downstream systems can be integrated into existing packaging lines for fish, seafood, and shellfish. The packaging lines can be fully automated, offering various modularly proven solutions for fish, seafood, and shellfish.

Horizontal and vertical packaging solutions are also possible for fish, seafood, and shellfish. These products require a high-quality packaging line that provides versatility, hygiene, and speed in the packaging process.

For example, filling trays with mussels and sleeving packaging with salmon is performed on a horizontal packaging line, and packaging bags of frozen whitefish on a vertical packaging line.

At JASA, we build customer-specific packaging lines and keep the service in-house to provide the best products and services. The systems JASA offers can be integrated into existing installations and synchronized with upstream and downstream equipment.



## 2.1 Components of a packaging line

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Vis, schaal- en schelpdieren worden in gekoelde pakketjes getransporteerd naar de verpakkingslijn, die kan bestaan uit diverse voor het product benodigde componenten. Afhankelijk van het product, het volume, de verpakking en de wensen van de klant zijn er de volgende componenten van een verpakkingslijn voor diepgevroren vis, schaal- en schelpdieren.



Image 3. fish species.

### De-nesters

In the case of tray packaging, a de-nester is added to the packaging line to de-nest the trays at high speed and advance them to the filling station. Here the tray must be designed for de-nesting. This is one of the reasons to involve a specialist early on in the process.

### Weighing

Carousel weighers and linear multi-head weighers are used for fish, seafood, and shellfish.

A multi-head weigher sets a target weight based on several partial weights. For example, 14 heads are available, from which the 4 closest in terms of target weight are chosen. The minimum weight is, of course, always secured.

In general, a weight between 150 grams and 2 kilograms is chosen for a package for fish, seafood, and shellfish. When choosing the weight, it is important to look at what the future may bring. At this moment, 250 grams may be packed, but this could become 1500 grams in the future. The packaging line can be set up in anticipation of this so that different weights can be packaged with the same line in the future. In all cases, the portion is weighed very accurately and with minimal deviation.

The choice of weigher depends on the weight to be produced and the desired capacity. Different products may also require different weighers. It is essential to consider the weigher's requirements and choose a version that ensures the product is processed hygienically throughout the packaging line.

## Top sealing or thermoforming

In the case of tray packaging, the most common choice nowadays is to seal the package using a top seal film at the top. This film can be resealable or have a peel-off window. It is also possible to opt for skin packs, which mold completely onto the product, finished with an attractive sleeve around it.



Thermoforming



Skinpack



Top seal

Image 4. Packaging types.

## Vertical packaging machine

A vertical packaging machine, also called a vertical forming, filling, and sealing machine, is used to bag frozen products automatically. The bag shape is made from a flat film that is pulled from a reel. This film can be printed or not. When the product is dispensed from the weigher into the bag, the bag is already formed and subsequently closed by sealing.

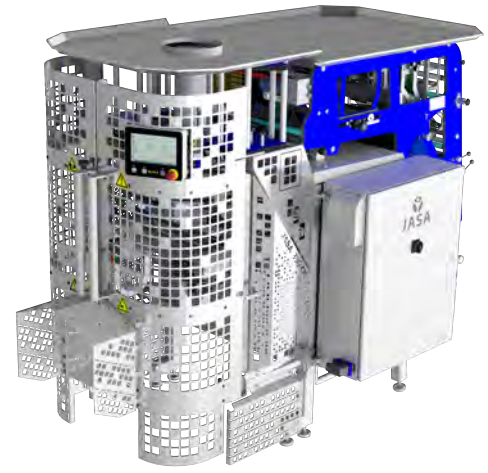


Image 5. JASA vertical packing machine.

## JASA Sleever

The cardboard sleeve of the JASA Sleever allows the fish, seafood, and shellfish to remain visible and provides plenty of space for marketing on the packaging, such as logos, recipes, or a powerful claim about environmental awareness. The sleeves themselves are also very eco-friendly as they are 100% recyclable.



Image 6. JASA double sleever machine.

With the JASA Sleever, you bring real innovation into your company. The Sleever has been designed according to the requirements and wishes of the user: the machine processes up to 100 trays per minute, has a very short change-over time of less than 5 minutes, has a hygienic design, and is ultimately easy to operate.

In addition, the Sleever is a compact plug-and-play machine and therefore suitable for use in virtually any packaging line, whether it is a semi-automatic or a fully automatic weighing, filling, sealing, and lidding packaging line.



Additionally, not only are the sleeves environmentally friendly, the Sleever itself is extremely energy efficient, compact, and pays for itself within a year by saving costs with automation. The Sleever can be used with different trays and punnets, both square, oval, or round.

## **Metal detection, x-ray & checkweigher**

Metal detection equipment is used to detect the smallest metal particles; x-ray systems can detect metal, glass, broken products, plastic, a broken knife, and many other materials; a check weigher checks the weight of all products.

Often a combination of these systems is used, for instance, metal detection and a check-weigher or an x-ray and a check-weigher.

## **Uitvoerband**

The JASA output conveyor complements JASA machines and can be easily connected to all JASA machines. The outfeed conveyor is available in 3 different belt widths. The belt is also adjustable in height, which minimizes the drop height of your products. Other features of this outfeed conveyor are:

- | Low noise level
- | Hygienic, high care design

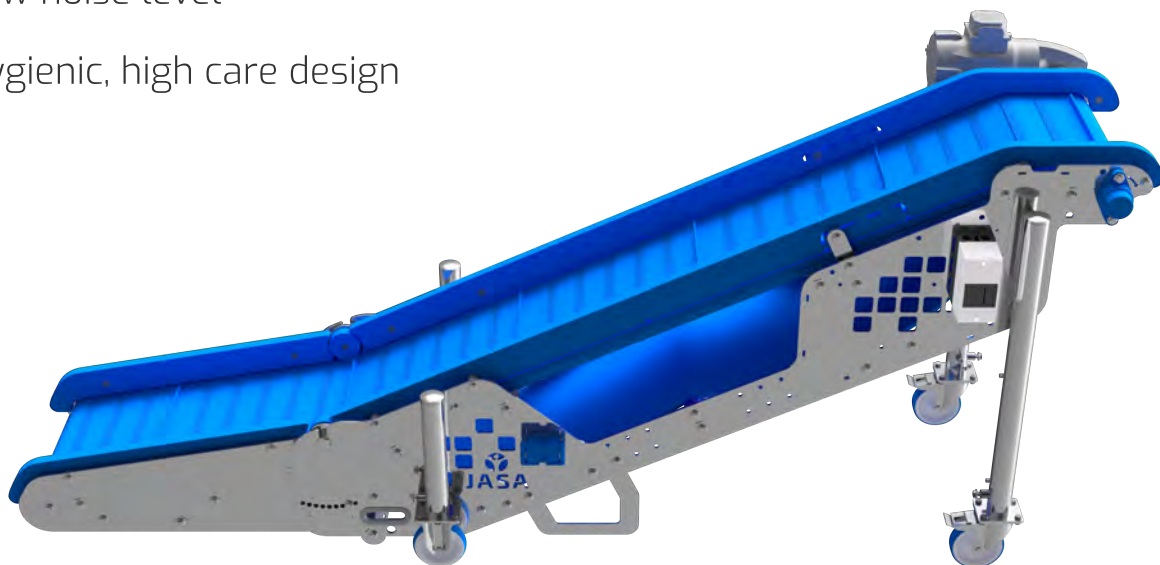


Image 7. JASA output belt.

## Conveyor Systems

Conveyor belt systems are the connecting link between the individual processing steps in the packaging line. All conveyor systems supplied by JASA are designed for their unique purpose. The conveyor belt systems are maintenance-friendly and ergonomically designed. In addition to the various industry standards, JASA also offers customized solutions.

The plastic materials used for the conveyor systems are suitable for foodstuffs, such as fish, seafood, and shellfish.

## Platforms

JASA platforms are constructed from box sections and may or may not be equipped with floor plates, stairs, and handrails for safety. These platforms are designed to absorb static and dynamic loads from, for example, weighing machines. They also provide optimal and safe access for operation, maintenance and cleaning. The platforms are equipped with brace structures, and height-adjustable base stands.

JASA offers a range of platforms for dry and wet environments:

- | QC range in dry environment painted carbon steel structures
- | QB range moist environment stainless steel structures
- | QA range hygienic environment stainless steel structures

These platforms are particularly suitable for packaging lines for fish, seafood, and shellfish due to their ease of cleaning. The QA range platforms are built according to the EHEDG (European Hygienic Engineering and Design Group) guidelines.

The QB and QA platforms can be equipped with a cleaning wall for the wet cleaning of weighing and buffer bins. The cleaning is accomplished with a high-pressure water jet whereby the cleaning wall prevents water from being sprayed into the premises. The platform floor is equipped with a gutter that collects and drains the water from the platform.

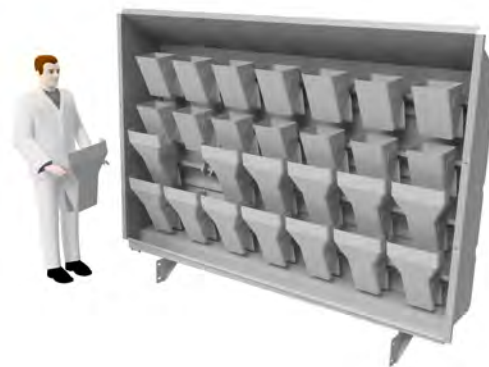


Image 8. JASA cleaning wall.

## **Case packing and palletizing**

At the end of the line, a case erector is used to unfold the box, a case sealer tapes the bottom of the box, and a robotic arm picks up the package and puts it in that box. This process is fully automated. Once all packages are in the box, it is sealed, and a palletizer places the box on a pallet.

## **Beckhoff control**

JASA equips its machines with the control technology of Beckhoff. Instead of separate PLC software, display software, and servo drive software, Beckhoff operates only one software interface. Partly because of this, there are possibilities for 'camming & gearing.' This means that movements flow into each other instead of the otherwise necessary separate servo movements. This results in shorter cycle times hence faster machines.



## **Modified Atmosphere Packaging (MAP)**

More than just seafood can be put into a package. Modified Atmosphere Packaging (MAP) involves packaging the product under a protective atmosphere, whereby gas is injected into the package. MAP generally uses one of these three gases: carbon dioxide, nitrogen, and oxygen. Other gases may also be used. MAP can extend the shelf life of some products. Depending on the application, product technologists will determine if and which gas mix is the most optimal.

## **Vacuumizing**

Vacuumizing frozen fish, seafood, and shellfish give the product longer shelf life. If required, JASA can execute vacuum packaging on vertical packers. This is especially interesting for large packages, for example, in the catering industry.

## 2.2 Tray Lines

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See Figure 8 as an example of a complete tray line. This is a basic layout with dimensions of 19m (length) by 3.9m (width) by 4.7m (height). Depending on the space in which the line will be installed and all the requirements concerning the line, it will conform to the available dimensions.



Image 9. Example of a complete scale line.

## 2.3 Bagging line

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See Figure 9 as an example of a vertical packaging line. This is a basic design with dimensions of 10 m (length) by 4.4 m (width) by 5.9 m (height). Depending on the space where the line will be placed and all the requirements concerning the line, it will be customized to the available dimensions.



Image 10. Example of a vertical packaging line.

# 3. Fish, seafood, and shellfish packaging



Fish, seafood, and shellfish can be packaged fresh, frozen, or processed.

Packaging varies by target group:

- | Hospitality
- | Retail
- | Wholesale

## Hospitality

For the hospitality industry, use is mainly made of:

- | Bag packaging
- | Large packaging
- | Vacuum packaging
- | Deep frozen products

## Retail

Mainly used for retail:

- | Skin packs
- | Smaller packaging
- | Fresh produce
- | Tray with top seal
- | Packaging with sleeves

## Wholesale

Mainly used for wholesale are:

- | Bag packaging
- | Large packaging
- | Vacuum packaging
- | Deep frozen products



# 3.1 Types of fish, seafood, and shellfish

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Fresh salmon steak, frozen cod, prawns. Fish and shellfish come in all shapes and sizes. These different species require different packaging types, sizes, materials, and packaging lines.



Image 11. Types of Fish, seafood & shellfish

## 3.2 Packaging types and sizes

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There are four different packaging types for seafood, all of which are suitable for optional printing, a sleeve, or a label:

### 1. | Bag packaging

These packages are suitable for vacuum packaging and packaging frozen products. Also, large packages are possible, which are, for example, ideal for the catering industry.



Image 12. JASA bag packaging

### 2. | Topseal tray

This tray packaging is sealed with a top seal. The contents of the packaging range from 85 to 1000 grams and is suitable for combining with a sleeve.



Image 13. JASA topseal scale

### 3. | Thermoformed packaging

Thermoformed packaging consists of a bottom film and a top film. The film is formed in the forming mold by either vacuum or compressed air. This packaging is, therefore, suitable for vacuum or gas flush packaging of products.



Image 14. JASA thermoforming packaging

## 4. | Skinpack

The product is vacuum drawn and wrapped in the packaging. This causes the packaging to take the shape of the product.



Image 15. JASA skinpack

## 3.3 (Sustainable) packaging materials

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When choosing (sustainable) packaging materials, three factors play a role:

- | Type of packaging
- | Thinner films
- | Mono-material

On the JASA packaging lines, all common types of sizes and films (also biodegradable) are possible, and depending on the packaging, up to 100 packages per minute can be packed.

### 3.3.1 Type of packaging

After deciding on the best-suited packaging, the packaging material is considered. This goes hand in hand, as the type of packaging is the first and easiest step to save material and thus keep costs low while using the most sustainable packaging possible. With bag packaging, thermoformed packaging, and top seal trays, plastic is decreasingly used for packaging.

When choosing the right packaging, considerations include:

- | The design of the packaging and whether it is easy to handle in an automated process, like in the de-nesting
- | Use of printed or unprinted film
- | Adding or not adding a label or sleeve

Because of the current (sustainability) market developments, a top seal is often chosen when packaging in a tray.

Compared to a container with a lid, this saves up to 40% material. Bagged packaging is also on the rise; up to now, this has been the packaging with the least material. Also, the process of bag packaging is simpler and the cost lower, while with the proper printing, the appearance can also be very stylish, and bag packaging is performed at high speed. Bag packaging is exceptionally suitable for packaging frozen fish, seafood, such as pollock and unpeeled king prawns.

### **3.3.2 Thinner films**

The use of plastic can be reduced by packaging with thinner films. Thinner films retain the advantages of plastic packaging but reduce the amount of plastic. However, the packaging line must be capable of handling the thinner films. This can be done by optimizing the sealing systems, filling methods, and film throughput.

### **3.3.3 Mono-material**

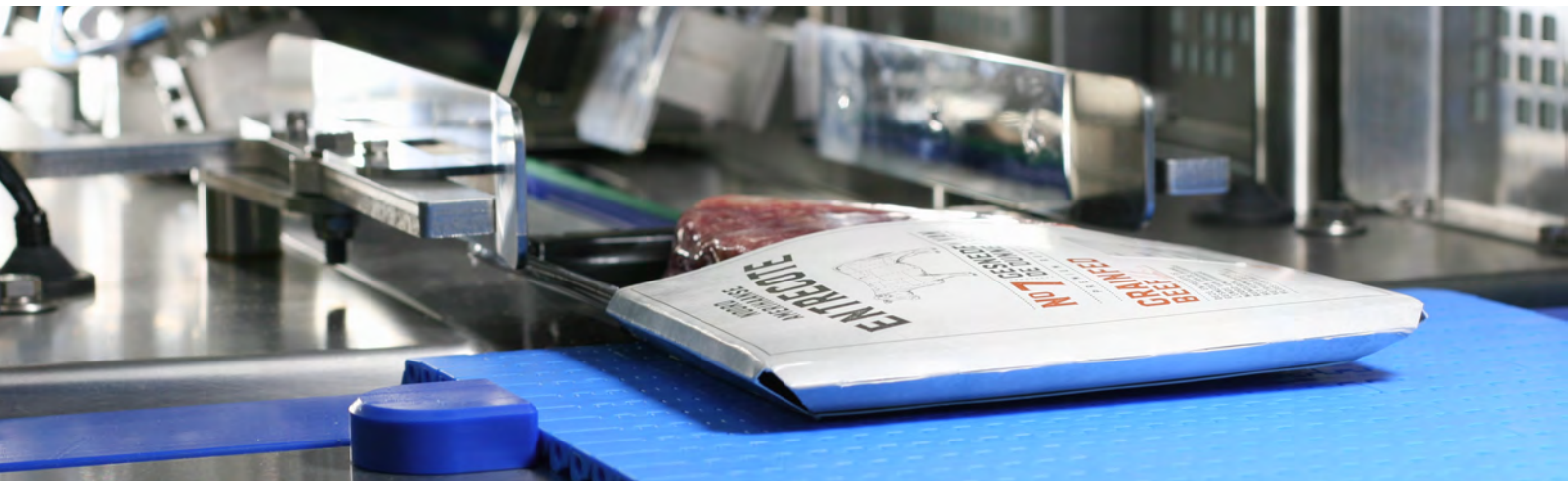
Mono-materials are increasingly used; they are more suitable for recycling. Complex composite films consist of multiple types of plastics and therefore cannot be easily recycled. Mono-material, on the other hand, is well suited for recycling.

Plastic packaging material can therefore be very sustainably used. Plastic does not have the best name in the game, but yet it offers other great (sustainable) advantages in addition to the points already mentioned:

- | Hygiene
- | Long shelf life
- | Less food waste.



# 4. Safety & hygiene



When it comes to hygiene and food safety, some strict laws and regulations stipulate stringent regulations for the packaging of food products. The packaging systems must be made of stainless steel and have a hygienic design that is quick and easy to clean.

In order to comply with hygiene and safety regulations, clean and safe packaging must be guaranteed. Working hygienically is an absolute requirement to ensure food safety for the consumer.

The packaging line is constructed in such a way that maintenance, cleaning, and disinfection can be carried out as quickly and efficiently as possible. The various components of the packaging line, like the platforms, are designed in such a way that no accumulation of dirt is possible, and molds cannot form.

The strict hygiene and safety guidelines do not have to compromise the flexibility and speed of the packaging line.

Ways in which JASA ensures hygiene:

- | Our machines are made of stainless steel, which is easy to clean.
- | The vacuum machine empties bags, taking a lot of moisture with it. JASA designed a practical system where the lances are rinsed without having to spend person-hours on it
- | A cleaning wall for cleaning weighing bins with central wastewater drainage
- | There are no inclusions or dead spaces in the packaging lines and machines

Employee safety is also ensured; the system includes an emergency stop for the entire line. When pushed, one knob brings the whole line to a halt.

# 5. A step-by-step plan for choosing the right packaging line

To compile a good packaging line, it helps to have answers to the following questions:

- What is your type of product
- What is your desired type of packaging
- What is the total output
- What is the expected weight per package
- What is the composition of the finished product
- How many packs/total weight of each SKU per day/week do you produce
- Additional preferred options such as:
  - MAP
  - Vacuumizing
  - Adding labels/print to packaging
  - Adding a cardboard sleeve
- Future expansion requirements
- Layout of the packaging area → dimensions to be taken into account

# 6. Conclusion



Food safety is essential in the packaging of fish, seafood, and shellfish. This can be ensured in various ways, including choices of machinery and the construction of the packaging line.

For fish, seafood, and shellfish, JASA offers the ideal packaging solution. JASA distinguishes itself with its turnkey solutions, high quality, and round-the-clock services. JASA has been active in tray and bagging lines for over 35 years. We listen to the customer's wishes and give advice on the best-suited machines, materials, and the outlook for the future.

JASA uses high-quality machines and components, and we can put together a fully automated and adaptable packaging line according to the customer's wishes. While we also consider the space where the packaging line will be installed. JASA packaging lines can even be installed in spaces with obstacles or a low roof.

With its innovative packaging solutions, JASA is a frontrunner and market leader in the packaging industry. JASA offers high-quality packaging lines for fish, seafood, and shellfish with sustainable packaging options that use less plastic while still providing flexibility and high-speed packaging.





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