



# X-Ray scanners guarantee Quality and Product Safety in Dairies

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## ➔ X-Ray scanners guarantee Quality and Product Safety in Dairies

X-ray technology is becoming increasingly important in the food industry. For level and foreign objects control of their products, the Theo Müller group installed X-ray systems of the OCS Checkweighers GmbH, Kaiserslautern. This means an important contribution in terms of consumer safety.

The headquarters of the Theo Müller group in Aretsried, Bavaria, dealt with the issue of X-ray technologies for a long time. The department "Central Production and Engineering" was looking for a system solution to detect foreign objects and to determine exactly the filling of their products. Back in 2007, the Müller group had invited renowned manufacturers of X-ray scanners to present their inspection systems. Extensive product testings resulted in a pre-selection of suppliers for a closer cooperation. In a way, it was decided at the last second to incorporate the X-ray scanners of OCS Checkweighers into the running selection process. The results of product tests on OCS scanners were very promising, despite their very short time on the market.

The German plants Aretsried (Alois Müller Dairy), Freising (Weihestephan Dairy) and the Müller Dairy in Market Drayton, UK, were equipped with one OCS X-ray scanner each. This enabled the employees on site to convince themselves of the outstanding performance of OCS X-ray scanners which then had to prove whether they maintain the meaningful results in terms of filling and foreign object control even under real production conditions. Furthermore, additional factors like handling, cleaning efforts,

maintenance and the service life were examined and assessed by the employees. In short, the machines were tested under production conditions to the acid test.

Müller made high demands on the X-ray scanners. Highest performance in detecting foreign objects and determining the filling with the lowest number of false-positive rejections. Furthermore, the X-ray system shall have no effect on the line efficiency, i.e. the highest possible availability (in a three shift operation) must be ensured – this they achieved with the OCS X-ray scanner.

Müllers project managers Rüdiger Herman and Bernd Stechele quote: "Not only the innovative capacity of OCS impressed us, but also the extremely high detection accuracy, outstanding technology and the extraordinarily robust design of the scanner. The future safety of this device and the overall concept was 100% convincing." The extremely high-quality individual components of the X-ray system, such as the high-performance camera, the X-ray tube and the high-power generator with a higher-than-average service life – this made OCS an odd-on-favourite.

And this was in 2008 the beginning of the close and cooperative partnership between Müller and OCS which starts with an extraordinary R&D project.

### Security

A very important aspect for the Theo Müller group was and still is the safety of inspection systems for people and products. Due to the robust and large-scale machine construction



X-ray scanner SC 5000 with separate display - individually adjustable and easy to operate



Clearly arranged display showing an X-ray of the "corner yogurt" in its tray

and thanks to a variety of “intelligent” security measures on the device, there is no danger to operator and product. This is also ensured by X-ray emission measurements conducted at regular intervals.

“Although the implemented X-ray scanners have a lower performance compared to inspection systems at airports, we decided to support the safety and harmlessness of our inspection systems by appropriate measurements”, said project engineer Bernd Stechele.

### The SC 5000 Belt Scanners for Müller

The SC 5000 X-ray scanner has been developed to check products packaged in trays. The large yogurt trays required equally large conveyor belts, which OCS implemented in the SC 5000. Variants with a remote display has also been realised. This practical and user-friendly display can be positioned according to the operator requirements while being multi-adjustable. OCS also implemented a high-performance camera to suit perfectly the application. OCS placed special emphasis on easy cleaning and tool free change of the belts and conveyor bodies requiring routine cleaning. Moreover, OCS developed a special programmable access system (EKS – Electronic Key System) tailored to meet the customer requirements. This access system allows for the protection of the individual access levels against unauthorized access. In cooperation with Müller, OCS developed and tested a special curtain material that withstands the abrasive and sharp trays.

The OCS SC 5000 scanners check the famous

twin pot Corner yogurt as well as several normal single yogurt pots. However, there was a special challenge which complicated this seemingly simple task: The checking of the twin pot Corner yogurt stacked in trays with two layers.

The large compartment is filled with yogurt, the small one with cereals, flakes or fruits. These products come in trays, stacked in two layers just as they can be found on the refrigerated supermarket shelves. For a conventional X-ray scanner however, this presents a serious challenge as the products can easily move and slide on each other causing an unacceptable number of false-positive rejections. Not so with the OCS scanner! The main advantage of the OCS scanner is that it compensates for sliding of the products – without any negative impact on the scan results.

The single pots are stacked in one layer while fixed in their tray, but they are driven at high speeds. This task takes many scanners to their limits, since the performance of the tube is not sufficient to fully scan the product. Here too, the OCS scanner scores with exceptional results.

### Tailored Software

In cooperation with Müller, OCS developed custom made software especially to meet and satisfy completely the requirements of the dairy industry. Heinz Peter Schmidt, Project Manager stated "That was a major challenge, we invested a lot of time in the development and it took away many resources but the result is worth all the efforts and we are proud to be



X-ray scanner SC 5000 with large conveyor body specially for yogurt trays



Yogurts in the twelve tray on the way to scan



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able to providing a software solution perfectly tailored to the requirements of the dairy industry. The synergies can be transferred to other sectors of the food industry, too".

However, not only the software was specifically developed for the dairy industry, the whole design of the OCS scanners also complies with the special requirements of this industry. Very high humidity and high temperatures in combination with cardboard abrasion are usual there where the scanner is implemented within the production process. OCS's response were constructive and technical solutions at the same time. Like the cooling device developed particularly for cooling the scanner cabinet and the tube in a closed circuit without absorbing the ambient air.

### **Unique SC 4000 L Integrated Scanner – a Milestone**

The world-wide unique SC 4000 L integrated scanner is the result of a joint development project. Since early 2010, two of these all-new X-ray scanners are integrated into lines at the Müller sites in Leppersdorf and Market Drayton.

This very space-saving and world-first solution detects and evaluates filling fluctuations and foreign objects of all kinds more accurately compared to the usual X-ray systems with belt technology. Müller implemented this revolutionary technology first to monitor the twin pot.

These single-layer pots are firmly fixed on the row and, after being sealed, are scanned during the respective cycle arrest. It should be noted

that the filling machine works with a very high number of cycles of about 32 cycles/minute. High-performance camera detector and X-ray tube with collimator are run absolutely synchronically over the pot row during the cycle arrest. As with the X-ray scanners of the SC series with integrated conveyor belt, a razor-sharp X-ray occurs. This is being investigated by the OCS image processing software with respect to filling fluctuations. Indispensable is the correct and reliable rejection of the defective product. Hereby, the pots and their compartments receive unique numbers. The SC 4000 L sends the monitoring results via Ethernet to the filling machine which then transports the pot right to the end of the filling line where defective products are reliably removed from the production process.

Since the SC 4000 L is fully integrated into the filling line, Start-/ Stop- and article changes are proceed via the display of the filling line. The scanner display is used to display images and teach in new products.

The X-ray equipment provides optimum access for cleaning and can be completely removed from the filling machine for major maintenance and repair work thanks to a specially designed traversing.

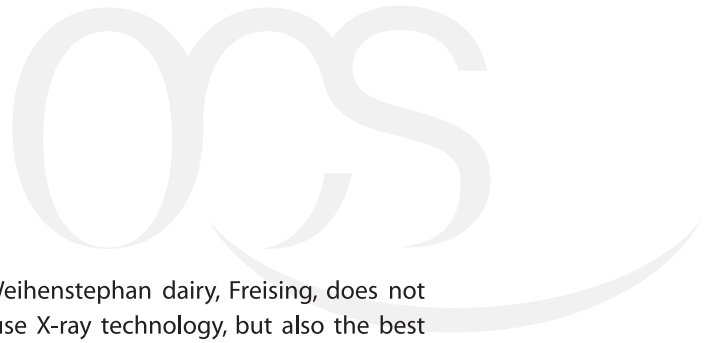
"We have made a further contribution to the high quality standards of our products and offer our customers a high degree of security by using OCS X-ray scanners", explained Bernd Stechele in his function as Müller's overall project manager. Further X-ray scanners in deep-drawing filling machines are planned to be implemented soon.



Unique: Integration scanner SC 4000 L - innovate, space-saving solution



The well-known "corner yogurt"



## Individuality at each Site

There is agreement at the Müller group: The X-ray scanners are indispensable in the production process. This is partly due to their high utility value and the really easy handling of the systems. The Müller group runs the scanners in three shift operations, 24 hours, seven days a week. In a word: Around the clock without a break! They detect even the smallest foreign objects of different materials and monitor the filling level of each compartment. They are easy to handle, extremely reliable and ensure the product quality of the Müller group – an important step towards increased customer satisfaction.

At its headquarters Aretsried, the department “Central Quality Management” defines very high quality standards for all sites. “The X-ray scanners are fully integrated in our HACCP program and allow us a 100% monitoring of our products”, said Jürgen Hahnemann from the Quality Management Aretsried. X-ray scanners are expected to rule out each possible foreign object risk. And they do. Even foreign objects with a spherical diameter of less than 1 mm can be detected without any problem! Müller soon will use a specially developed foreign object for its products in test specimens to carry out functional tests of the device. “This makes the easy monitoring during the production possible”, explains Olaf Böttcher, head of the filling and material handling. In general, the acceptance of the OCS X-ray scanner is extremely high within the sites. “The scanner works really well and the detection accuracy can be improved continuously”, added Böttcher.

Müller Dairy – market leader in the UK – currently has several SC 5000 and SC 4000 L X-ray scanners. The acquisition of further OCS scanners is in full swing. With the help of the OCS X-ray scanner, the complaint rate could be significantly reduced. Furthermore, Müller met the end-of-line control, which the British Retail Consortium (BRC) calls for, at the highest standard. For Müller an important step to meet the increasing quality requirements of their customers.

The Weihenstephan dairy, Freising, does not only use X-ray technology, but also the best weighing technology available. The very popular Weihenstephan 250 g butter is weighed and monitored at a throughput rate of 165 pieces / minute with a checkweigher determining the weight to the gram exactly. The stainless steel design (V2A) is designed to meet the highest hygiene standards in the food industry and is easy to clean. Depending on the application, it is also possible to implement a checkweigher and X-ray scanner as all-in-one solution. OCS has also successfully realised such projects in the past. Project engineer Josef Jell considers the cooperation with OCS as perfect: “From the project work to the technical service to the practical usability of the devices, I can only say that it is perfect. By using X-ray scanners, we could increase our quality promises for premium products.” Quality manager Christian Neuberger adds: “The scanner is also used as a tool for ranking raw material suppliers.”

In one of the most modern dairies in Europe and largest site of the Theo Müller group – Saxon dairy, Leppersdorf – the function testing is now a step further. It will be in future automatically run by pressing a button at the integration scanner. This means, that the test medium card is equipped with the respective test balls and automatically driven under the pot by a servo drive and via a boom. Then the test scan starts. After a successful performance test, the operator acknowledges this at the device. Head of the filling procedure, Jürgen Vogt, and engineer Holger Raschke remember well the beginnings and the new technology. “The staff felt uncomfortable with the X-rays since this was very new and strange.” OCS had addressed this issue and trained the employees on site and at their training center in Kaiserslautern. Today, X-ray technology is no longer an issue to worry about. The informatively training and the massive and absolutely safe machinery construction contributed to this.

### Costs, Benefits and highest Quality Requirements on Site

“Even before the project started we required an inspection system specifically tailored to meet the requirements of our industry. Implementing the X-ray scanners also helped us to improve and optimise the internal line management”, explain Hermann and Stechele. The OCS X-ray scanners had to pass the last major challenge – the final quality audit in spring 2010 where they could prove their performance capabilities. The final acceptance of the machines were then held in August and September 2010.

### Service

For the future, the Theo Müller group is in good hands with a 24/7 service. “High flexibility for maintenance and service is a must. The lines at Müller work seven days a week without a break. Fastest response times are extremely important”, says OCS service technician Oliver Lotz.

### Spirit of Innovation

OCS Checkweigher's pleasure to be innovative and their strive for further development goes on. “Production optimisation through effective data processing”, this is the tenor of the current project, which will nevertheless be implemented on all sites. The scanners are connected to ComScale NT, as specially developed software for process monitoring and therefore optimising the production data monitoring. The productivity of all lines can be kept constant and monitored online from a PC with the help of this particularly developed software solution. Any number of inspection systems respectively checkweighers can be networked together on selectable locations. This makes the production process completely transparent. From a central PC, pictures and statistics of all networked scanners are available. The perfect overview of the complete production data in real time – what more could you want!

### Theo Müller Group

The Theo Müller group is the largest private dairy company in Germany with several subsidiaries in other European countries as



well as Israel. In 2010, about 4,700 employees generated a turnover of around 2.2 billion Euros.

The group has subsidiaries with independent strong brands: Müller, Weihenstephan, Saxony Milk and Loose dairy. Brands and milk-based products such as butter, UHT milk, lactose powder and whey protein supplement their portfolio.

In addition to the milk processing subsidiaries, the packing company Optipack GmbH belongs to the group as well as the logistics company Culina, the automotive engineering Aretsried GmbH and Müller Nature Farm, one of the largest fruit-processing company in Germany.



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