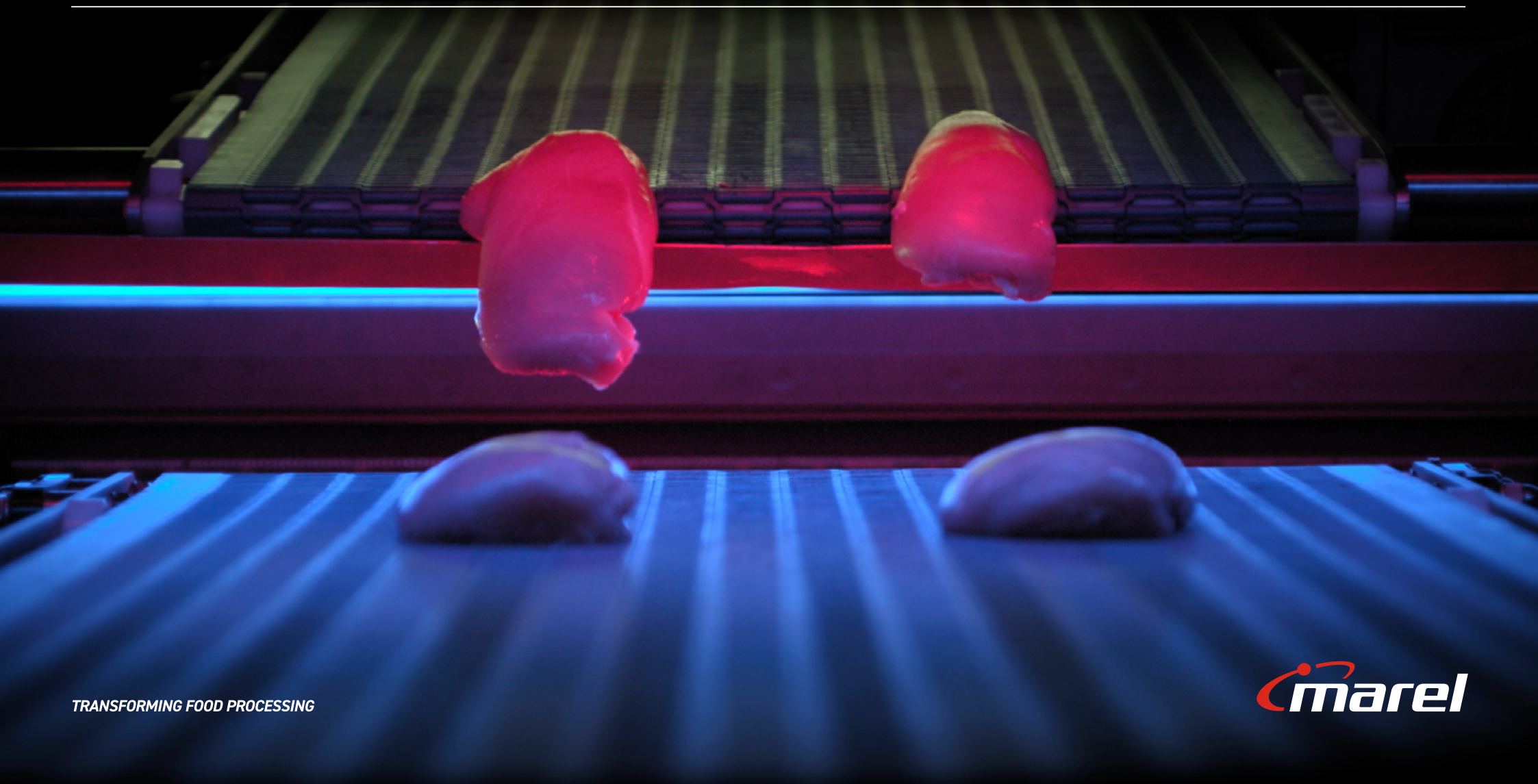
Introducing the future of food inspection

This eBook explores the technology behind **Spectra**, Marel's groundbreaking new spectral imaging solution. The first viable solution of its kind, Spectra accurately detects foreign material on the surface of poultry products, thereby meeting the industry's most pressing quality need.



TRANSFORMING FOOD PROCESSING

marel

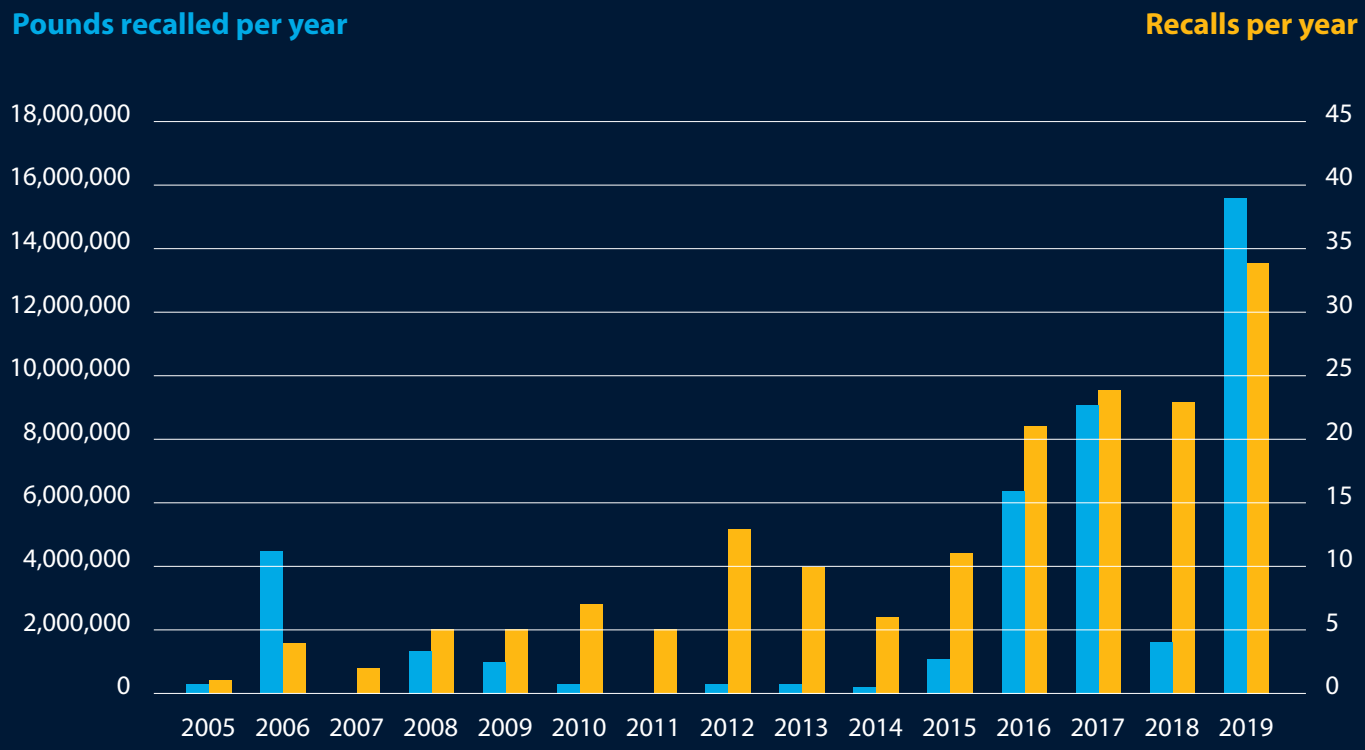
Content

Meeting a major industry challenge

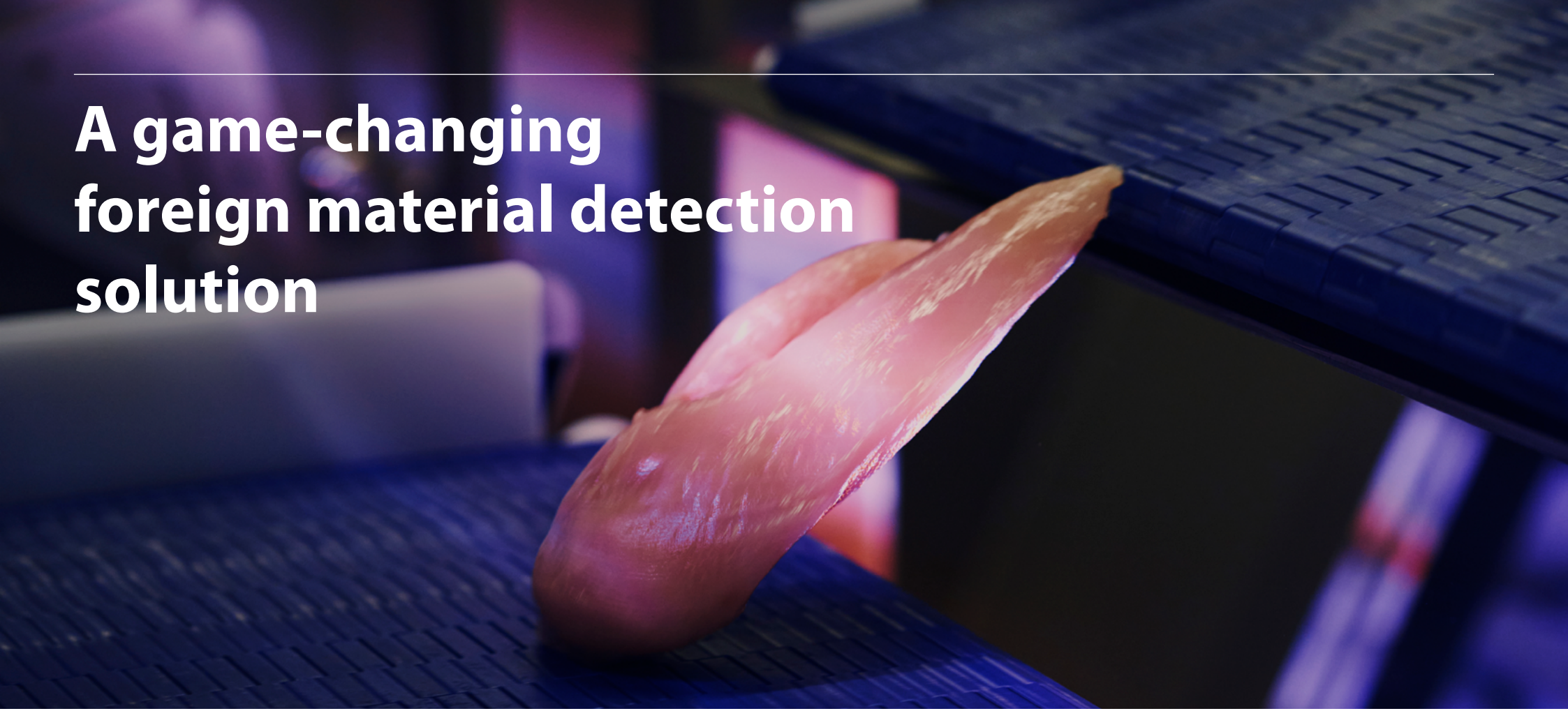
More informed than ever before, the modern consumer expects that the food they purchase is of the highest quality, and rightly so. Unfortunately, the risk of food contamination poses a serious challenge to food industry companies, preventing them from delivering on expectations.

Especially difficult to detect, plastic, rubber and other types of soft contaminants often go unnoticed during processing. In addition to posing severe risks to consumer health, such contaminants can cause significant damage to both the brand in question and the company's bottom line. There is, indeed, a lot at stake.

Recalls and product wasted are growing rapidly



A game-changing foreign material detection solution



Introducing Spectra, an unrivalled foreign material inspection solution bound to set a new standard in poultry processing and quality control.

With a spectral imaging technology surpassing the human visual range, Spectra performs a double-sided surface poultry fillet scanning, detecting and discarding foreign surface material with great effectiveness and precision.

Thanks to this groundbreaking innovation, created in partnership with TOMRA, food processing companies can consistently deliver a premium quality product.

> *"By being close and listening to our customers, we know how much of a challenge plastics and other contaminants are for them. This is why we are investing so much in developing the Spectra with TOMRA."*
>
> *Roger Claessens, EVP of Poultry at Marel*

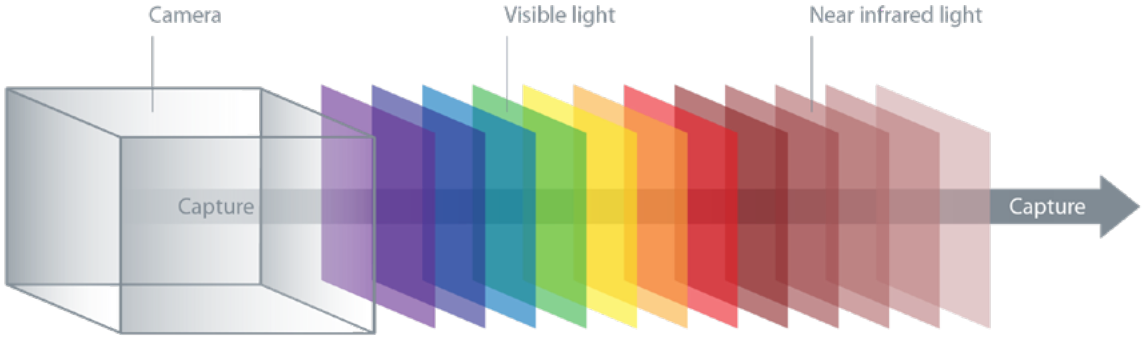
A partnership of pioneers

To ensure optimal function and value, Marel sometimes joins forces with a specialist in a particular field. The result of a rewarding partnership with **TOMRA**, Spectra is a shining example of that. A renowned leader in sensing and sorting technology, TOMRA builds on decades of innovation and expertise within the food industry.

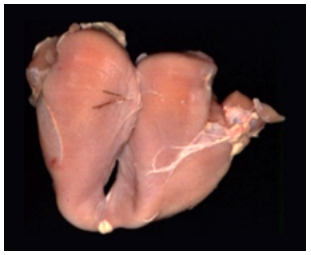
"We have known for a long time that Marel is leading the food processing industry with innovating solutions in both hardware and software. Combining that with TOMRA's cutting edge technology in a partnership of pioneers certainly creates a lot of value and leading-edge for the food processing industry."

Michel Picandet, Executive Vice President of TOMRA Food

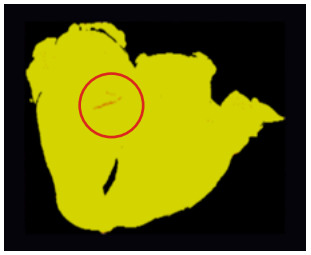
Quality in a new light



For decades, spectral imaging technology has played a leading role at NASA, enabling the exploration of new frontiers and various research benefitting the global population and the planet we all share.



Images captured on **multiple wavelengths, some not visible to the human eye**



Images are combined and hyperspectral analaysis perfomed, providing detailed analysis of product surface

Reaching beyond the limitations of the human eye, spectral imaging technology has the strongest detection capabilities when it comes to surface analysis. Therefore, it is the perfect basis for Spectra.

What is spectral technology?

In recent years, conventional photography has been transformed by improved technology. Thanks to the increase of pixels, improved focusing and shutter speed, and so on, even a mobile phone can capture clear, crisp images rich in detail. However, no matter how advanced or expensive—conventional photos cannot capture anomalies in a product's surface structure. For example, orange plastic on top of a poultry fillet is very difficult—or even impossible—to detect on a conventional photograph or with the human eye, not to mention on a production line running at full speed.

How does it work?

Spectral technology is applied when additional information about the surface structure is needed. A spectral image is created by capturing multiple images of a surface – at various wavebands of the electromagnetic spectrum, that is, both traditional images – and images on infrared wavelengths that the human eye cannot see. These images are captured using specific lighting and sensors. By combining the information from these images and processing, using advanced software, the different surface structures can be analyzed, for example, to detect differences in the chemical structure of a surface.

How can it be used?

From discovering a difference in vegetation in farming to finding underground missiles in military operations, from pinpointing cancer cells on human skin to detecting defects or foreign materials in food processing, spectral technology continues to improve our lives in various fields.

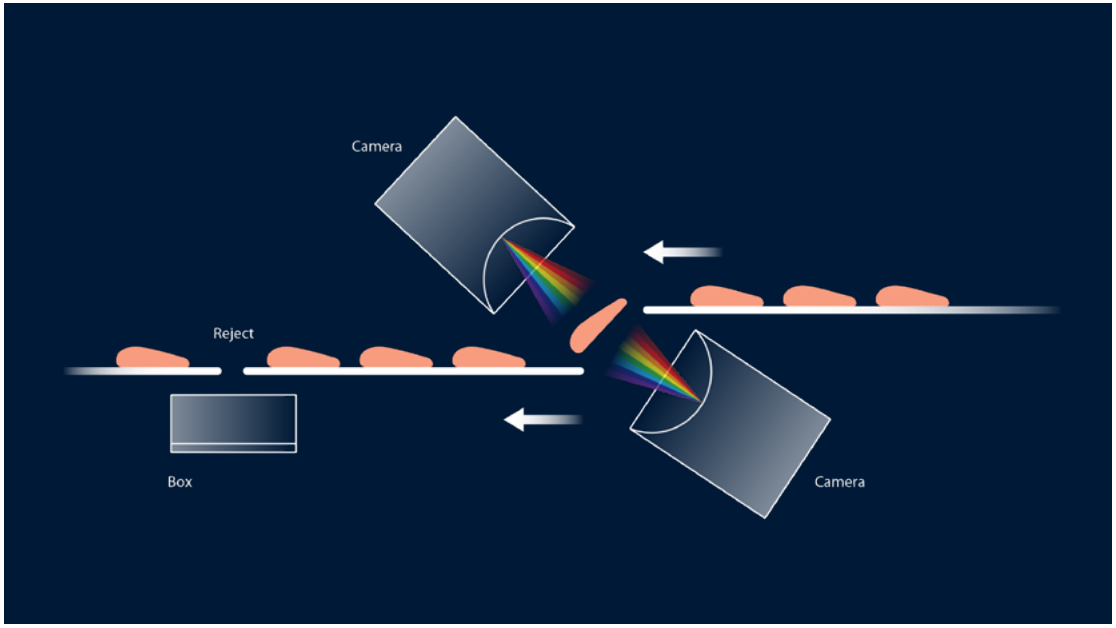
Tailored to the poultry industry

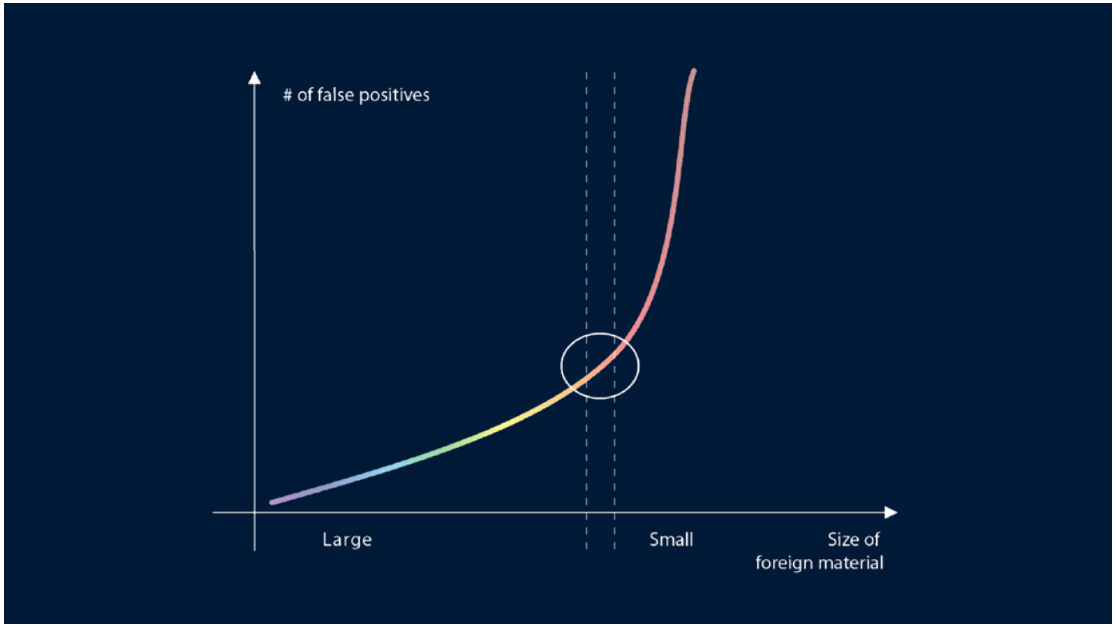
Via spectral imaging technology, Spectra can detect foreign material, such as plastics, rubber, and wood, on the surface of a product, solving an urgent poultry industry problem.

Applying Marel's decades of poultry processing know-how and TOMRA's vast experience in vision technology, Spectra has been designed specifically for the poultry industry. It accurately detects contaminants on the poultry product surface and removes the contaminated pieces from the production stream.

Tailored to the poultry processing environment, Spectra is easy to use and robust, built to fit well into the modern plant's streamlined processes, withstand high throughputs and fulfil strict hygienic requirements.

Spectra is the perfect addition to the poultry plant aiming to consistently deliver product of highest possible quality – aiding in protecting and enhancing its brand.





How does Spectra work?

A singulated product (a chicken fillet, for example) enters the system on an infeed conveyor. Inside the system, it drops from the infeed conveyor to a lower conveyor. During the fall between conveyors, spectral images are captured of both sides of the fillet.

The images are processed and analyzed with specifically designed software. The spectral technology, providing much more information than a conventional photograph, determines whether any type of foreign material is present on the fillet's surface. If foreign material is detected, a reject is opened, automatically diverting the contaminated product into a box.

Spectra is fully automatic—no manual product handling takes place. The system has a very low false-positive rate, making rework minimal. A false-positive is when a product is rejected despite not being contaminated. A high false-positive rate results in a higher number of rejected pieces of product that need to be reworked.

Spectra has been designed and optimized to find the perfect balance between detecting small foreign materials and keeping a low false-positive rate.

A perfect match

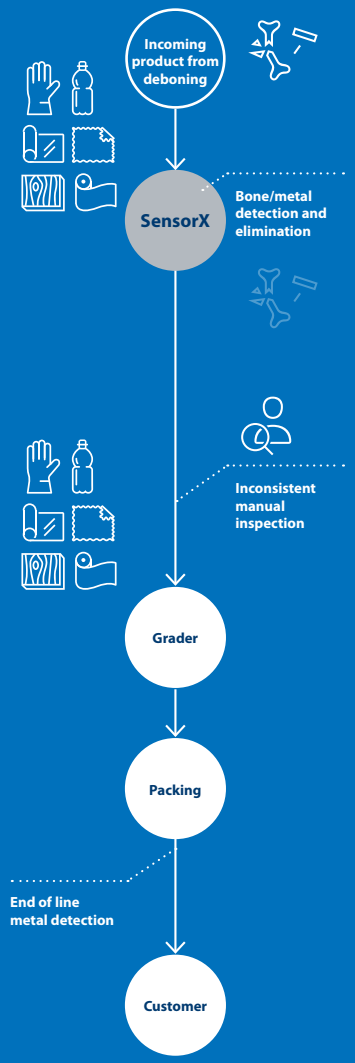
With its outstanding SensorX systems range, Marel has established itself as an industry leader when it comes to innovating reliable FMD solutions. For over a decade, global food industry companies have counted on SensorX for offering their customers a premium product.

As the name indicates, SensorX is based on X-ray inspection technology. One might wonder if Spectra is destined to replace it with its revolutionary spectral imaging technology.

The answer is simple: Not at all. Spectra detects and rejects soft contaminants on a product's surface, whereas SensorX focuses on eliminating hard contaminants such as bone and metal.

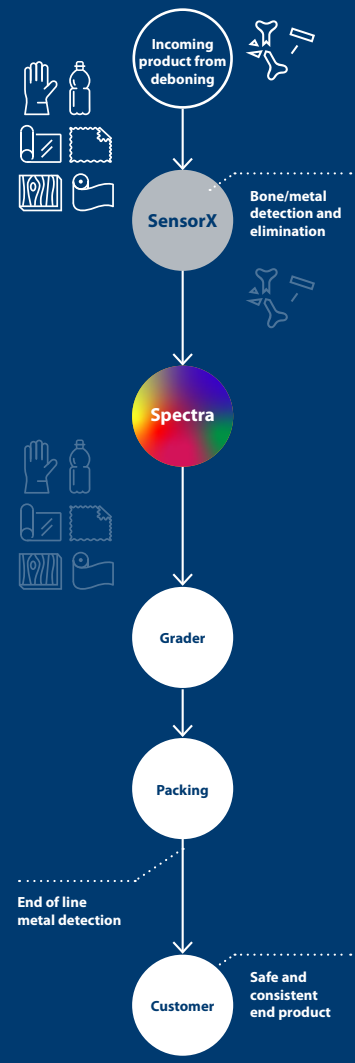
Therefore, Spectra and SensorX work in harmony, each performing a designated purpose during processing—partners on a mission to provide a top-quality product.

Inspection **without Spectra**



- Possibility of surface foreign material
- Inconsistent quality
- Higher risk of recalls/ complaints

Inspection **including Spectra**



- Best available foreign material detection
- Consistent quality of inspection
- Dual side inspection
- Automatic process
- Less product handling
- Safe, consistent end product

An impressive range of benefits

Brand protection
Enabling processors to consistently provide a superior quality product, Spectra will reduce the chances of recalls, claims, and related costs. Consistently delivering on customer expectations will help you protect your brand. Also, consistent quality is the key to establishing your company as a leading producer and maintaining a solid customer relationship.

Full automation
A fully automated solution, Spectra reduces the inherent risks of human error and minimizes product handling. The automation speeds up the production process and guarantees a food product of a higher quality standard.

Peace of mind
Marel's groundbreaking solutions, such as Spectra and SensorX, continue to improve food safety. Our customers can rest easy at night with the fullest of confidence in their product.

Sustainability
As with all other Marel innovations, Spectra promotes sustainability by making the most of our planet's precious resources.

Ready to get started?

Come join the hundreds of poultry processors worldwide who benefit from our industry-standard SensorX solutions developed over the past few decades.

With the revolutionary Spectra, your company will obtain invaluable peace of mind and a premium quality product.

Please visit **marel.com/spectra** for further information or to book a meeting with one of our FMD specialists.