News

ENGILICO

Edition 2024

ENSURING THE HIGHEST QUALITY OF BABY FOOD PACKAGING

New! HyperScope | In-line seal inspection for rigid packages

Puratos relies on SealScope® for packaging of sourdough mixes

Keeping savory snacks crackling with hyperspectral seal inspection

100% SEAL INSPECTION FOR BETTER PACKAGING QUALITY

„The implementation of SealScope® is resulting in automated quality control, better process management and cost reduction on labor."

Frau Heilscher - Kneipp

HyperScope
RIGID PLASTIC PACKAGES

SealScope
FLEXIBLE PACKAGES

Engilico® provides in-line seal inspection systems for flexible packaging (pouches, flow-packs and pillow bags) and rigid packaging (trays, pots and thermoformed packages). Renowned customers in the food, pet care and other industries use Engilico's technology to optimize the quality and productivity of the packaging process.

ENGILICO

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CASE STUDY

100% SEAL INSPECTION BECAUSE OUR PETS DESERVE IT...

SPECIAL DOG COMPANY INNOVATES WITH INLINE SEAL INSPECTION OF RETORT POUCHES FOR WET PET FOOD

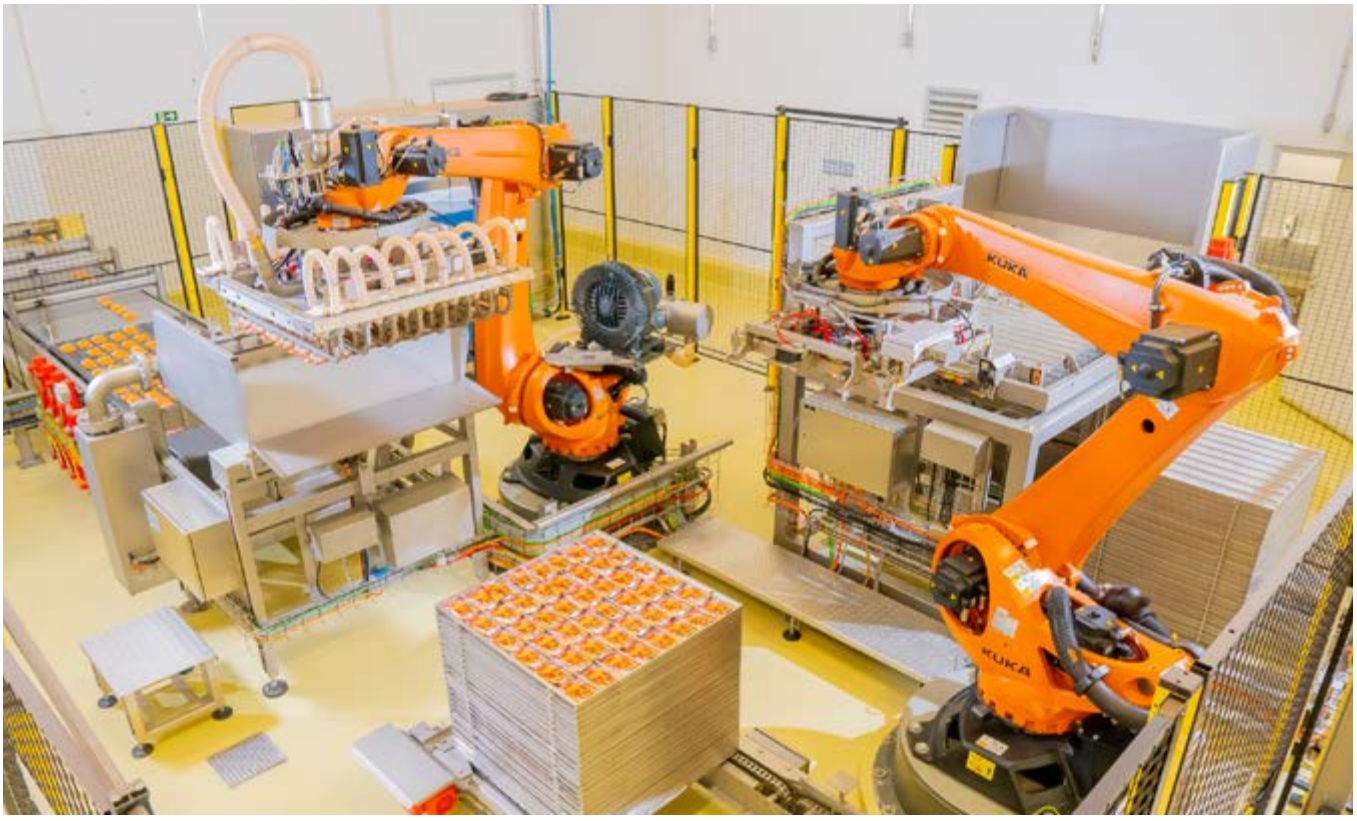
Wet pet food manufacturing is a complex process to consistently guarantee a top quality, healthy and tasty product. Sealing of the filled package is the culmination of all processing steps and protects the food's quality once shipped from the plant. Incompletely sealed packages, and packages with product spillover outside of the seal both negatively impact the packaging processes. Exposed product results in contaminating machines, lost production and labor time for cleaning, manual sorting of bad packages, etc. If these badly sealed packages leave the production site, the impact can be even greater, with potential risk for expensive product returns, call backs and brand damage.

And that's why Brazilian producer Special Dog Company invested in a 100% inline seal inspection to guard the quality of the seals.

Established in 2001, Special Dog Company is today one of the four most significant pet food producers in Brazil, selling in the local market and 11 other countries. In 2019, the company deployed an ultra-modern wet pet food factory to increase the product portfolio to keep growing in the market.

"The sealing of flexible packages is a critical phase in the packaging process.", says Octávio Soberón, Manager of Wet Pet Food Division. "Even with a top quality packaging machine, bad sealings could occur from time to time." Defective seals are often caused by wrinkles, folds, or product in the sealing area and lead to open or leaking packages.

> **" The main benefit of 100% seal inspection is to have a good night of dreams, instead of dealing with quality nightmares."**
>
> Octávio Soberón, Manager of Wet Pet Food Division



Special Dog Company inaugurated an ultra-modern pet food factory with automated processing and packaging.

Wet pet food is especially prone to sealing concerns. Because many glutinous sauces or gels are used in the recipes, it easily can stick in, or around the package's sealing area during the filling process.

Badly sealed pouches are a major concern during the sterilization process, as when the pet food is heated, it might leak and pollute the autoclave. The disruption to production and man-hours for autoclave cleaning has a domino effects in cost. Worse, if compromised packages are not detected they can lead to reduced shelf life, liability for health risks, and broad re-calls.

"Packaging is also responsible for making sure the product gets from the factory, through transport and distribution, and on to retail and the home without any loss to the integrity of the product. At the latter end it may also be responsible for providing barriers to oxidation and moisture migration which can affect palatability and the nutritional composition of the product."

> **" The sealing of flexible packages is a critical phase in the packaging process. That's why we invested in 100% automated seal inspection."**
>
> Octávio Soberón – Technical Operation Manager

Special Dog Company is one of the top pet food producers in Brazil and named Best Workplace in Latin-America.

100% Seal Inspection

Delivering quality products is one of Special Dog Company's corporate values. This requires investment in top equipment, well trained people and refined quality procedures. Special Dog Company is certified with many international quality standards and this vision of quality has also resulted in multiple awards as Best Workplace in Latin-America in 2019. Maintaining quality at the highest level also needs continuous improvement in quality procedures and equipment.

For the packaging of the wet pet food, Special Dog Company deployed a Toyo Jidoki rotary pouch packaging machine. To inspect the sealing of the retort pouches, Special Dog Company extensively researched the market and finally they opted for ***Seal****Scope*®, the in-line seal inspection system.

Leaking packages need to be avoided to prevent outgoing product quality issues and the soiling of packaging machinery.

***Seal**Scope*® offers a unique approach for in-line seal inspection. Vibration sensors are retrofitted on the sealing jaws of the dual-lane rotating packaging machine at two stations in the carrousel. During the closing of the sealing jaws, the vibration response is measured and compared to a reference model of correctly sealed packages. When the deviation is higher than a user defined limit – whether the cause is from product in seal, wrinkles, or folds in the seals – the package is rejected. This automated, 100% inspection leads to immediate benefits: Every single package is inspected, so manual inspection can be reduced or drastically reduced. By rejecting the defective packages, the outgoing quality is instantly increasing.

"The non-destructive seal testing made directly on the sealing bars greatly improved our effective line efficiency compared to previous manual inspection methods." continues Octávio. As it is needed to comply to their internal statistical quality control standards, Special Dog Company still maintains a random sampling for physical inspection process, but with a much lower number of samples than before. These random samples undergo destructive burst testing amongst other human inspections, requiring 5 to 6 minutes per package.

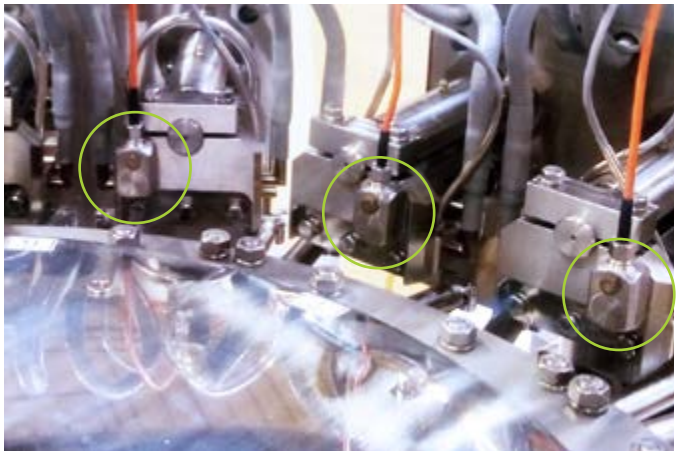
"The main benefit of SealScope in-line seal inspection is to have a good night of dreams, instead of dealing with quality nightmares." Mr Sobéron continues, "Special Dog Company is delivering a 100% inspected product, which means satisfied consumers."

Optimizing the packaging process

As ***Seal**Scope*® inspects every product, it also serves as a continuous monitoring system, not only for the sealing process but indirectly for the complete packaging line. When the repeatability of sealing process is varying, this indicates systematic errors in the packaging process.

The system generates user defined warnings, so the operator can take preventive corrective actions - for instance cleaning of the sealing station, replacement of the Teflon protection foils, etc. As such ***Seal**Scope*® helps to avoid further process drift and to keep the machine in optimal shape. ***Seal**Scope*® also enable to optimize the productivity of the packaging process. Often packaging machines run either too slow (to get acceptable quality) or too fast (with an adverse effect on quality). Using ***Seal**Scope*®, one can determine the optimal machine speed where production output and package quality are maximized.

With the ever increasing demand for high quality wet pet food, Special Dog Company plans to further extend their production capacity. Octávio concludes: "For the installation of the new line, Engilico's ***Seal**Scope*® system is going to be there, for sure."



*The sealing bars of the rotary packaging machine are equipped with **Seal**Scope® sensors that detect product in seal, wrinkles and folds that cause leaking packages.*

AUSTRIAN PRODUCER MACHLAND AUTOMATES SEAL INSPECTION OF PACKAGES WITH CABBAGE

Machland obst- und gemüsedelikattessen (Efko Gruppe) is a leading producer of sauerkraut and red cabbage. The seasonable vegetables are grown by the local farmers and the crops are delivered to Machland directly from the field. Machland then uses its expertise in processing and packaging to conserve the taste and freshness of the product.

> „***Seal****Scope*® **helps us to deliver excellent outgoing package quality“**
>
> Andreas Kirsenhofer – Technical Operation Manager

Packaging cooked cabbage on a vertical machine requires a lot of know-how and expertise. The product is sticky and contains cutting strands that make it challenging to fill at higher speeds. At Machland the most common challenge is product in seal, since this will cause open packages which in turn lead to shorter shelf life and contamination of other packages.

Checking every pouch by hand is a challenge since the production speeds are high and manual labor is costly. This is where ***Seal****Scope*® comes in. ***Seal****Scope*® is the first in-line, non-destructive, seal inspection device that checks 100% of all top seals. Wrinkles and product are easily detected and can be rejected via a rejection unit. In addition, ***Seal****Scope*® continuously monitors the sealing process, providing early warning in case of process drift.

The results of SealScope® are quite impressive. After the first machine was installed, not a single open package was found downstream. This sparked the decision to equip all machines with ***Seal****Scope*®.

"***Seal****Scope*® helps us to deliver excellent outgoing package quality", says Andreas Kirsenhofer, technical plant manager at Machland, "In addition, the process monitoring lets us know if we need to re-adjust the machine, which is a tremendous help to maintain our productivity".

Sensors on the sealing bars

Product in seal

CASE STUDY

ENSURING THE HIGHEST QUALITY OF BABY FOOD PACKAGING

gittis®

GITTIS DEPLOYS SEVERAL PRODUCTION LINES WITH IN-LINE SEAL INSPECTION AND PROCESS MONITORING

At the foot of the Alps near Salzburg, the Austrian company Gittis is surrounded by an impressive natural environment. Gittis produces and packages baby food for their own brand and on behalf of international clients, mainly for export to Asian countries. As the Asian market, where quality requirements are extremely high, is of great importance, Gittis upgraded all their packaging lines for baby nutrition with 100% in-line seal inspection to guarantee the best packaging quality.

Export imposes stricter quality requirements

It was more than a decade ago that China was confronted with an immense scandal after several infants died because of melamine contamination in Chinese baby milk powder. This caused a huge demand for European products. As costs associated with packaging quality issues, such as recalls and brand damage, are extremely high, Gittis extended their manufacturing process with in-line seal inspection.

Gittis packages baby food powder in aluminum foil bags on ROVEMA VFFS (Vertical-Fill-Form-Seal) packaging lines. A perfect seal is critical as the baby food is packed under modified atmosphere conditions. With a daily production of over 90.000 bags, it is impossible to manually check every package. For optimal secondary packaging, the bags have tuck-ins and the multiple layers of foil need to be perfectly sealed. At high packaging speeds, it occurs that the foil is not ideally positioned during the filling, which can cause an imperfect seal and potentially leaking product.

Better process control through in-line seal inspection

As Gittis is driven by continuous improvement, they were looking for better and automated methods to inspect the product for potential leaks. They learned about ***Seal****Scope*® through another premium Austrian food producer. After a positive evaluation, Gittis equipped their Rovema VFFS machines with ***Seal****Scope*® in-line seal inspection.

The innovative ***Seal****Scope*® system uses sensors mounted on the sealing bars to verify whether there are defective seals which can lead to open packages. Every produced seal is instantly compared to a good reference seal and faulty packages are automatically rejected.

The most common seal defects are plies or folds caused by the aluminum-based foil that is not correctly positioned during the sealing phase. Another seal defect example is product that is stuck in the sealing area which can also lead to badly sealed and open packages.

Gittis uses several Rovema VFFS packaging machines

*Package with undesired plies ejected by **Seal**Scope® system*

"We are very satisfied with ***Seal*Scope®, especially the process control is a huge benefit. It is a smart investment, as the system quickly pays for itself."**

Mr. Kalchhofer, Director Operations

A major benefit of ***Seal***Scope®, which also fits in with Gittis' philosophy of continuous improvement, is the process control and monitoring function. In case of consecutive errors - e.g. due to plies or folds of the foil, or synchronization problems during dosing and bag filling - the packaging process is halted, and operators are timely alarmed so they can quickly investigate the cause of the fails and take immediately corrective actions. This is extremely important to avoid issues with rework, sorting bad packages and unnecessary material costs. As an example, ***Seal***Scope® was crucial to timely detect poor quality foil rolls that were supplied with pre-existing folds.

"We are very satisfied with ***Seal***Scope®, especially the process control is a huge benefit.", says Mr. Kalchhofer, Director Operations, "Since the use of this efficient in-line inspection system, our complaints have been drastically reduced. It is a smart investment, as the system quickly pays for itself."

Defective packages are automatically sorted out by a reject unit.

Excellent cooperation

Gittis is delighted with the professional cooperation during the installation and the daily use. More specifically, the remote support is a valuable functionality, allowing the ***Seal***Scope® systems to be managed from within Engilico's HQ support center. As such, unforeseen issues, software upgrades or system fine-tuning can be efficiently addressed without wasting time and money on local support visits.

Long-term cooperation with suppliers and partners is an important element in Gittis' company values. Because of the excellent cooperation, Gittis has also already hosted several other potential customers in their production facilities to witness the state-of-the-art in-line seal inspection solution. ○

Employees can concentrate on process control instead of checking the packages manually

NEW PRODUCT

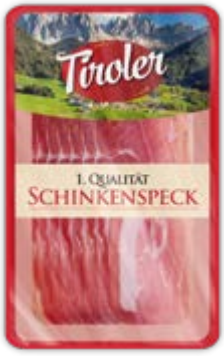
HyperScope

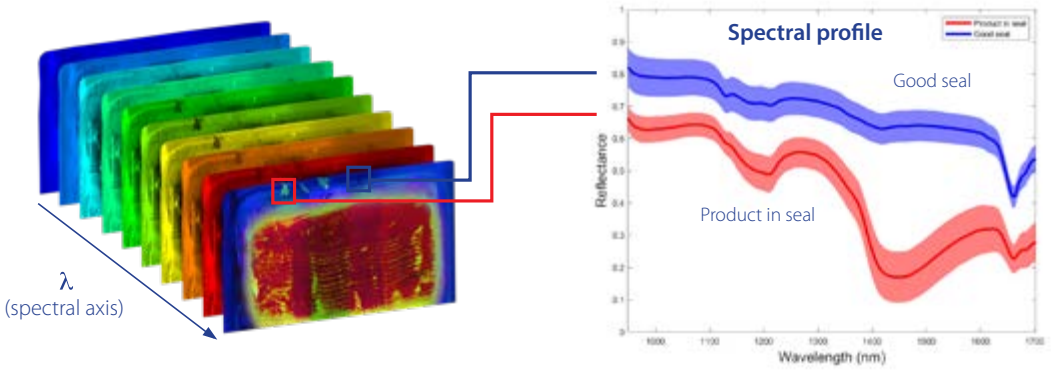
HYPERSPECTRAL SEAL INSPECTION OF PLASTIC FOOD TRAYS & POTS

INNOVATIVE IMAGING TECHNOLOGY DETECTS SEAL CONTAMINATION, EVEN THROUGH PRINTED FILMS

Contamination in the seal of rigid plastic packages causes important issues for food producers as it may lead to leakage and consequently reduced shelf life, health issues and even expensive recalls with potential brand damage. As such automatic detection of contaminated seals is important for both food safety and production automation in packaging. Engilico, specialist in in-line seal inspection for flexible packaging, now introduces a seal inspection solution for rigid trays, pots and thermoforms sealed with plastic film.

The *HyperScope*® solution is based on hyperspectral imaging (HSI). This technology enables to obtain images with much higher contrast than traditional vision systems and can even detect contamination through printed films. Typical applications are the in-line inspection of trays with meat, cheese, seafood and vegetables.





A standard camera image is built from 3 wavelengths ranges (RGB) and only provides visible information

The hyperspectral 3D spectral image map is built from hundreds of images in different wavelength bands. Every pixel is analyzed individually and differences in materials or composition can be detected, even through printed film. A point or region with contamination has as a different spectral profile points where the seal is correct.

One of the main concerns in the packaging industry is to avoid leaking of open packages. Defective packages have a vast impact on outgoing product quality and productivity, as sealing issues may induce extra costs due to line stoppage, manual re-packaging or machine cleaning. For inspection of flexible packages such as pouches, flow wraps and VFFS bags, Engilico already offered ***Seal-Scope***®, an in-line, 100% seal inspection sensor-based solution. But many – and often the same - food manufacturers use also rigid trays, pots and other thermoformed packaging, and they have a similar need for seal inspection for these packaging types. This why Engilico developed ***Hyper****Scope*®, an innovative system based on hyperspectral imaging, to detect contamination in seals of thermoformed packages.

Seeing more with hyperspectral imaging

Product in seal often causes issues for standard vision systems, as there might be not enough contrast between the plastic film and the contamination. In case of printed packaging, often used in more luxury packaging, the contamination can even not be seen. An alternative is X-ray inspection, but this technology is expensive and is only efficient in case the material density is sufficiently different to reveal the distinctive materials, which is not the case for contamination due to organic materials such as meat, cheese and vegetables.

A solution to overcome these challenges is hyperspectral imaging. A traditional vision camera only provides a single image with spectral information from the three primary colors (RGB). Hyperspectral camera technology results in hundreds of images, each with information of a specific wavelength range, including infrared wavelengths. For the detection of contamination in the seal, the relevant wavelengths are merely situated in the (near)-infrared region.

As different materials react uniquely to infra-red light, they can be reliably detected based on their specific transmission, reflection and absorption properties. Since hyperspectral imaging delivers the spectrum for each pixel in the image, it provides information about the composition of each measured point in the sealing area. As such hyperspectral imaging allows to distinguish with high contrast undesired materials such as meat, fat, oil from the plastic film, even if it is printed.

In-line, 100% inspection

In an industrial food production environment, a hyperspectral system is implemented as an in-line, 100% seal inspection system that can check up to 160 packages per minute. Every package is inspected and the system issues a signal to an ejector to reject packages with seal issues. The "core" of the ***Hyper****Scope*® system is situated in the software controller that instantly processes the hyperspectral image to recognize the orientation of the package, and to analyze the seal quality. All information is displayed in an operator-friendly user interface to provide feedback on every package. All production related data, such as product type, number of good/bad packages, date, time is saved to monitor the production quality.

In general, in-line seal inspection enables customers to realize better packaging quality, higher packaging productivity, end-of-line automation and reduction of manual inspection.

Visual image
When product and film have similar colors (yellow-on-yellow), contamination in the seal is not visible

Hyperspectral image
The higher contrast reveals contamination (red) in the seal (green mask)

Interested to see HyperScope at work?

Contact us for a live, remote demonstration!

CASE STUDY

A CENTURY OF TRADITION AND TOP QUALITY, DAY AFTER DAY

GB FOODS INNOVATES WITH SEAL INSPECTION OF POUCH PACKAGES WITH POWDER MIXES

More than 100 years ago, Jeanne Verelst created the first Belgian recipe for powdered pudding preparation. Today, powdered desserts are still a classic in the GB Foods range and millions of units are packed every year on state-of-the-art packaging machines. For the automated, 100% quality control of the seals of the pouches, GB Foods recently switched from vision-based control to *SealScope*® in-line, 100% seal inspection.

GB Foods, one of Europe's leading food companies with branches in Belgium, Finland, France, Germany and Sweden recently acquired the Belgian Continental Food company. The food group represents brands that are steeped in tradition and quality, with products that have been used daily in most kitchens for more than 100 years. Well-known brands include Devos-Lemmens, Royco, Heisse Tasse, Liebig, Aïki Noodles, La Gallina Blanca, Blå Bland and Imperial.

It is for these last two brands that GB Foods, based in Puurs, looked for a new inspection solution that better detected open or leaking paper pouches. These individual packages are typically packed in a carton of six. If certain pouches are not 100% closed after filling,

> " The ***Seal****Scope*® inspection system has increased the production quality and improved the robustness of the packaging process."
>
> Engineering Manager GB Foods

Packages rejected by the SealScope system: Folds (left) and product in seal (right) often result in open packages.

there is a high risk of contamination further along the packaging line, resulting in production stoppages and clean-up actions. If an open package slips past the quality control and is still delivered, there are additional risks of faster spoilage and damage to reputation if the consumer is confronted with a box with a powder film due to open packages. Bart de Bont, Engineering Manager at GB Foods, confirms: "It is extremely important that open or leaking pouches are detected and removed from the packaging line."

Dust - the enemy of a camera inspection system

GB Foods processes the pouches on state-of-the-art HDG rotary pouch machines. Three pouches are simultaneously opened, filled and finally sealed at different stations. At the end of the line, there is a reject system where defective packages are removed from the conveyor belt. Initially, the seal inspection was handled by a camera system, which analyzed the number of ridges in the seal and -based on this analysis- approved or rejected the pouch. However, the fine dusting powder contaminated the camera lens, resulting in too many faulty analyses with unnecessary rejects or failures to emit defective packages. In order to cleanse the camera lens, the line had to be stopped each time, resulting in considerable production downtime. The camera was also mounted just before the ejector system, which often meant that the response was too late to remove a faulty package. In practice, the camera was often turned off and then replaced by manual inspection. In order to implement a fully automatic, in-line inspection system, GB Foods was therefore looking for a new, more robust solution. At the same time, it was decided to invest in a new packaging machine due to increased capacity requirements.

Automatic, 100% seal inspection

It was the German machine supplier HDG that introduced Engilico to GB Foods. After presenting the capabilities of ***Seal****Scope*® by the Engilico team, it was decided to first equip an existing machine with the in-line inspection system. The ***Seal****Scope*® solution consists of specialized distance sensors mounted on the existing sealing bars, the industrial controller that processes all incoming and outgoing data, and the HMI presenting the results in an intuitive dashboard.

When closing and sealing the package, the distance between the seal bars is measured with high precision. This measurement is then compared with a good reference seal measurement. If there are any folds or product in the sealing area, this is instantly detected and ***Seal****Scope*® sends a signal to the sliding hatch to remove the defective product from the packaging line.

> **" We are very satisfied with the service provided by the Engilico engineers and their perfect collaboration with packaging machine provider HDG."**
>
> Bart de Bont, Engineering Manager

The existing HDG machine used to seal three pouches simultaneously on a single seal bar. Because it could not be determined with 100% certainty in which of the three pouches there was a defect - and therefore in principle all three pouches had to be manually verified or removed- it was converted into three individual, synchronized sealing bars, each equipped with separate ***Seal****Scope*® sensors. Switching to just a single pouch per bar, they were able to reject the individual pouch with defect, and no more.

Smooth integration

The cause of defective seals is inherent to the type of product to be packaged: because powders create a lot of dust during filling, the pouches are not always correctly transferred from station to station by e.g. contaminated grippers or because a part of the machine is

Distance sensors on the sealing bars detect whether there is product or folds in the seal

Defective packages are dropped from the belt with a sliding hatch system.

no longer correctly tuned. As a result, folds may occur during sealing or the seal may be skewed. In addition, the pouches sometimes stick to the sealing bars due to the presence of (vanilla) sugar in and around the sealing area, which then melts on the hot sealing bars. Initially there was some internal skepticism to whether this sensor-based system would work due to the presence of the powder dust, but it soon turned out that ***Seal****Scope*® was much more reliable and efficient than the original camera system. After ***Seal****Scope*® proved itself with extensive real production tests, it was decided to also equip the new HDG Triplex machine with the seal inspection system. This retrofit was carried out at HDG in LindLar, before the machine was installed in Puurs. "We are very satisfied with the service provided by the Engilico engineers and their perfectly coordinated collaboration with HDG," continues Bart de Bont, "The fine-tuning of the ***Seal****Scope*® system went smoothly and even in the dusty conditions the system continues to work reliably.".

"The new pouch packaging machine also works much more efficiently than the existing 2012 model. On the new machine we have a rejection rate of 1 per thousand packages, where on the old machine we often had a rate of 1% to sometimes 5%. "

Better packaging process through ***Seal****Scope*®

Seal*Scope*® brings another important advantage. Since the sensors are mounted directly on the sealing bars, the condition of the sealing process can also be monitored and tracked. If rejects of pouches increase at any point in time, it is often because there is something wrong with the tuning of the machine or maintenance is required, such as the cleaning of the sealing bars. Due to the instant reporting and newly gained insights by using the ***Seal****Scope*® system, Continental Foods decided to clean the sealing bars once an hour. By planning this preventive maintenance correctly, the machine is kept in optimal condition and rejects are significantly reduced.

On the packaging lines, several products with different paper thicknesses are packed, which is no problem for the inspection system. ***Seal****Scope*® keeps track of all packaging statistics per product type, such as number of correct and wrong packages, total number of checked pouches per hour or per batch and even per operator. This data enables comparisons to be made between operators and packaging machines for different products. Based on the information, it can be determined what are the optimal operation settings and these can be applied by all operators and for all machines.

The installation of the ***Seal****Scope*® inspection system has both increased production quality and made it more robust. With the old camera system, one person was continuously inspecting the quality of the bags, a challenging and mentally tiring task that cannot guarantee a 100% inspection.

"Engilico's ***Seal****Scope*® system for the inspection of the seals exceeds our expectations", concludes Bart de Bont, "At Continental Foods we also strive to exceed the expectations of the consumers by always delivering top quality. That's why we continuously innovate and invest in our production and inspection methods, so that our products will remain the first choice for future generations".

Two packaging lines for different products are equipped with the ***Seal****Scope*® *inspection system*

CASE STUDY

SEEBERGER INCREASES PACKAGING QUALITY AND LINE OUTPUT USING *Seal*Scope®

Seeberger is the leading brand of premium nuts and dried fruit in Europe. These products require gas flushed packages to make sure that the product quality and flavor are preserved. To improve their packaging quality and productivity, Seeberger deployed *Seal*Scope®, Engilico's inline seal inspection and monitoring technology.

Seeberger was facing challenges when filling and packaging dried fruit on a vertical bagger. Depending on the variety of the product, the moisture and the natural sugar content, the timing of filling with product can vary significantly. This occasionally leads to product in seal. When this seal is then cut, the knife gets contaminated with the product. This causes both a quality and a productivity challenge since the bags with product in seal cannot be hermetically sealed and the machine needs to be stopped to clean the knife.

With ***Seal***Scope®, it is now possible to detect both wrinkles and product in seal. In this case, the knife is deactivated which has two main advantages. Firstly, packages with contaminated seals can be rejected, - increasing outgoing product quality- and secondly, as the knife is kept clean, the machine can keep running, increasing line productivity. In addition, ***Seal***Scope® enables to determine the optimal packaging speed to further maximize the line output..

Typical case of product in seal

CASE STUDY

hazeleger kaas
met zekerheid verpakt

CHEESE PACKED WITH CARE

HAZELEGER MONITORS PACKAGING QUALITY USING *SealScope®*

When introducing a new type of package, Hazeleger Kaas optimized the performance of its horizontal flow wrap machines by deploying *SealScope®*, Engilico's in-line seal inspection and monitoring technology. Since the integration of the *SealScope®* solution, the packaging line speed and the outgoing packaging quality are maintained at the highest level.

> **" We made a huge step forward in mastering our packaging line to guarantee our high outgoing quality"**
>
> Wim van Rijn, owner of Hazeleger Kaas.

Hazeleger Kaas is an independent packaging company of Dutch cheese specialty products and a service provider for renowned cheese brands. One of the main activities is to slice cheese and package it in horizontal flows packs under modified atmosphere.

When introducing a new type of package, it is necessary to control the quality level of outgoing products at the desired production volumes in the shortest time possible. As Hazeleger launched a new re-sealable package for sliced cheese, they searched for the latest technologies in seal inspection to monitor and optimize the new packaging line. Possible causes of defect packages are product in seal or wrinkles. To avoid product in seal, the positioning of the trays, the stacking of cheese on these trays and the relative positioning within the packaging film turned out to be crucial. Also wrinkles in the fold-over need to be avoided to warrant seal integrity, especially for gas flushed products.
Engilico's *SealScope®* was evaluated and the expertise of packaging partners Selo BV and Omori Europe joining forces with Engilico®, turned out to be key in the implementation of the in-line seal inspection and monitoring system.

Analyzing the packaging process

In a first step of the process optimization, the number of defective packages needed to be reduced by analyzing the sealing process.

***Seal**Scope® monitoring console in the packaging line*

This was a crucial step as the new packaging line still needed fine-tuning. As ***Seal**Scope®* instantly and objectively measures the seal quality of every package, it automatically quantifies whether adjusting the packaging line parameters improves the process.

After the first runs at Hazeleger Kaas, ***Seal**Scope®* revealed that process optimizations were possible. The sealing process showed a too high variance and by inspecting the rejected packages, the production line was finetuned. As such, using ***Seal**Scope®* as an objective measurement device, the balance between packaging speed, tray positioning and cheese stacking was gradually optimized.

Continuous process monitoring

After successfully optimizing the packaging line for both output quality and line speed, it was important to keep this process within the narrow optimal performance tolerances. As every process will drift sooner or later, this can lead to variations in productivity and packaging quality. Drift can be caused by e.g. dirt accumulation on the sealing jaws, wear on moving parts, etc.

As ***Seal**Scope®* continuously monitors the sealing process and generates early warnings, this allows the operators to take corrective actions - for instance preventive cleaning of the sealing station. As such, the ***Seal**Scope®* monitoring tool, allows to avoid further process drift and to keep the machine in optimal shape.

Wrinkles in the seal can lead to leaks in the cheese package

100% seal inspection

Beside process monitoring, the immediate role of ***Seal**Scope®* is detecting and rejecting residual packaging defects, optimizing the outgoing packaging quality. The patented ***Seal**Scope®* technology automatically builds an adaptive reference model of good seals and compares every sealed product with this base line. Typical rejects include cheese trays partially stuck in the seal, product in seal or wrinkles. The sensitivity of the rejection level can be set according to the customer's quality policy to find the right balance between outgoing quality and rejected packages. In-line, 100% seal inspection also enables end-of-line automation and eliminates the need for manual inspection of every single package.

A huge step forward in outgoing quality

The benefits of ***Seal**Scope®* at Hazeleger Kaas are measurable in both increased output and better package quality, creating a sustainable competitive advantage.

"We made a huge step forward in mastering our packaging line to guarantee our high outgoing quality", says Wim van Rijn, owner of Hazeleger Kaas. "We fully trust on the ***Seal**Scope®* application for our packaging quality."

As a direct result of the initial installation, Hazeleger Kaas invested in an additional ***Seal**Scope®* for a second packaging line. Also for future lines, ***Seal**Scope®* will be integral part of the packaging solution.

*Cheese parts in the seal are retrieved in a package that is rejected by **Seal**Scope®*

CASE STUDY

HANDL TYROL OPTS FOR STRICTER CONTROL ON OUTGOING PRODUCTS

Tucked away in the Austrian Alps, Handl Tyrol manufactures its famous cold meat delicacies using only ingredients of exceptional quality. Handl Tyrol enjoys a solid reputation for tradition, quality and exquisite taste. Quality packaging ensures a product retains its original flavor until it reaches the consumer. Flawed packaging reduces the shelf life of a product and leads to customer complaints. Where horizontal flow-wrap (HFW) machines are used in cold meat manufacturing, typical elements that affect packaging quality are plies, folds or product stuck in the seal.

Packaging challenges

Handl Tyrol has always played a industry leading role when it comes to quality and innovation. In order to control the quality of the flow packs, that are produced at ever higher output rates, Handl Tyrol performed a market research for an in-line seal inspection system. Controlling the quality of flow packs is challenging because this type of packaging is flexible, meaning camera-based visual checks are not feasible. Also, traditional CO_2 detectors used in the final packaging have limitations; not only do they slow the process down, but they can also only detect larger openings in packaging. For this reason, Handl Tyrol required a more effective and versatile solution.

"Thanks to *Seal*Scope® we have been able to significantly improve the packaging quality as well as the underlying processes," reports the head project engineer for Handl Tyrol, "In my opinion, *Seal*Scope® is one of the greatest innovations in the packaging industry in recent years."

Wrinkles in seal

Product in seal

The *Seal*Scope® solution

Mechanical sensors on the sealing jaws measure the signals during the sealing process. The intelligent ***Seal***Scope® software analyses whether the seals have been manufactured correctly by comparing the measurement to a reference signal. The technology easily detects any plies or areas where the product or foreign material have been caught in the seal. Compromised packaging can then be ejected and the product can be re-packaged. In addition, the ***Seal***Scope® system detects process drifts and sends an early warning signal so that preventive actions can be taken to keep the machines running smoothly. The sensitivity of the system can be adjusted to the customer's own QA guidelines in order to find the most cost-effective balance between acceptable packaging and production speed.

Sealing is critical to prevent leaking packages

Each type of packaging presents its own typical challenges. Companies that use horizontal pillow bag machines with MAP conditioning need to pay attention to the quality of the film and sealing to guarantee the atmospheric treatment of products.
The goal is to ensure consumers receive quality packaging and reliable best before dates. The critical point in the process is when the product is filled into the bag and the bag is sealed. If a fragment of the product is caught in the seal, or there is a ply or fold in the bag, the seal may be damaged, and the product is no longer vacuum sealed. This reduces the shelf life of the product, leading to possible call-backs and customer complaints.

Impressive results

Today, six packaging lines are equipped with the ***Seal***Scope® solution. Imperfect seals and large wrinkles are systematically identified; this has significantly improved the quality of the finished goods, leading to enduring customer satisfaction.

The introduction of the ***Seal***Scope® system has also improved productivity levels. Thanks to the monitoring of the sealing process, simple preventive maintenance measures – e.g. cleaning the sealing jaws – can now be executed in time. The monitoring function ensures that the packaging process operates within the correct tolerances. As a result, Handl Tyrol gained more control over its packaging process; downtime is reduced, and capacities are optimized.

CASE STUDY

EXCELLENT PACKAGING QUALITY FOR FRESHLY MADE PÂTÉS

DE SPIEGELEIRE IMPLEMENTS *SealScope*® 100% SEAL INSPECTION ON PÂTÉ PACKAGING LINE

Retailers always impose higher quality requirements on suppliers of freshly packed products. When packaging food - often under modified atmospheric conditions, leaking or open packaging must be prevented to ensure preservation and food safety. That is why De Spiegeleire N.V., a Belgian producer of quality pâtés, implemented the *SealScope*® seal inspection system to automatically check their pâté in consumer packaging.

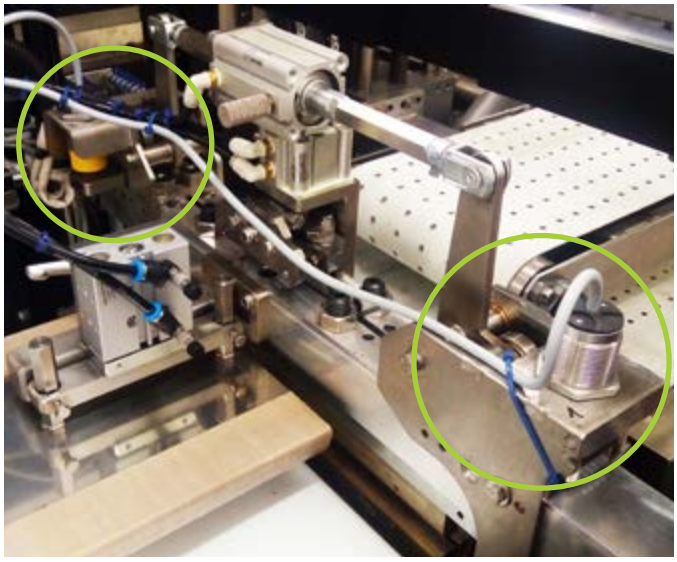
Founded in 1972, De Spiegeleire produces fresh, artisanal pâté preparations for butchers, catering and retail customers. As a second generation family run business, David De Spiegeleire took over from his father in 2003. The company has grown into one of the most important pâté producers in Belgium. Initially De Spiegeleire produced pâté blocks, but since 1999, slices of pâtés have also been available in a horizontal flow pack. The pâté in this consumer packaging is prepared in many variants and is sold to large European retail customers.

As an international player, De Spiegeleire considers quality of paramount importance, resulting in a large number of quality certifications, such as the IFS certificate (International Food Standard) and

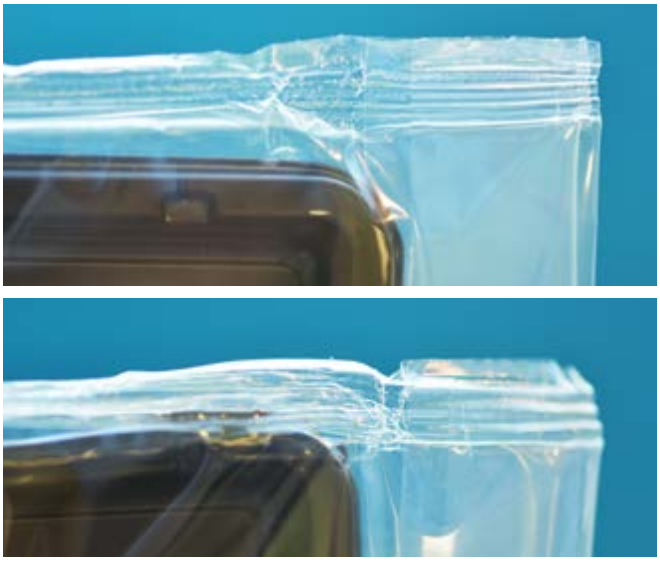
" Our pâté itself is authentic, but our machinery is modern and our production process is fully tailored to our customers' high quality requirements."

David De Spiegeleire, managing director

DE SPIEGELEIRE
Liver pâté



Distance sensors on the sealing bars detect if there are product, material or folds in the sealing area.



*Defective packages rejected by the **Seal**Scope® system with folds (top) and plastic tray in seal (bottom).*

the BRC certificate (British Retail Consortium), which represent the most sophisticated food standards in Europe. But the increasingly stringent requirements of customers, who are striving for a zero tolerance of defective packaging, also drive De Spiegeleire to continuously improve their quality procedures. That is why De Spiegeleire recently invested in a 100% seal inspection system for their flow-pack packaging line to eliminate open or leaking packages.

The consumer pâtés are individually packed in a resealable flow-pack under modified atmospheric conditions. This allows the products to have a longer shelf life while still preserving freshness. Leaks in the seal are very detrimental because the product is then exposed to the air which causes visually unappealing discoloration and faster spoiling. These leaks are typically caused by product or material in the seal - such as a piece of pâté or the plastic tray - or by folded packaging film. Since millions of units are produced every year, a full manual inspection is impossible and too costly. As there is still a risk that manual sample tests can deliver defective packaging, De Spiegeleire investigated a solution that automatically inspects 100% of the packaging produced.

Omori Europe, the packaging machine supplier and a partner of Engilico, recommended De Spiegeleire to evaluate the ***Seal**Scope*® seal inspection system. After checking with other references, they were confident it was a technology they needed to adopt. This flexible packaging inspection system is based on sensors mounted on the sealing bars of the packaging machine, measuring the distance or vibration when closing the sealing bars. The measured signal is compared with a reference measurement signal of good seals. Folds or product in the seal are thus detected and further ejected from the conveyor belt. Because the sensors are directly integrated into the packaging machine, there is no extra floorspace required and no need for special adjustments to be made to the production line. Another advantage of the non-destructive seal inspection is that if the product in the rejected packages is still intact, it can be repackaged, which leads to less overall waste.

"The choice of ***Seal**Scope*® is perfectly in line with our quality policy," says David De Spiegeleire, managing director, "Our pâté itself is authentic, but our machinery is modern and our production process is fully tailored to our customers' high quality requirements."
The ***Seal**Scope*® system is complementary to the extensive quality controls and systems that De Spiegeleire has in place, such as weight control, metal detection and gas and sample analysis. Also the supplier of the packaging line is very impressed. He reports that to their customers, De Spiegeleire is the production site with the most advanced quality control systems.

De Spiegeleire is very satisfied with the installation and operation of the Engilico system. The system accurately tracks production data per variety, such as the number of good and rejected packages. Because every package is measured, one can also observe trends in the production process. This also allows timely maintenance or fine-tuning of the packaging machine, which can prevent sudden production stops or manufacture of defective packages.
"100% seal inspection of packaging is necessary to meet our customers' quality requirements," Jeroen De Spiegeleire from the technical service department continues, "It gives us a high level of confidence that each product is inspected individually."

Due to the increasing demand for pâté in consumer packaging and recent expansion of their customer base, De Spiegeleire has increased both their production and inspection capacity. ○

CASE STUDY

FOCUS ON CHEESE PACKAGING QUALITY

FLANDERS FOOD PRODUCTIONS DEPLOYS SECOND *SealScope*® SEAL INSPECTION SYSTEM ON NEW CHEESE PACKAGING LINE

A delicate product such as sliced cheese, requires a packaging that is perfectly sealed to guarantee shelf life. That is why Flanders Food Productions has again equipped their newest sliced cheese flow-pack packaging line with an Engilico in-line seal inspection system.

Flanders Food Productions (F.F.P. - Belgium) has been specializing in cheese processing since 2003. Its main activities are slicing, grating and packaging of a wide range of cheeses and alternatives. With more than 10 processing lines in an ultra-modern production facility, F. F. P. is one of the leading producers in the Benelux and distributes its products to more than 55 countries worldwide. The full range of products is produced in a variety of packaging formats, ranging from retail packaging to industrial bulk packaging.

Quality and automation

Flanders Food Productions focuses strongly on quality, that is intensively monitored over the entire production line. All incoming goods, such as the unsliced cheese blocks, are subjected to an extensive entry control. The products are then processed and packaged according to strict protocols with corresponding production checks (temperature, metal detection, gas composition, residual oxygen, sealing seam quality, etc.). Another key element is the high level of automation in the packaging lines to guarantee top quality at high production speed.

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Seal inspection of flow-packs

Specifically for the processing of several varieties of cheese, F. F. P. has recently invested in a new slicing and packaging line. In 2020, their first processing line was equipped with ***Seal****Scope*® as a part of their continuous quality improvement. "We were very satisfied with the Engilico system on our first line, and it was a logical step to also equip the new line with the ***Seal****Scope*® system." explains Ben Verheyen, Technical Project Manager at F.F.P. .

"The ***Seal****Scope*® system was installed on an OMORI flow-pack packaging machine," adds Peter Nijs, CTO Engilico. "Because of the recurring cooperation with the manufacturer, the new machine is delivered pre-equipped with brackets to hold our sensors, which makes the on-site installation and fine-tuning very smooth. "

Cheese is packaged under a protective atmosphere to ensure its shelf life. Quality control of the seal is therefore of great importance to avoid open or leaking packages. The innovative ***Seal****Scope*® system verifies by means of sensors mounted on the sealing bars, whether there are folds or cheese in the seal which can lead to open or leaking packages. Also if e.g. the protective tray on which the cheese slices sits, is badly positioned and gets stuck between the seal, ***Seal****Scope*® will detect the defective package. The entire production is thus automatically verified and when errors in the seal are detected, the cheese packages are automatically removed from the conveyor belt by an ejection system. These rejected products are then carefully checked whether they can be repackaged or go to the grating line, minimizing production waste.

Monitoring the packaging process

Another important function of ***Seal****Scope*® is the monitoring of the packaging process. The system accurately tracks production data per product variety, such as the number of good and rejected packages. Because each package is measured, it is also possible to register trends or deficiencies in the production process. In this way, if the rejection ratio increases, proactive maintenance can be planned. The machine can also be timely adjusted, which can prevent production of bad packages and production delays.

Rejected package with folds in the seal.

> **" We clearly notice that the quality of our outgoing production is significantly higher by using *Seal****Scope*®. "**
>
> Ben Verheyen, Technical Project Manager F.F.P.

It is also possible to compare the performance of operators, shifts, lines, etc. Through the exchange of knowledge and experience, the ***Seal****Scope*® data enables to bring all operators to a higher level.

"The in-line seal inspection system is definitely an assurance for our quality department, as - when a line operator loses focus for a moment-, ***Seal****Scope*® ensures that packages with defective seals are eliminated and not delivered to our customers.", concludes Ben Verheyen, "We clearly notice that the quality of our outgoing production is significantly higher by using ***Seal****Scope*®. "

Info on F.F.P. : https://www.flandersfoodproductions.be

*Also the new OMORI flow-pack line is equipped with the **Seal**Scope® seal inspection system.*

The state-of-the-art packaging line is fully automated.

CASE STUDY

KEEPING SAVORY SNACKS CRACKLING

IN-LINE HYPERSPECTRAL SEAL INSPECTION ENABLES END-OF-LINE AUTOMATION FOR PACKAGING SNACK TRAYS

Since 1949, one of the most popular party snacks has been produced in Austria: the thin, salty pretzel sticks from the brand Soletti. Meanwhile Soletti became part of Kelly Snacks, and the successful product is exported to more than 40 countries. A key element for these salty snacks is to preserve the crispiness, so seal integrity is critical. That's why Kelly also integrated *Hyper*Scope® systems into two new production lines, for 100% in-line seal inspection of the single- and multi-compartment trays with transparent as well as printed films.

Challenges with crispy snacks

Snacks are packaged in different variations for many occasions: small personal treats, movie portions or bigger sized servings for families and parties. This requires different packaging formats such as flow-packs, VFFS (gusseted) bags, cups or thermoform trays with multiple compartments. To guarantee best-before dates and offer an appealing product, seal inspection is essential to avoid leaking packages or visible product particles in the sealing area. As the demand for snacks in trays is growing, Kelly decided to expand/upgrade their production capacity with new fully automated lines for packaging single trays, dual trays, or even quadruple trays with a mixed variety of snacks.

As seal integrity is equally important for these types of trays, Kelly was looking for a solution to inspect in-line 100% of the seals and automatically remove faulty packages, overall reducing manual labor for inspection and sorting. Defective packages lead to internal and external quality problems and high sorting costs, which of course need to be avoided.

There are different challenges with this type of product and its packaging. As the salted product is crispy there are crumbles that might get stuck in the sealing area. When these particles are small, they have a limited effect on seal integrity. But larger parts can result in a seal breach.

As the top film of the packages is often printed, contamination cannot be "seen" by a human eye or standard vision inspection systems. Inspecting with a camera from the bottom is also not a solution as the crumbles are hardly visible as there is typically a low contrast between the crumbles and the pale underside of the film, and certainly not when the tray is opaque.

Also, at a high production rate, manual inspection is simply not feasible. Finally, with multi-compartment trays there are often issues with product particles in the bridge. Also in this case, viewing or inspecting from below is difficult as the steep walls of the trays easily block the view of camera. So ideally, Kelly was looking for a solution that was: 1) capable of detecting contamination through printed top film; 2) usable for multi-trays; 3) capable of handling high production speeds and ; 4) automatically rejecting faulty packages.

Enters ***Hyper*Scope®**, Engilico's new solution for hyperspectral-based seal inspection of rigid trays and thermoforms.

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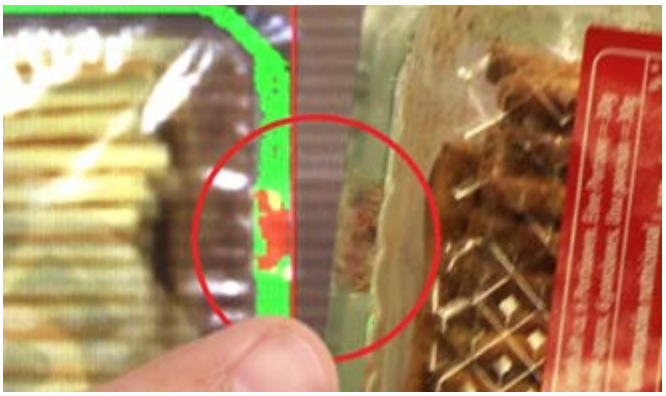


***Hyper**Scope® seal analysis compared with rejected package*

Multi-compartment tray with assortment of snacks and product in sealing area

Seeing more with hyperspectral imaging and AI

HyperScope® uses hyperspectral imaging to detect seal contamination with high contrast, even with printed film. The inspection system features GPU-accelerated artificial intelligence (AI), which enables real-time, high-precision seal area detection, regardless of the package orientation, packaging material, layout and size. The system includes a conveyor belt that can be completed with an integrated reject unit.

Hyperspectral cameras capture information from a larger part of the electromagnetic spectrum including infrared wavelengths that penetrate through thin plastic or paper top films. Hyperspectral imaging, therefore, unlocks new inspection possibilities where classic imaging often falls short, e.g., on printed film packages which are often used in the range of premium products with luxury packaging, on packaging with opaque backings or in applications where the seal contamination is difficult to detect due to limited contrast. The system can inspect up to 160 packages per minute, a speed that is well aligned with most food production lines.

Since contamination only needs to be detected in the sealing area, it is particularly important to detect this region with high accuracy. ***Hyper**Scope®* relies on artificial intelligence for this task: the sealing area is automatically determined, regardless of package orientation, degree of deformation and number of tray compartments.

The detected sealing area is then further analyzed in several post-processing steps to detect e.g. seal breaches, contamination inclusions in the seal, etc. Finally, based on configurable decision criteria, the package is accepted or rejected.

***Hyper**Scope®'s comprehensible user interface instantly provides operator feedback*

"*Hyper*Scope® is an innovative inspection technology that is particularly suited for our multi-compartment packages with printed top film."

Matthias Stoessl, IWS Manager Kelly

"It is very important for us that 100% of our production is inspected and packages with seal contamination can be removed from the packaging line.", says the IWS Manager Mr. Matthias Stoessl, "Seal defects can have an impact on the freshness of the product. Also for aesthetic purposes, product inclusion in the sealing area is not acceptable."

Smooth installation and deployment

As the tray packaging lines were newly configured, the installation was relatively straightforward, teaming with the professionals from Kelly as well as with an external third-party line integrator.

***Hyper**Scope®* is capable of processing different products and variations, which is important as the packaging lines are producing for different brands. In total, more than 16 different product models were created and extensively validated. All daily inspection information for the different products is saved in a database that can be exported to many reporting formats.

"We are very pleased with the installation and deployment of the ***Hyper**Scope®* systems. This is a very innovative inspection technology that is particularly suited for our multi-compartment packages with printed top film.", concludes Mr. Stoessl, "The new fully automated packaging line that features metal detector, ***Hyper**Scope®* seal inspection and checkweigher, positions us at the forefront of production and inspection capabilities."

Being a center of excellence, other companies from the Intersnack Group are obviously very interested in following these latest innovations at the Feldbach production site. ○

CASE STUDY

100% SEAL INSPECTION SPICES UP POUCH QUALITY

KOTÁNYI INNOVATES WITH IN-LINE SEAL INSPECTION OF POUCHES WITH SPICES

What is the perfect recipe for a company that specializes in enhancing food with herbs and spices? Well, you need more than just paprika — you need passion, pioneering spirit, production excellence and an enduring striving for superb quality. Because Kotányi is automating their pouch packaging lines, they recently deployed two innovative, in-line seal inspection systems to assure the quality of their packages with herbs.

Spice pouches full of flavors

Kotányi supplies their herbs in different packaging formats for the retail and gastronomy business:: classic glass or plastic jars, mills and pouch packages. The packaging design and materials are subject to continuous development and improvement. Eg. for the spice pouches, by leaving out a single layer of plastic, Kotányi was able to considerably reduce the packaging waste. Customers can always rely on the proven quality of Kotányi herbs and spices. The strictest quality controls and compliance to the highest standards such as ISO 9001:2015 and IFS Food 6.1 ensure that the freshness and aroma is retained for a long time.

"One important aspect of the pouch quality is a perfect sealing to preserve the highest quality and excellent taste.", adds Mr. Bernhard Brenner, Plant Manager at Kotànyi, "For this purpose, Kotányi opted for ***Seal****Scope*® seal inspection, more specifically for their packaging lines of bay leaves and cinnamon sticks."

Success based on using the latest production technologies: Enter ***Seal****Scope*®

For the packaging of pouches, Kotányi uses rotative Laudenberg and SN packaging machines. First the pouch is made from packaging film, by sealing three sides. Next the pouches are filled with herbs and sealed at the top. Initially operators manually verified the individual packages, but as Kotányi aims at production excellence by automating the packaging lines, altogether with the fact that operators are always more difficult to hire, it was clear that an automated inspection solution was required. Also, it is nearly impossible to manually check the sealing with a constant focus and high quality.

Kotányi learned about the automated, in-line ***Seal****Scope*® solution through their packaging machine manufacturer. The innovative ***Seal****Scope*® system uses sensors mounted on the sealing bars to verify whether there are product or folds in the seal which can lead to open packages. Every produced package is instantly compared to a good, reference seal and when errors in the seal are detected, the defective packages are automatically removed from the conveyor belt by an ejection system. As herbs are expensive, the rejected products are reworked, so there is no production waste and yet the best quality is ensured. Two packaging lines for bay leaves and for whole cinnamon sticks are equipped with ***Seal****Scope*®. These are relatively solid, rigid herbs that will certainly cause a seal breach when stuck in the seal. Also, because the herbs are large, there is an increased probability that during the filling and sealing, product is stuck in the sealing area. Even when the seal is not breached, product in seal is not acceptable for cosmetic reasons. Besides inspecting for product

The Kotányi and Engilico teams during the deployment of the in-line seal inspection system

in seal, ***Seal****Scope*® also detects folds or plies in the sealing area which can also lead to open packages. This is equally important to avoid that the spices lose their aromatic qualities.

Another important function of ***Seal****Scope*® is the monitoring of the packaging process. Because each package is measured, it is also possible to register trends and deficiencies in the production process. With the spices and herbs, there are often residues contaminating the sealing bars. In this way, if the rejection ratio increases, the packaging can automatically be paused and pro-active maintenance can be planned. Or the machine can be timely adjusted, which can prevent production of bad packages and production delays.

Remote support helps to quickly solve issues

Kotányi is delighted with the professional cooperation during the deployment of the project, especially as this coincided during the corona pandemic. In an initial visit, all specifications and dimensions of the packaging machines were registered to manufacture

For the packaging, Kotányi uses Laudenberg and SN machines

" Kotányi is definitely pleased with the automated seal inspection. Superb quality and safety are what we are all about, and *Seal*Scope® fits perfectly within this philosophy."

Mr. Bernhard Brenner, Plant Manager at Kotànyi

the sensor brackets and configure the electronics for the controller cabinets. Soon after, the system was successfully deployed and operators were trained.

A valuable benefit that became apparent was the capability adapt the ***Seal****Scope*® installation from within Engilico's headquarters. As such, unforeseen issues, software upgrades or system fine-tuning can be efficiently addressed without wasting time and money by avoiding the need for local support visits.

Further focus on automation

As Kotányi is increasingly automating the production and packaging in their facilities, in-line seal inspection will continue to play an important role in further upgrades of packaging lines, also for grinded spices.

"Kotányi is definitely pleased with the automated seal inspection" concludes Mr. Brenner, "Superb quality and safety are what we are all about, and ***Seal****Scope*® fits perfectly within this philosophy." ○

SCHOEPS CONTROLS OUTPUT QUALITY OF GRATED CHEESE BAGS USING *SealScope*

When SCHOEPS appointed a new general management in 2018, one of the first objectives was to increase outgoing product quality. With the company's vision to deliver premium quality cheese products to their worldwide customers, they opted for *SealScope*® to 100% inspect their grated cheese bags for defective seals. As a result, the number of compromised outgoing products reduced drastically, to almost zero.

SCHOEPS S.A. - situated near La Louvière - is a leading Belgian company active in cheese processing and packaging. They offer a wide variety of grated cheeses and block cheese. Schoeps` customer portfolio comprises of manufacturers of ready-made meals like pizza, lasagnas, sauces, etc. and distributors who supply restaurants, institutional kitchens and so on. SCHOEPS has a wide range of grated cheeses, including Mozzarella, Emmental, Gouda, Cheddar, Maasdam and several different mixes. The grated cheeses are packed under a modified atmosphere in bags (neutral, printed, private label) starting from 500 grams to 5kg. SCHOEPS' vision is to provide their customers on a daily basis with a premium service and a high-quality product.

" We are very pleased with the *SealScope*® solution. We drastically reduced our customer complaints on badly sealed packages. About 1% of the total outgoing production had micro-leaks and was returned. This has now dropped to a few packages."

General manager of SCHOEPS S.A.

Schoeps outputs a yearly production of 35 tons

Wrinkles in the seal can lead to leaks in the cheese package

Cheese parts in the seal in a bag rejected by ***Seal****Scope*®

In 2018, the new owner decided to appoint a new daily management and one of the main objectives was to increase the outgoing product quality. A common issue with gassed bags of grated cheese is that micro-leaks in the seal can lead to defective packages. Defective packages can be caused by plies or folds in the seal or by cheese particles stuck in the seal. Due to micro-leaks, the cheese bags lose their gassed condition and this is often only noticed after delivery, with the consequence that the products are returned to the manufacturer.

To cope with their vision on delivering premium quality products, SCHOEPS had too many issues with defective seals. About 1% of the total outgoing production had micro-leaks and was returned to sender. Schoeps initiated a research to find a solution to inspect each single seal. Engilico, the Leuven specialist in seal inspection and monitoring was contacted to provide ***Seal****Scope*® for 100% inspection of seals of flexible packages.

In-line 100% seal inspection

To inspect the integrity of seals, Engilico® retrofitted two distance sensors on the sealing bars of the packaging machine. The responses of these sensors are measured during the closing of the sealing bars for every produced bag. A reference signal is built from good seals and during production the response from every sealed bag is compared to this reference. Plies/folds or product in the seal cause a different signal than the reference response. When detecting a defective seal, ***Seal****Scope*® reports the error and returns a signal to an ejector to eliminate the compromised bag.

After installing ***Seal****Scope*®, the results were impressive. The outgoing quality increased significantly and today Schoeps has almost no customer returns of badly sealed packages.
The general manager of Schoeps comments, "We are very pleased with the SealScope solution. We drastically reduced our customer complaints on badly sealed packages. About 1% of the total outgoing production had micro-leaks and was returned. This has now dropped to a few packages. We fully rely on this system that checks every individual product. This automated inspection is so much more effective than an operator that manually checks samples from the production."

Monitoring of the sealing process

Other major benefits of ***Seal****Scope*® are the reporting and monitoring capabilities. ***Seal****Scope*® logs date, time, total packages, number of good/bad packages per product type. As SCHOEPS produces different variations, this enables them to analyze reports per bag or per product type. The issues with specific bags can be quickly identified and resolved. The monitoring function also enables to finetune the packaging process to find a balance between productivity and product quality.

"We are very satisfied with the cooperation of Engilico", concludes Schoeps, "As an example of our excellent relation, we have already hosted visits to our facilities for Engilico and other potential customers.

CASE STUDY

INNOVATING FOR BETTER PACKAGING OF BAKERY MIXES

PURATOS RELIES ON *SealScope*® SEAL INSPECTION FOR PACKAGING LINES OF O-TENTIC SOURDOUGH MIXES

Delicious bread is a favored element in the daily food consumption of millions of people. Bread is typically prepared with high-value bakery mixes that consist of living ingredients such as yeast. As these need to be protected from oxidation and moisture, the packaging must be perfectly sealed. That's why Puratos has equipped their Vertical-Form-Fill-Seal packaging machines with a SealScope® in-line seal inspection system.

puratos
Food Innovation for Good

To produce sourdough, flour is mixed with water and inoculated with lactic acid bacteria, which are selected according to the taste of the bread. During fermentation, the sourdough is fed flour and water to reach the desired consistency. Andenne's sourdough production line allows the liquid sourdough to be dried to increase shelf stability. The drying gives the sourdough an interesting toasted flavour as well. During the drying process, the liquid is transformed into a fine powder used in the production of bread. Quality is an important value for Puratos, as is their drive to always learn and improve. The decision to invest in seal inspection technology to deliver better packaging to their customers, perfectly fits into this vision of quality and continuous improvement.

Quality and automation trigger the need for in-line seal inspection

The sourdough bakery mixes are packaged in flexible bags of 1 kg or 10 kg on UVA vertical packaging machines. As these are packaged under modified air conditions for long preservation, it is important that the sealing of the bags is perfect. For the bigger bags, a firm horizontal seal is needed to support the heavy weight. The small 1 kg packaging format features tuck-in sides and the seal also requires easy manual opening. This requires extra attention to properly adjust the sealing parameters.

In view of Industry 4.0, the lines are fully automated - from packaging to placing the labeled bags in cardboard boxes, ready for shipment. Focusing on continuous improvement, Puratos was searching for an automated solution for seal inspection. In practice, at the

*The **Seal**Scope® system is fully integrated into the UVA VFFS machine and requires no additional space in the packaging line.*

Rejected package due to fold in the seal.

speeds which they are packaging, it is impossible to manually check each bag produced for the presence of seal defects.

And the sealing process, especially with a powdery product, is a challenge as product in the sealing area can result in a defective seal. A costly possibility would have been to check each bag under a vacuum bell to detect leaking nitrogen, but this would have required the use of an additional machine on the production line, taking extra space and adding significant maintenance costs. Inspired by another Puratos plant where chocolate pellets are packaged, the production team of Andenne decided to evaluate Engilico's innovative ***Seal**Scope*® system on a first packaging line. After a successful line audit, a first system was equipped with ***Seal**Scope*® , and shortly after, Puratos decided to also retrofit their new, second packaging machine.

"We were pleased with the Engilico system on our first line, and it was a logical step to also equip our second line with ***Seal**Scope*®. The system instantly detects seal problems and allows us to detect a process deviation as early as possible." explains Thomas Partiot, Process Improvement Manager, "On top of that, this solution excels in its simplicity of installation and its integration directly on the structure of the bagging machine.

Automated seal inspection

As sourdough is a living product that is sensitive to oxygen and moisture, it is essential to have an effective barrier to protect it. Quality control of the seal is therefore of great importance to avoid open or leaking packages. The innovative ***Seal**Scope*® system verifies by means of sensors mounted on the sealing bars whether there are folds or product in the seal which can lead to leaking packages. The entire production is thus automatically verified and when errors in the seal are detected, the bags are automatically remove from the conveyor belt by an ejection system. The rejected products containing defects are reworked, so that there is no production waste and yet the best quality is ensured.

"***Seal**Scope*® is an important element in the quality and value chain. As we are dedicated to deliver our customer the best quality and also because the cost of returned goods due to defective packaging is extremely high, our goal is to deliver 100% inspected packages to our customers," comments Paul Rase.

Optimizing the packaging process using SealScope®

Another important function of ***Seal**Scope*® is the monitoring of the packaging process. Because each package is measured, it is also possible to register trends and deficiencies in the production process. In this way, if the rejection ratio increases, proactive maintenance can be planned. Or the machine can be timely adjusted, which can prevent production of bad packages and production delays.
"A noteworthy example where ***Seal**Scope*® demonstrated its value occurred when an internal mechanical component suddenly broke in the packaging machine." says Thomas Partiot, "As ***Seal**Scope*® instantly indicated a process variation, we could quickly react and investigate the source of the problem. "

> **" This solution excels in its simplicity of installation and its integration directly on the structure of the bagging machine. "**
>
> Thomas Partiot, Process Improvement Manager

To get the most out of the equipment it was necessary to have a clear understanding of the capabilities of ***Seal**Scope*® to put in place the right maintenance and use practices. With the support of Engilico as part of a continuous improvement project of the production area, it allowed us to optimize the production process. Before the optimization process, the rejection ratio of defective bags was in the range of 15%, where after optimizing the production lines it is now between 1 and 2%.

"We are very satisfied with the seal inspection installations and believe this has a wide potential in the packaging industry", concludes Paul Rase, "The main advantages of the ***Seal**Scope*® system are better quality of outgoing production, better control of the packaging process resulting in fewer product returns."

CASE STUDY

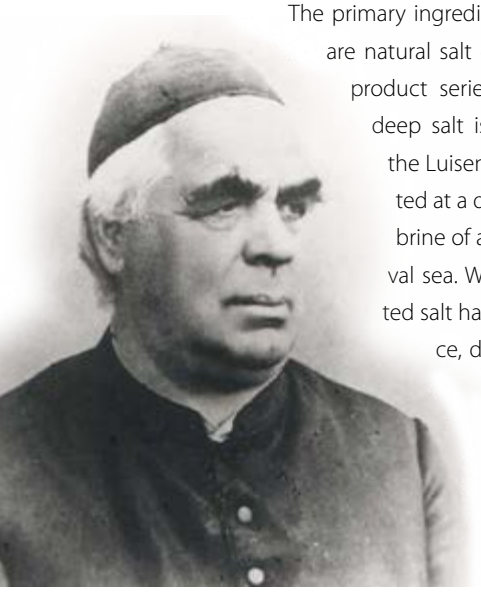
ENJOY THE SCENT OF PERFECTLY PACKAGED BATH SALT

KNEIPP IMPROVES THEIR PACKAGING PROCESS WITH IN-LINE SEAL INSPECTION

For Sebastian Kneipp, water was everything. He was known as the "Water Doctor" in Europe, pioneering hydrotherapy 130 years ago. People came from far seeking his healing expertise and that tradition continues today. Only now, with the naturally pure bathing salts, one can experience it in the soothing comfort of its own bathtub. The perfumed crystals packaged in easy-to-use sachets require perfect sealing to prevent leaking crystals, aromatic loss and cosmetic seal deficiencies.

Today we visit the Kneipp® Oberhauser plant near Würzburg with Mrs. Heilscher, responsible for lean manufacturing. In this modern production plant, a wide variety of products are processed, including bath, body care, and even nutritional supplies.

Unique deep salt



The primary ingredient of the Kneipp bath salts are natural salt crystals, whereby for certain product series the renowned Luisenhall deep salt is used. This originates from the Luisenhall salt works and is extracted at a depth of 460 meters from the brine of a 250-million-year-old primeval sea. While the crystals of evaporated salt have a rough, but closed surface, deep salt has a kind of crater landscape. With the help of these tiny cave systems, the salt crystals can literally absorb essential oils. In water, the bath salt dissolves and releases the active ingredients. Unlike many other salts, the primal salt in the depths of the Luisenhaller earth is protected from environmental pollution - and therefore free from harmful residues from fine dust and exhaust

Packaging in sachets

The precious salt crystals are packaged in sachets on different packaging lines including a rotary pouch/sachet packaging line and a horizontal-form-fill-seal (HFFS) machine.

As Kneipp is associated with outstanding quality products, there is a definite need for in-line seal inspection of the sachets to guarantee the outgoing product quality. As salt is a brittle product, it will contaminate the seal if it gets crushed between the sealing bars during filling and sealing phase. With the high production volumes of up to 60.000 packages per day, it is nearly impossible to manually inspect every single sachet. This is why Kneipp was looking for an automatic, in-line seal detection solution.

In-line seal inspection is key to reduce manual QC

Kneipp learned about the automated, in-line ***Seal****Scope*® solution while visiting an international packaging tradeshow. The in-line seal inspection system instantly caught my attention.", comments Frau Heilscher, "This could definitely address our inspection needs for the bath salt packaging lines." The innovative ***Seal****Scope*® system uses sensors mounted on the sealing bars to detect undesired product in the seal or folds, which can lead to open packages. Every produced package is instantly compared to a reference seal and when sealing errors are detected, the defective packages are automatically ejected from the conveyor belt. As bathing salt is a

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***Seal**Scope® controller in the bath salt packaging line*

Defective sachet with salt crystals in the seal

precious product, the rejected products are reworked, so there is no production waste.

At first, the rotary packaging line was equipped with ***Seal**Scope®* to verify seal defects such as salt that is stuck in the seal. Even when the seal itself is not breached, product in seal is not acceptable for esthetic reasons. ***Seal**Scope®* also detects folds or plies in the sealing area which can also lead to leaking packages. This is equally important to avoid the salt losing its aromatic qualities or spill in the final carton end-packaging box.

"Before using ***Seal**Scope®* we had to manually eliminate bad sachets from our production, which was an inefficient process.", comments Herr Klaus Müller, Technical Director Kneipp, "By using our automated seal inspection, we are able to eliminate nearly all defective packages in the production output."

With the high amount of product variations and package sizes, ***Seal**Scope®* is also highly suited to keep all the production data stored per product type. A change in product requires about half an hour to replace the foil and clean the product fillers. ***Seal**Scope®* records all data per new production batch, so that eventual errors can be traced back to the exact product data.

Monitoring function supports lean manufacturing

But there is more. Another interesting function of ***Seal**Scope®* is the monitoring of the packaging process. Because each package is measured, it is also possible to register trends and deficiencies in the production process. In this way, if the rejection ratio increases, the packaging process can automatically be paused after e.g. ten defective packages and maintenance can be done. Or the machine can be timely adjusted, which can prevent production of bad packages and production delays.

Members of the Kneipp packaging team

> "We learned about the automated, in-line ***Seal**Scope®* solution on a tradeshow. The in-line seal inspection system instantly caught my attention, as it could definitely address our seal inspection needs for the bath salt packaging lines."
>
> Mrs. Gabrielle Heilscher, Lean Manufacturing

Typical issues can occur with small foil parts or salt that are built on the heat seal bars. From environmental perspectives, this is also beneficial to reduce plastic film waste as the production is instantly stopped when there are occurring consecutive sealing issues.

Also highly valued is the remote support via TeamViewer. In the rare case there is a technical question or issue with the seal inspection system, the Kneipp team can consult with the support team in Belgium, who can directly access the installation to provide assistance. This avoids enduring and expensive support visits.

Further deployment of seal inspection automation

As Kneipp is gradually automating the production and packaging, in-line seal inspection will continue to play an important role in further upgrades of packaging lines. "We are definitely pleased with the automated seal inspection solution.", concludes Herr Müller, "The implementation of ***Seal**Scope®* is resulting in automated quality control, better process management and cost reduction on manual labor." Also, our quality requirements are very challenging, as we need to comply as well to pharmaceutical, cosmetics and food standards. In this sense, the in-line seal inspection fits perfectly in the quality philosophy of Kneipp.

Another interesting project is being investigated for inspecting the end seals of tubes for e.g. shower and shampoo gels. Kneipp and the research team of Engilico are evaluating the use of hyperspectral imaging, with the purpose of detecting leaks in the opaque seals of the tubes. As such, Engilico's seal inspection can be a solution to the challenges of today and tomorrow. ○

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