

INSPECTION

LATEST SYSTEMS FOR CONTAMINANT DETECTION AND CONTAINER, CODE AND LABEL MONITORING

CONTAMINANT DETECTION

X-ray moves into the mainstream

As X-ray technology moves into the mainstream it seems to be developing in two, distinctly different directions.

At one end of the market, suppliers are focusing on broadening the capabilities of X-ray systems, with high specification units that offer mass measurement, missing product detection and fat analysis. At the other end, suppliers are going back to basics, focusing their efforts on developing affordable and user-friendly equipment that shakes off perceptions that X-ray is somehow 'difficult to use' and 'unreliable'.

Smiths Detection is one company that is focusing firmly on adding value with X-ray. Terry Woolford, manager, product inspection, says: "More and more people are looking to get additional value from their systems – it seems there's a move towards integrating X-ray into process control."

One area in which Mr Woolford says X-ray can enhance process control is in fat analysis. Smiths Detection's Eagle FA X-ray system incorporates an on-line fat analyser, which means it not only checks for foreign body contamination, but also verifies the chemical lean (CL) of meat products.

"Meat buyers and importers don't always know the fat content of the meat that is coming into their factory," explains Mr Woolford. "If they know what they are buying they can negotiate with their supplier and only pay for what they have received."

Another 'value adding' function which can be carried out by Smiths' units is the detection of product caught in seals. "Our systems can tell the user when they've got product trapped in the seal before the seal degrades and the pack becomes useless. Supermarkets will return a whole shipment based on one or two leakers," comments Mr Woolford.

Smiths has supplied dozens of X-ray systems

to UK food plants to carry out the combined job of a metal detector and checkweigher. Using an X-ray machine to fulfil the role of contaminant detector and checkweigher also takes some of the sting out of the cost of X-ray, because although the technology has come down in price in recent years, it is still pretty steep compared to the more modestly priced metal detector.

Smiths is by no means the only company to be pushing the mass measurement capabilities of X-ray machines.

Anritsu's KD74 Japanese-built series of machines, which is distributed by Selo UK, features a mass measurement function which enables the unit to act as a checkweigher and detect missing product as well as broken and mis-shapen products. All these functions are controlled via a 15in colour touchscreen that also incorporates the X-ray image monitoring screen.

Calculating weights

Loma, part of Spectrum Inspection has long been extolling the virtues of mass measurement in calculating individual weights in multi-compartment products. This 'zonal' weighing function is particularly valuable for identifying miss-

ing components in boxes of chocolates or multi-compartment lunch packs.

But do food companies really want a machine that can verify product weights and identify missing items, or do they actually just want a system that does "what it says on the tin", namely find contaminants?

Pressure from retailers

While there is a clear justification for these additional functions in certain applications, many adopters of X-ray are ready meals companies who are switching to X-ray under pressure from retail customers.

Recognising this, Mettler-Toledo has gone back to basics with its latest system, the AdvanChek. "This machine is purely a contaminant system designed around food industry requirements," explains Ian Robertshaw, sales account manager with Mettler Toledo.

"We've taken away the functions that a lot of companies, to be completely honest, don't use. I'd say it is for somebody in the ready meals industry who is being pushed by a retailer to start doing some proper contaminant detection on a foil package, who doesn't want mass measurement and just wants a reliable contaminant detection system. The only thing the operator has to input is the belt speed and the name of the product."

Cintex, now part of Spectrum Inspection, was one of the first companies to bring X-ray into the realms of affordability with the launch of its XR system, a few years ago. The XR is still going strong and, for example, was recently installed at Healthbars Unlimited to inspect cereal, fruit and nut, energy and carob bars.

Healthbars Unlimited knew it needed to go further than a conventional metal detector, as occasionally stones and other contaminants from the fields come in with organic fruit, nuts and seeds, but wasn't that keen to pay X-ray prices.

Cintex recommended the XR X-ray system, a low cost system that is priced in line with many metal detectors.

It uses the same computer electronics and user interface as the Cintex range but includes a new, low power WASC (wide angle, self cooled) X-ray design which has fewer moving parts and



Combination X-ray machine: Anritsu's KD74 X-ray machines have a mass measurement facility

occupies minimum space. With an overall length of 1.8 metres including integral reject system, the system fitted into the limited space available. Ease of operation is assured by a backlit LCD with simple touchscreen controls.

Other developments in X-ray have focused on improving performance in specific applications.

Better sensitivity

Ishida Europe entered the UK X-ray market last October with its IX-GA range, already a commercial success in Japan. Ishida says its USP is Genetic Algorithm (GA) technology. "The machine can learn to look for certain types of contamination, which means it can achieve better detection sensitivity and reliability than machines with standard algorithms, and other types of contaminant won't suffer," explains new product development manager Rich Rotkirch.

Smiths Detection, meanwhile, has introduced a new technology called MDX (Material Discrimination X-ray), which allows detection of 'softer contaminants' that previously passed unchecked through X-ray machines. "To give you an example, we can actually find golf balls in bulk flow potatoes. A normal X-ray machine can't find that because there's no real difference in density between the two," says Terry Woolford, manager, product inspection. "MDX does this by discriminating between organic and inorganic materials."

The company has recently launched a four-beam X-ray system, leaving no escape route for contaminants lurking in the bottom of glass jars.

"Current systems are limited because they can't see round the bottom of a container, so contaminants can hide. If you want 100 per cent coverage, the only way to do it is with a four-beam system," says Mr Woolford. He adds that Smiths Detection has already received orders from two of the world's five largest baby food manufacturers.

A twin-beam system for upright jars, cans, bottles and boxes is one of the units in the POW-ERx series, a new X-ray range currently being launched by Thermo Scientific. The POWERx family consists of 16 models which are collectively capable of inspecting products ranging from small pharmaceutical glass vials to large cases. The range is said to use high resolution detectors and advanced image analysis software to achieve the highest possible sensitivity and lowest possible false reject rates. Virtual Contaminant Testing software is available to simulate various contaminant types, sizes and positions and quickly determine how to achieve the best

performance in each monitoring application.

Advances in X-ray might be more exciting, but it doesn't mean innovation in metal detection is dead. Admittedly, sensitivity levels are nearing their limits, however, judging by recent new product development, some metal detection suppliers believe there is still room for further improvement.

"One of the problems we have in terms of delivering high performance is stability – customers can set up the machines for very high sensitivity, but unless the metal detector is stable, they will get false rejects," explains Mettler-Toledo's Ian Robertshaw.

The company has redesigned the coil system on its pharmaceutical metal detector, the Tablex, to give it more stability. In addition, Mettler-Toledo has launched a new series for the food industry, branded the R-Series Profile. Three units are in operation at Shrewsbury-based Rea Valley, a manufacturer of tongue products for the deli and pre-pack market.

Rea Valley turned to Mettler-Toledo because it wanted to invest in equipment that was capable of isolating minute metal particles and slithers of metal in frozen meat products weighing up to 25kg.

The application presented a number of challenges. The general rule in metal detection is 'the smaller the aperture, the greater the sensitivity', however the large product required a correspondingly large aperture. Secondly, while Rea Valley needed to guard against slithers of metal, the 'orientation effect' makes it more difficult to detect non-spherical particles.

So Mettler-Toledo specified a triple-head configuration which addresses these issues by maximising the opportunity for detecting metal. By positioning one metal detector straight across the conveyor and the other two angled at 40deg, the chance of any orientation effect occurring is minimised.

Redesigned coil system

A redesigned coil system is also the basis of the latest introduction from Thermo Scientific. In launching the Apex metal detector, the company claims it has improved sensitivity by up to 20 per cent over the previous generation of products. The Apex incorporates 'multi-coil' technology, which uses several emitter coils to make magnetic flux more consistent in the aperture, improving signal levels and hence detection performance.

S+S Inspection has also improved the stability of its metal detector to make it less suscepti-

ble to electronic and mechanical interference, while reducing the size and weight of the head.

"One of the things manufacturers are very concerned about is the amount of space the equipment takes up on a line, because to most people, it is an insurance policy that doesn't add any value whatsoever to production," says Richard Lines, managing director of S+S Inspection's UK business.

Indeed, space restrictions were a major consideration when the company was asked to devise a solution for inspecting individual cake portions at Devonvale Bakery in Honiton. Conventional equipment was too big for the restricted, metal-free space available between the labelling station and the packing line, but the compact Consense-D slotted neatly into the line. S+S also extended the length of the outfeed conveyor to allow contaminated product to be easily removed.

Four frequencies

S+S has also launched the Genius Quattro metal detector, which uses four frequencies, allowing it to monitor products with a variety of characteristics while achieving low false alarm rates.

In fact, metal detectors with multiple operating frequencies are becoming increasingly common in the food industry, driven in part by the widespread use of metallised film.

Loma and Cintex at Spectrum Inspection recently introduced the industry's first variable frequency metal detector with an IP69K rating. This allows the machine to resist the harshest of manufacturing conditions, such as washdown using water at pressures of 80-100 bar, and temperatures of 80deg C, from a distance of 100-150mm.

The unit is said to deliver a 'quantum leap' in immunity from vibration, electrical interference, case distortion and thermal shock.

Anritsu claims to be the only manufacturer offering metal detectors that operate simultaneous dual wave frequencies. "Most metal detectors have either one frequency or two frequencies that can only operate individually," explains Chris Keenan at UK representative Selo UK. "This feature allows the operator to set one frequency to detect stainless steel, and the other to detect ferrous metals – ensuring the best possible accuracy for both types of metal."

Lock's high frequency detector – which was originally only available on horizontal heads – is now also available as a 'Wafertin' and free fall model. The detector works at 875kHz and is



Latest X-ray machine: Thermo Scientific has launched the POWERx series of 16 models

thought to be one of the highest frequency models for food. Its sensitivity to stainless steel in dry products makes it ideal for the snack industry, according to Lock. Most recently, Lock combined the high frequency with its triple frequency machine, the 3f, to make a 3f/hf model, which operates at three frequencies: 875, 286 and 100kHz.

Fortress Technology makes the point that ease of use for both operations and maintenance staff is a key issue and has therefore developed a facility for its Phantom metal detector to learn, save and recall easily the characteristics of multiple products.

In particular the machine is said to respond quickly to changes in product effect, with the calibration (phase adjustment/learn) allowing the detector immediately to learn and store the characteristics of each product.

Often it just takes an individual pack to achieve this, says Fortress, so minimising any interruption to production. Generally the function is initiated by the operator by a single key press, but for some products that can change over a production run it can be automatic.

Even so, where automatic calibration is chosen, limit controls ensure that contaminated product cannot be learnt and ignored, while the Phantom includes as standard a number of fail-safe features to ensure that any automatic reject device is monitored for proper operation.

For further information:

Fortress Technology (Europe)
T: 01295 256266
E: info@fortresstechnology.co.uk

Ishida Europe
T: 0121 607 7700
E: info@ishidaeurope.com

Lock Inspection Systems
T: 0161 624 0333
E: marketing@lockinspection.co.uk

Mettler-Toledo
T: 0116 235 7070
E: enquire1.mtuk@mt.com

S+S Inspection
T: 01489 889824
E: info@splussinspect.co.uk

Selo UK
T: 0151 644 9393
E: chriswilliams@selo.co.uk

Smiths Detection
T: 01923 294400
E: terry.woolford@smithsdetection.com

Spectrum Inspection
T: 01252 893300
E: sales@loma-cintex.com

Thermo Scientific
T: 01788 820300
E: sales.wi.uk@thermo.com

CODES AND LABELS

Checks avoid consequences of bad codes

The consequences of incorrect or illegible coding and labelling are serious stuff for packaged product producers, as Barry Day, sales manager at Codeway, points out.

"If a case is incorrectly marked or the bar code doesn't work, suppliers face fines. In the worst case scenario, if a consignment is found to be faulty, the retailer may reject the complete lorry load and charge a penalty fee for the inconvenience."

After being fined for incorrect labelling of products, a major jam factory installed the Codeway CheckRite system and now runs a number of production lines with self-checking as part of the standard process. Operating at speeds up to 250 jars a minute, the systems verify that containers are labelled correctly by checking bar code information.

Dimaco's Veri-Pack is available as an on-line and off-line label verification system. It checks that the correct labels have been applied to packs and verifies all essential pre-printed and overprinted data such as sell-by and use-by dates, price and weight information.

Meanwhile, Logic TPS has just designed a complete container handling system for checking 2D matrix codes and batch information printed around the circumference of the screw caps on eye dropper bottles.

Working with its principal PCE in Germany, which built the OCR and 2D matrix code cameras incorporated into the system, Logic developed a unit that only allows bottles giving positive read signals to pass to the next packaging stage, with unacceptable containers being rejected and moved into a secure storage bin.

A tray unloading unit removes the eye dropper bottles from collapsible trays and diverts them into three lanes on an indexing conveyor. The bottles are then fed three at a time into a servo controlled indexing starwheel, which presents them to the Minismart cameras. They then rotate through 2.5 revolutions to enable the codes to be read before the starwheel indexes round to a reject station, where any bottles with incorrect codes or missing information are ejected from the line.

In the pharmaceutical industry, Paul Osborne,



Label verification: Veri-Pack system from Dimaco checks all pre-printed and overprinted data

director of Hapa-Laetus UK, says the ability not only to read bar codes but also grade them according to their print quality is a major advantage for manufacturers.

"Codes can be subjected to processes that degrade their readability during pharmaceutical packaging," he explains. "If a manufacturer has a system that can verify the code and give its readability grade, they can prove they are getting codes out of the door that are readable by point of sale and other types of scanners in the supply chain."

Hapa-Laetus says it can carry out such checks at line speeds of 600 packs a minute using its Inspect wt. The system consists of three application modules: one and two dimensional bar code reading, print quality control (OCV/OCR) and bar code quality checking. Its modular design is said to make it more versatile with, for example, a single camera used with more than one application module at the same time (bar code and OCR/OCV together).

It also means the system can be extended by adding other application modules, with minimum revalidation requirements.

For further information:

Codeway
T: 01206 751300
E: identify@codeway.com

Dimaco
T: 01234 851515
E: sales@dimaco.co.uk

Hapa-Laetus UK
T: 01480 414242
E: paul.osborne@hapa-laetus.com

Logic TPS
T: 01344 750101
E: sales@logictps.com

CONTAINERS

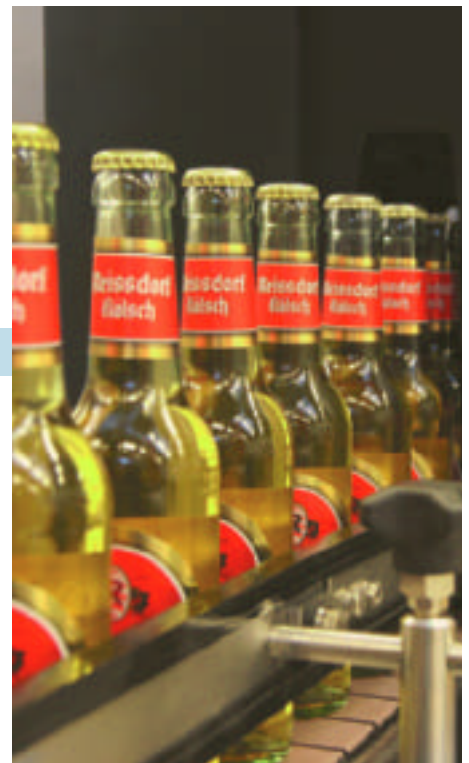
Camera system rejects variety of defects

For pre-fill inspection, ICS Inex offers a range of systems that inspect incoming containers from base to finish, detecting even the most subtle defects.

The SAFI, for example, scans product surface and sub-surface defects using a two camera inspection system. It rejects chipped finish, overpress, lineovers and out of rounds in a variety of finish diameters including widemouth containers.

For post-fill inspection of rigid round or cylindrical containers, ICS Inex has also introduced the Gemini 3D non-contact inspection system. The system is described as a practical alternative to labeller-based inspection, as it provides a clean, adhesive and dust-free environment for inspection. Proprietary 3D technology enables containers to be inspected without orientation.

Heuft has drawn on experience in X-ray technology in developing the Heuft eXaminer for the beverage industry. The foreign body detection system, which was designed with the detection of glass splinters in mind, can examine up to 72,000 bottles an hour using a proprietary linear transport system.



Inspection for bottles: Heuft FinalView monitors the external appearance of filled bottles

Also new from Heuft is the Heuft FinalView, a system for checking the external appearance of filled bottles. High resolution colour cameras combined with object-oriented image processing are said to provide precise inspection of 'no label' look labels.

The main advantage of a new fill height technique developed by Krones versus camera or infra-red technology is that there is no source of radiation. This means there is no need for any approval or extended protective measures, plus the results are not affected by the bottle's shape and colour or by the light transmittance of the product.

The technology works by measuring the change in a capacitor's capacity (the two measuring legs and the bottle form the capacitor), and is equally suitable for glass and plastic containers.

The system is also said to offer a favourable price-performance ratio while accuracy is usually within 1.5mm of the target fill height.

For inspecting vials, ampoules and bottles containing injectable liquid, Adelphi Manufacturing recommends the German-built RMCA range of machines from Rota.

Besides verifying fill volume, the machines inspect product for glass fragments, particles and fibres, and check the packaging for cosmetic defects such as cracks, black specs and missing stoppers.

The inspection turret provides a double sequence of spinning and inspection by two cameras for particle inspection and a third camera for fill level detection. The system can handle containers of up to 52mm in diameter at speeds up to 24,000 an hour.

For further information:

Adelphi Manufacturing Co
T: 01444 472300
E: sales@adelphi.uk.com

Heuft
T: 01827 716541
E: sales@heuft.com

Inex Inspection Systems
T: 0161 876 1700
E: david.bragg@inexinspection.com

Krones UK
T: 01942 845000
E: sales@krones.co.uk

For full details of all PPMA members able to supply inspection equipment, consult the PPMA machinery finder service, tel: 020 8773 8111, or visit www.ppma.co.uk

Soft gel capsules checked by OCR

RNA has adapted its tablet inspection machine to accommodate soft gel capsules, using a system of rotating the capsules for OCR to be employed to verify logos and/or dosage over 360 degrees of the surface – an achievement the company believes to be an industry first.

Previously the system was used purely for carrying out single and double-sided inspection of tablets – checking for surface defects, chips, cracks and bubbles, and undersized product, and verifying the presence and legibility of multiple characters stamped or printed on both surfaces using OCR and/or OCV.

The system consists of a stainless steel vibrating bulk hopper, a stainless steel bowl



feeder, a two-camera system and an air blast reject mechanism.

T: 0121 749 2566
E: rna@rna-uk.com

All round inspection for one-side faults

The Autosort MC-DX72 sorter from Radix offers all-round inspection to detect defects that can be seen on one side of the product only, for example, the green top of a sliced carrot, a mouldy peanut or a bad crisp buried in the product.

A new ejector configuration combined with fast acting pneumatic valves also promises to ensure accurate removal of defects and contaminants with minimal wastage of good material.

A purpose designed 'Snapshot' processing engine capable of inspecting more than 500,000 items a minute lies at the heart of the

sorter technology, according to Radix, while higher speed line-scan cameras allow detection of defects as small as 0.5mm. Using four specific wavelengths for illumination is said to give a wealth of information, including high speed analysis of spectral signature. This enables detection of subtle colour differences and even contaminants the same colour as the product.

In addition to colour, the sorter can detect size or shape defects in snacks, nuts, biscuits, rice cakes and so forth.

T: 01794 830240
E: info@radixsystems.co.uk

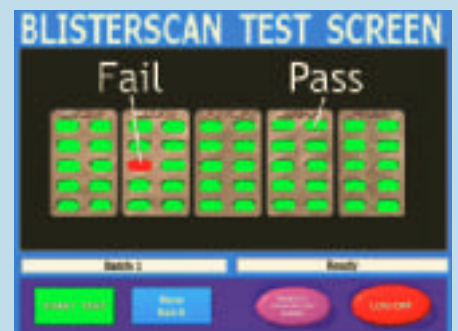
Validatable NDT on blister packs

The BlisterScan from Sepha is a validatable, non-destructive alternative to the methylene Blue Dye test.

Pass or fail indication is not subject to operator interpretation while leaks and weak seals as small as 10 microns can be detected across the full width of the blister web, and the individual leaking pocket identified.

Sepha points out that this precise fault location allows blister line engineers to trace the exact source of quality inconsistencies including pinholes in packaging material, inconsistent sealing temperatures, material indexing problems or tool imperfections, such as burrs on sealing plates.

Unlike blisters subjected to the Blue Dye test, the non-destructive nature of the BlisterScan test allows packs that pass to be re-introduced to the line while product from failed



blisters can be deblistered intact and immediately repackaged.

As a result, explains Sepha, one BlisterScan user packing a product valued at £1 on a blister line running on a single shift, calculated the payback on one BlisterScan machine to be less than 25 days.

T: 028 9182 4252
E: sales@sepha.com