



The world of  
**Turkey processing**



# The world of Turkey processing

Turkey meat is becoming ever more popular all over the world. Recent years have seen consumption continue to grow with the USA still accounting for a major part of the total. Turkey is eaten all the year round and not just at Thanksgiving and Christmas. Consumers appreciate its nutritional value and excellent taste. The meat has a healthy low fat image and is available in a wide variety of products with further processed items from turkey meat responsible for much of the growth in its consumption. Last but not least, the meat is seen as excellent value for money.



## Healthy and protein-rich

Turkey meat, particularly its white meat, has impressive health credentials. Turkey meat contains more protein per ounce than other meats and is lower in fat and calories than many other foods. It is therefore an attractive alternative source of protein for health conscious individuals. Turkey's naturally mild taste combines readily with different seasonings, making it an ideal choice in spicy ethnic dishes, as a substitute for higher-fat meats in favorite recipes and as a complement to other foods on the plate.

## Market needs

The world's population is on the increase, as is the increase of protein consumed per capita. The turkey sector will be sure to benefit from both developments. Markets are demanding an ever wider variety of safer and healthier turkey end products. This means automated industrial processes yet enabling processors to operate flexibly, producing a growing number of different end products.

## A bird apart

Turkeys are more than just "big chicken". Marel understands this perfectly. Its turkey processing solutions focus on the specific needs of this specialized market and are the result of in depth knowledge both of the market itself and of the necessary processing technologies. A turkey's specific characteristics dictate customized processing solutions. By using these unique systems, turkey processors can be sure of carrying out each single process step correctly, while keeping perfect control of the stream of incoming and outgoing products.

## Wide range of equipment

Marel leads the market for turkey processing solutions, leadership earned through years of dedicated experience developing equipment specifically for the sector. Today we offer the highest level of automation for the highest processing capacities currently available. We offer robust solutions for processing today's turkey weights at hourly throughputs ranging from 250 birds up to a maximum of 3,000 males or 3,600 females (4-50/60bpm). Besides resulting in an efficient and effective automated process, our solutions make for better working conditions for operators.

## Responsible efficiency

Processors will always strive to produce as efficiently as possible whilst maximizing food safety and quality. Production processes must run perfectly with the highest possible up-time and yields and the lowest possible cost of ownership, which should always be predictable. At the same time the closest care and attention should be paid to producing safe, high quality products in an ethical and socially responsible manner. Besides aiming to add value as effectively as possible, animal welfare, the careful handling of valuable raw material, full traceability and keeping a close eye on water and energy consumption will always be starting points for the provision of Marel solutions and services.



# Your process

How your turkey process will be laid out will depend on many factors, not least on planned capacity and the products to be made. Other important factors will be market potential, how you want your business to grow and the availability of skilled labor to achieve your aims. You can choose to automate certain process steps or do them manually.

## The best solution every time

Marel systems are modular. This means that, when market requirements change or grow, modules can be upgraded or added. Users will not therefore be forced into unnecessarily replacing whole systems. Manual processes can be automated in phases, ensuring that Marel will always have the best possible processing solution for each individual situation.

## Monitoring and control

A number of steps in the turkey process can be automated. The whole production process can be controlled and managed with the help of Innova intelligent management and production software. This software helps optimize logistics. It provides comprehensive product information and guarantees full traceability and FIFO. Product can be assessed by weight and quality grade at various points in the process. This information is useful for the efficient management and control of downstream processes such as cut-up and deboning. It is also possible to monitor the technical condition of equipment, meaning that yield, traceability and module performance are all under your complete control.

## Different markets

No matter how much the turkey market can differ from country to country, our versatile processing solutions will always ensure the correct process. We always take into account all relevant local, national and global requirements, not forgetting of course the demands of your customer, the consumer.

## Tailored to your situation

We are able to offer solutions for each step in the process and for all production capacities. We would ask you to contact the Marel Poultry Sales Manager responsible for your area, who will go through your particular requirements with you. He and his team will then propose a solution tailored specifically to your market and your situation and best suited to helping you achieve your aims. This brochure will now present each step in the turkey process, so that you will be able to see for yourself the wide variety of Marel solutions available to the turkey processor.



# Process steps

## Live bird handling

- GP container guarantees maximum efficiency
- Labor savings and excellent ergonomics
- Live birds handled humanely
- Top levels of hygiene

How well live turkeys are supplied to the processing plant will contribute significantly to its overall efficiency. Modular Marel live bird handling systems provide the best possible conditions for the efficient and welfare-friendly loading of birds on farm and transport to the processing plant. Excellent logistics are the hallmark of a Marel live bird handling system, meeting the most stringent requirements for throughput, durability and hygiene. Each system will be laid out to take account of individual hourly throughput and the desired level of automation. In each case the result will be higher product quality, labor saved and better ergonomics. Various technically advanced options for cleaning and disinfecting containers will reduce the risk of cross-contamination to an absolute minimum. The GP live bird handling system makes for optimum efficiency and saves labor. An automatic container unloading unit removes turkeys from the container and places them smoothly on a belt in a constant flow for entry into a CAS-T controlled atmosphere

stunning installation. Stunned birds are then hung to killing line shackles. It is no longer necessary to hang conscious flapping birds. Marel can also offer traditional crate handling systems with the option of mechanical stackers and de-stackers.





## Stunning

- Effective reliable stunning
- Electrical or CAS methods
- Humane procedures
- Suitable for all cultures and religions

Marel offers turkey processors all over the world systems which will always comply with their own local religious, cultural and legislative welfare requirements. These can be higher or lower voltages when stunning electrically or different air mixes when using CAS controlled atmosphere stunning.

Marel waterbath stunners are extremely reliable and ensure an optimum result. The ability to steplessly adjust the voltage applied allows the unit to be fine-tuned to different throughputs and circumstances.

Multiphase Controlled Atmosphere Stunning is humane and causes virtually no damage to the live bird, ensuring a top quality end product. It also has the additional benefit that it is no longer necessary to handle struggling, flapping birds, as these are hung stunned and unconscious to the kill line.

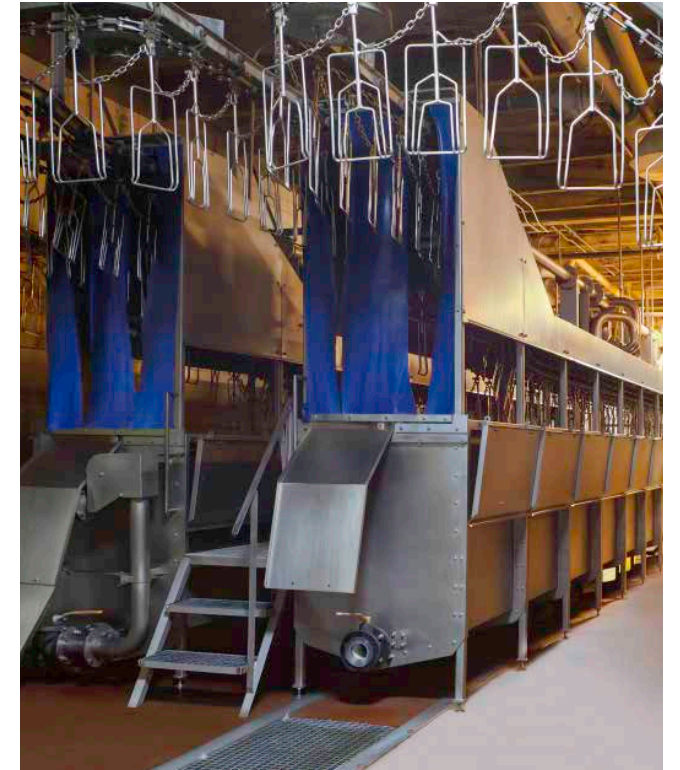


## Scalding

- Precise temperature control for a consistent processing result
- Low energy and water use
- Designed for optimal cleanability

How a product is presented for sale will depend on market preferences and on individual customer requirements. How the bird looks, its color and visual quality will be largely determined by the scalding process. Marel scalders ensure optimum heat transfer and precise temperature control, both essential for a first-class scalding system.

Marel heavy duty turkey scalders are designed for the largest birds and combine powerful agitation of the scald water with the ability to keep this water at a constant preset temperature. A consistently perfect scald will maximize picking quality, resulting in top-class product presentation and optimum yield.



## Killing

- Accurately applied kill cut
- Adjustable for males and females
- Precise positioning of the head

An accurately and consistently applied kill cut is a vital step in the primary process. Marel has developed dedicated automated killers for turkeys which take full account of their specific characteristics.

Careful positioning of the bird together with precise presentation of the bird's head to the cutting knife ensures a correct kill. Birds bleed out quickly and completely before entering the scalding tank.

Both the head guide and the rotating knife are manually adjustable, allowing both males and females to be handled. It goes without saying that Marel turkey killing solutions can meet all existing cultural and legislative requirements.

## Defeathering

- Dedicated turkey solutions
- For every situation and every capacity
- Maintaining the highest product quality
- Easy to set, maintain and clean

Picking/plucking will largely determine the presentation of the end product. Defeathering to the highest possible standard is particularly important if the epidermis or outer skin layer is to remain wholly intact on whole turkeys or skin-on turkey portions to be sold fresh.

Marel has extensive experience of picking/plucking poultry gained worldwide over many years and backed up by thorough in-house research. Marel offers a wide range of pickers/pluckers,

all with proven excellent performance. They come with flexible settings options to give the best result in every situation. Their weight and lack of flexibility make turkeys particularly challenging to guide through the defeathering process. Marel's chosen method of picking /plucking turkeys is an essential component in any successful turkey operation. The process is about more than just removing feathers, as the mechanical action of the picking/plucking fingers on the product will influence the physiological quality of the meat. One of the many options available is the counter rotating principle, which allows a softer, lower temperature, scald. As less equipment is needed at higher line speeds, wing damage is reduced too.





## Evisceration

- Dedicated turkey solutions
- For every situation and every capacity
- Three-point suspension prevents contamination
- Optimized yield and hygiene

The evisceration process consists of a number of modules which can be configured to suit your needs, your processing capacity and your degree of automation. Marel has a dedicated turkey solution for every situation. Products hang from shackles suspended from an overhead conveyor. A Marel three point

suspension system angles products, so that they are perfectly positioned for each process step. This technique saves labor and ensures that the lower digestive tract does not come into contact with the product during evisceration. Contamination is therefore avoided. Marel offers a wide range of equipment for the turkey evisceration process, engineered to give optimum efficiency at the very highest line speeds. The equipment prepares products in the best possible way for chilling and all subsequent downstream operations. Good evisceration is essential for achieving the highest standards of yield, quality and hygiene at the end of the line.



## Chilling

- The correct chill for optimum product quality
- Unique turkey chilling options
- Top product presentation, yield and shelf life

An effective chill process is essential for the production of top quality, attractively presented and supremely safe turkey end products with an optimum shelf life.

Depending on what their market demands, processors can opt for immersion chilling in water or in-line air chilling. Off-line immersion chilling is used across the globe. The chilling medium is air-agitated water which flows in the opposite direction to the product, ensuring a quick and effective chill.

DownFlow Plus with Aqua Film Control is a unique air chilling process for turkeys. Water is sprayed onto the products, which then leave the chilling process dry, preventing the growth of harmful bacteria. The result is top presentation with excellent color and top quality, yield and shelf life.

Regardless of whether end products are to be sold fresh or frozen, Marel can always offer the correct chilling solution for the products and capacities involved. This can also include in-line maturation.

## Giblet processing

- Modular configuration
- Maximum yield
- Optimum hygiene

Harvesting giblets the Marel way is really straightforward. Once drawn out of the carcass, inedible offal is separated manually from the valuable giblets, which can then be inspected, peeled (gizzards), washed and chilled.



## Weighing, grading, distribution

- Automated, accurate and fast selection
- Product tagging using production and control software
- Optimum distribution options with minimum give-away

Smart automated grading and weighing equipment is essential for accurate and effective product classification. Advanced Marel technology in the form of SmartWeigher and visual inspection gathers weight and quality information on each product. Management can use these details as input material for plant production and control software. This software ensures that products are assigned individually to the destinations which will give the maximum return. All further processes benefit as a result.







## Deboning

- Unique turkey deboning solution
- Modular set-up for optimum flexibility and yield
- Numerous end products possible
- High food safety and quality standards
- X-ray technology for deboned meat

Marel's ability to fillet turkey front halves automatically is unique in turkey processing. Marel's technically advanced solution gives users maximum turkey meat yield and its modular construction allows generous layout flexibility. Marel's solution, the FHF-XT front half filleting system, can process turkey front halves into various products such as whole or segmented wings cut into three parts, shoulder meat with or without skin, skin-on or skinless fillet with or without tenderloin attached. The system will handle both male and female turkeys. Changeover between males and females is quick and easy.

Front halves are transported suspended from the system's overhead conveyor through various processing modules and past semi-automated or manual work stations where different operations are carried out. For consistently top quality end products, an FHF-XT installation can be complemented by a StreamLine system. The Marel turkey deboning solutions give high quality end products,

ensuring the highest standards of hygiene and food safety. Deboned turkey meat can be scanned using Sensor X advanced x-ray technology. Sensor X detects the exact location of bone and any other contaminants, allowing meat to be trimmed effectively and adding extra value to your product.



## Cut-up

- Unrivalled high-yield automated cut-up
- Limitless layout and production flexibility
- Highest percentage of A-grade cuts

Together with accuracy of cut and unrivalled yield, flexibility is the hallmark of Marel's high performance modular cut-up solution. A wide choice of modules gives almost limitless configuration and production options, allowing the system to be used for all capacities and market requirements.

Product carriers transport products through the different processing modules positioning them precisely for each operation even at high line speeds. Top yield and quality are the result. Some of the modules can be by-passed. The Marel ACM-T turkey cut-up system is suitable for both water and air chilled products.

Examples of processing modules are modules to stretch product, to make an incision into the skin at the groin, to cut off front halves, and to cut stumps, socks and drumsticks. The system can be reset quickly for bigger or smaller products giving optimum production flexibility.



## Batching

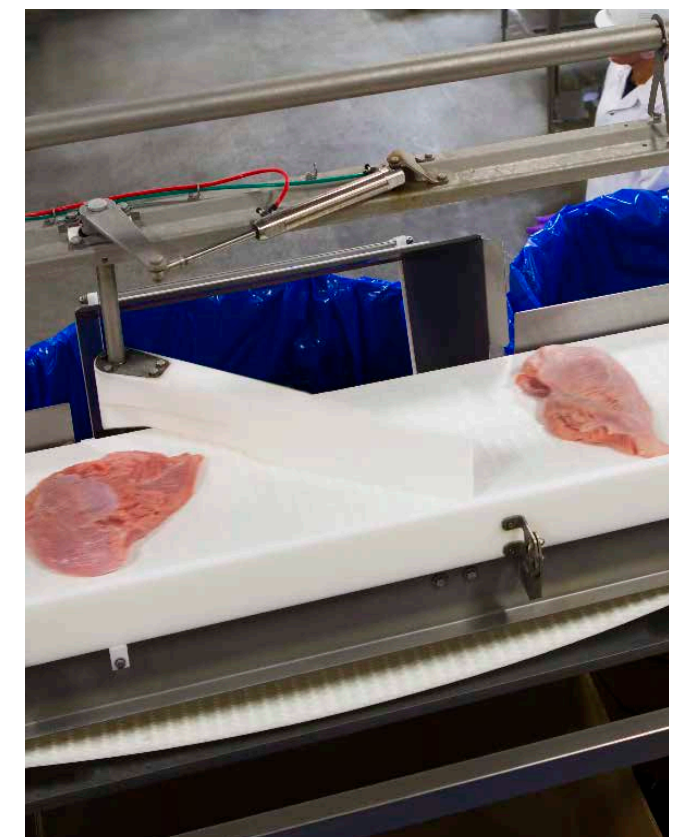
- Wide range of flexible, inline solutions
- Extremely low give-away
- Labor saving
- High food safety and quality standards

Marel processors are always looking to make optimal use of all incoming products, reducing give-away to an absolute minimum, while customers get their exact target weight. To help processors achieve this goal, Marel offers all kind of batching solutions, including integrated tray loading and packing systems.

Multihead Weighers can handle any in-feed, sorting, mixing and weighing requirement. They automatically portion and pack all types of fresh or frozen turkey products.

Marel batchers cleverly decide which product weights and sizes best match the order requirements. They can operate as stand-alone units or can be integrated into a complete packing line. All Marel batchers fulfill the most stringent requirements in the food industry, thanks to their versatility and easy-to-clean design.

Innova intelligent production software provides a complete overview of all aspects of the batching process and its results during production.







## Portioning

- High-speed, high-precision cutting
- Minimum give-away
- Easy to program

Automated, high-speed, high-precision performance is the number one requirement for good portioning and slicing. We offer high-speed solutions for production of all kinds of fixed weight or fixed dimension products.

Having a wide variety of portioning options, our equipment is designed to live up to your need for uniform, natural looking end products.

Keeping give-away to an absolute minimum is probably one of your highest priorities. Portion cutting should therefore be done extremely accurately, creating opportunities for maximizing your profit.

Remote programming and control become easy when portioning equipment is combined with Innova intelligent production software. The software allows for real time monitoring of actual performance.



## Marinating and tumbling

- Fully automated in-line process
- Uniform distribution of additives
- Easy tracking and tracing of batches

The market for seasoned, ready to cook and ready to eat products continues to grow. It is very popular to marinate and garnish all kinds of bone-in and deboned products. These techniques add value to your products and offer interesting possibilities in virtually all markets, with new tastes and applications being introduced all the time.

With our massage and marinating solutions you can process small batches in-line, either wet or dry, larger or smaller products, with or without bone and with or without additives.

Keeping this process in-line does away with the need for manual product handling operations. As tracking and tracing is easier, concerns about logistics are no longer an issue.

## Meat harvesting

- Adding the most value to your products
- Harvesting meat from good quality raw material
- Easy to operate and clean

As a turkey processor you want to make the most of every incoming product. Even carcasses, breast caps, upper backs or necks can be sources of valuable meat. Marel enables you to harvest those pieces of meat and add maximum value to your process.

Primal parts and previously deboned parts of turkey meat provide a profitable source of good quality raw material for the sausage, snack and comminuted meat industry.

Our Marel meat recovery systems perform highly efficiently and durably. They require only a minimum of maintenance and are easy to operate and to clean.



## Further processing

- Full line solutions
- Modular, flexible set-up for all desired capacities
- Wide product range

With decades of experience in food technology and animal protein processing, Marel develops, manufactures and installs innovative systems for the further processing of animal proteins.

The product range includes full line solutions from meat preparation to sausage production, from portioning and coating to frying and cooking. With your end product and all its specific characteristics as starting point, specialists put together the most effective system to meet your requirements.

In our DemoCenter your production facility can be mimicked to create the products of your choice. In this way you will gain valuable insight into the technologies you consider buying. You can learn, see, feel, smell and taste how your wishes and expectations are translated into attractive end products.







## Packaging and end-of-line

- Tailored to your requirements
- Advanced checkweighing and labeling
- Automated pack handling and batching
- For a wide range of products and capacities

Marel end-of-line systems perform the final operations to complete the packing process and provide the presentation specified by the end customer. This equipment comprises a combination of well-proven elements from the Marel range, and can be tailored to your particular requirements. Our advanced, high speed CheckWeighers and Labelers weigh and label virtually any product. It is the most effective way of ensuring conformity to stringent weights and measures legislation.

The Marel Weigh Price Labelers provide excellent performance with low running cost through class leading print head life. Designed for a wide range of applications, they can handle all popular pack sizes at up to 160 packs per minute.

You can benefit from cost savings, improved product flow and higher throughput by automating pack handling and batching in your end-of-line operations. Controlled by Innova software, this equipment minimizes the need for manual intervention and achieves perfectly labeled and accurately tracked packs and batches.



## Process control software solutions

- Control
- Monitor
- Improve

Highly automated processing requires ever more production control and management information. When it comes to optimizing profits and overall production performance, we provide a complete management solution.

Our modular software packages can cover the complete value chain in the production cycle, from the receipt of input material right up to dispatch of the end products.

Innova is the modular production control software for Marel equipment, focusing strongly on those parts of the process where products are transported in shackles suspended from the overhead conveyor.

Innova provides key performance indicators (KPIs) relating to every stage of processing, enabling users to control, measure and monitor virtually every aspect of the production process.

Using Innova production control software, Marel is able to offer the most extensive and best process control solution for all poultry processors.

## Internal logistics

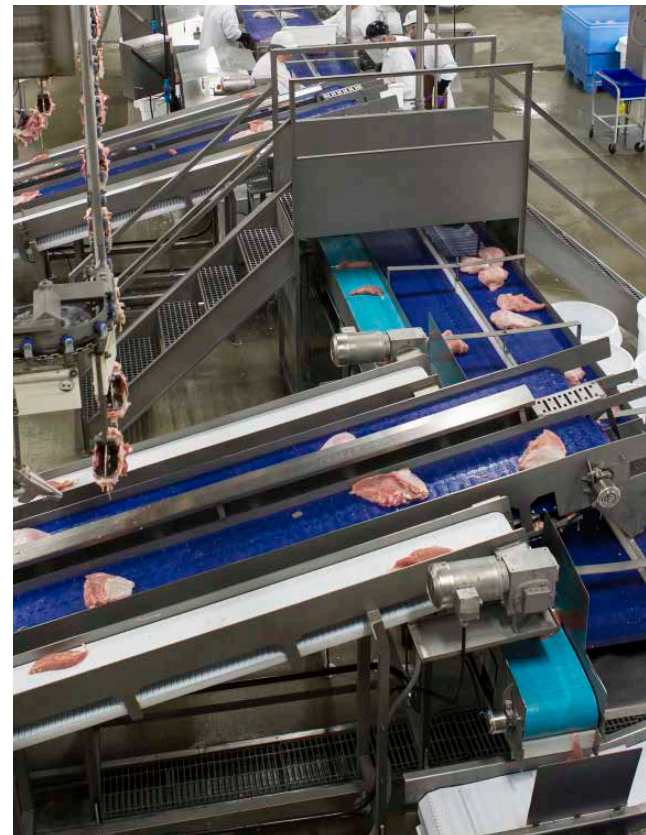
- Bringing the right products to the right place
- Improved product flow
- Reduced labor, reduced touching
- Higher food safety and quality

A conveyor belt is not just a simple way of getting product from A to B. Marel has developed the SystemFlex modular conveyor system to create an interactive logistical environment for optimal process integration. In this way maximum product quality can be maintained.

Well-designed internal logistics improve product flow, safeguarding quality during the various process steps. The modular design of SystemFlex allows each system configuration to be tailored precisely to specific customer requirements.

Food safety is an overriding concern when conveying products through the plant. Besides bringing products safely and hygienically to the next process step, SystemFlex also reduces human contact with the product by automatically positioning products correctly for in-feed into a downstream machine.

We also offer a complete TrayTrack system consisting of an overhead conveyor equipped with specially developed tray carriers, automatic tray loading and unloading stations.



## Rendering and waste water treatment

- Effective and hygienic transport
- Rendering offal into attractive base material
- Treatment of waste water

The quick, effective and hygienic collection and transport of blood, feathers and other inedible by-products is a vital component in poultry processing.

Marel offers various options, ranging from simple pumping systems to extensive vacuum transport systems including in-place cleaning and disinfection.

Some slaughter waste is particularly rich in proteins. It is profitable to render this material. Marel offers a range of rendering systems, which will process blood, feathers and inedible offal into attractive raw input material for other industries. Marel can also take care of the treatment and purification of both process and waste water, offering tailor-made solutions to suit all requirements and levels of pollution. Regarding rendering and waste water treatment, Marel has the best people, knowledge and engineering in the industry.







© Copyright Marel Poultry B.V., 2020: All rights are reserved. Any reproduction or modification of all or part of this publication, regardless of the method of reproduction or modification used and regardless of the carrier used, is strictly prohibited, unless prior written authorization by Marel has been obtained beforehand. Those acting in breach of this notice expose themselves to criminal and civil prosecution, in accordance with the international conventions and copyright laws. The data published herein answer to most recent information at the moment of publishing and are subject to future modifications. Marel reserves the right to modify the construction and the execution of their products at any time without any obligation on their part to modify any equipment delivered before accordingly. The data mentioned are meant as an indication only. Marel assumes no responsibility for errors or omissions in the data published or use of the data published. The publication of these data may not be interpreted as a warranty or guarantee of any kind (either expressed or implied).

**Marel Poultry B.V.**  
P.O. Box 118  
5830 AC Boxmeer  
The Netherlands  
t +31 485 586 111  
f +31 485 586 222  
e [info.poultry@marel.com](mailto:info.poultry@marel.com)

**Marel Inc.**  
P.O. Box 1258  
Gainesville GA 30503  
USA  
t +1 770 532 70 41  
f +1 770 532 57 06  
e [usa.poultry@marel.com](mailto:usa.poultry@marel.com)



PO005\_EN\_20-02

**In partnership with our customers, we are transforming the way food is processed.  
Our vision is of a world where quality food is produced sustainably and affordably.**



**TRANSFORMING  
FOOD PROCESSING**

[marel.com/poultry](https://marel.com/poultry)