

QIPACK'S DISTANCE SENSORS
MEASURE EVERY SEAL DEVIATION

QIPSCAN: SEAL INSPECTION FOR FLOW PACKERS

LEESTIJD

4 minutes

WIE KOMT ER AAN HET WOORD?

Alexander van Puijenbroek, co-owner of Qipack.

WAAROM DIT ARTIKEL LEZEN?

Qipack introduces a new technique to check the cross seal of bags in 'the flow'.

Qipack has been developing and producing leak and tightness inspection systems for packaging since 2011. In 2017, the company won the NL Packaging Award with its QipCam inline inspection system. The company introduces the QipScan for inspecting cross seals on flow packers. In combination (longitudinal seam and cross seal control) the two systems are collectively referred to as a QipFlow. A large chip manufacturer in the Netherlands is one of the first users.

TEKST **Harry van Deursen**

'We regularly introduced our inspection systems at companies that are starting up fully automatic end of line packaging equipment,' says Alexander van Puijenbroek, co-owner of Qipack from Den Bosch. 'The same applies to this Dutch crisps producer, which has set up two completely new packaging lines with form, fill and seal machines, in which four QipFlow systems check the crisp

bags.' Previously, the chips bags were placed in the boxes by hand, with a visual check by the packers. That control has been lost due to automation. That's why Qipack's inspection systems now check whether the cross seals and longitudinal seam are properly sealed, so that the chip manufacturer does not receive any complaints from its customers afterwards. 'Our systems detect

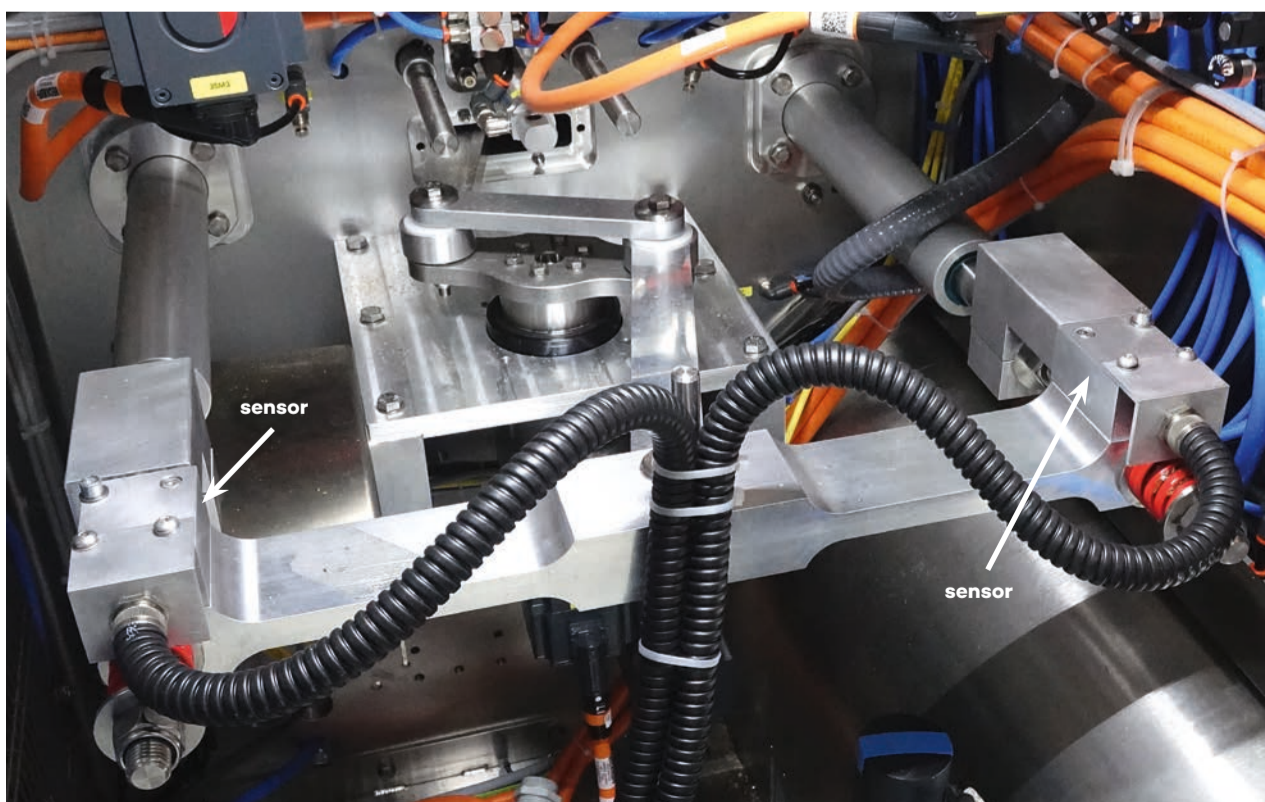
errors that you cannot see with the naked eye. As a result, the potato chip manufacturer now removes poorly sealed packaging that would otherwise have ended up in the store.'

Infrared camera

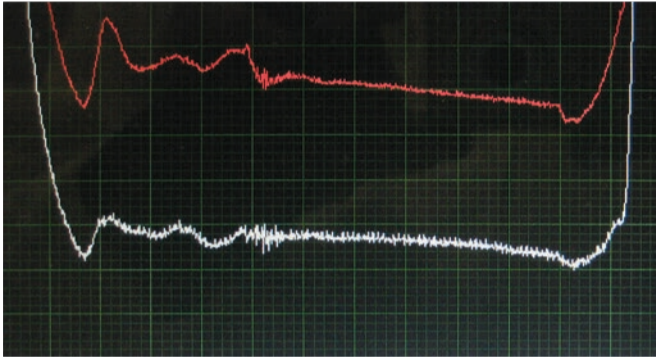
An infrared camera and special software form the basics of the QipCam inspection system. After sealing, the infrared camera checks the residual heat contained in the seal. This forms a certain fingerprint at the pixel level. This is compared to a calibrated value. The degree of deviation determines whether or not a transverse or longitudinal seam seal is good and whether or not a package is approved.

About 70 systems of the QipCam have now been installed worldwide. However, there are packaging machines where the cross seal of a bag is difficult to visualize with the camera. This may be because the packaging is not clearly visible or because the packaging falls too quickly after sealing and cutting. 'We need a certain amount of time to make the heat scan. The packaging has to stand still for a short time so that we can take our picture. We don't have this time with flow wrap machines, such as a vertical form, fill and seal machine.

To prevent damage to the sensitive sensors, Qipack places the sensors in the machine and not on the sealing bars themselves. This is possible because there are moving parts in the drive of the machine that make the same movement as the sealing bars.



The sealing progress, see also the Graph paragraph. There are two lines in the graph. That is because a sensor is placed on both sides of the sealing bars. Van Puijenbroek: 'The sealing beams will never move completely parallel to each other. With a fin-seal, for example, you have a thickening in the middle and the sealing bar folds in one direction. But it is also possible that the longitudinal seam has turned. You also see this kind of deviation.'

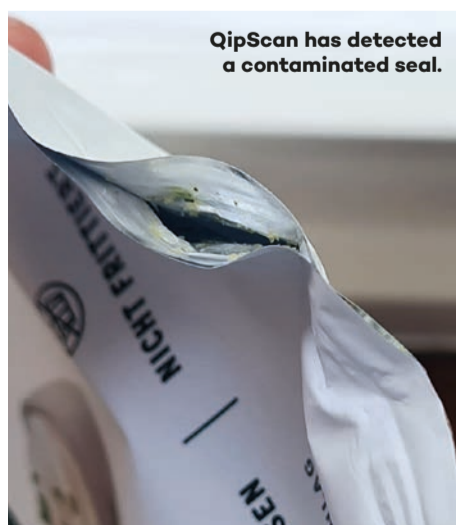


After sealing and cutting, the bags immediately fall down and then the next one arrives.'

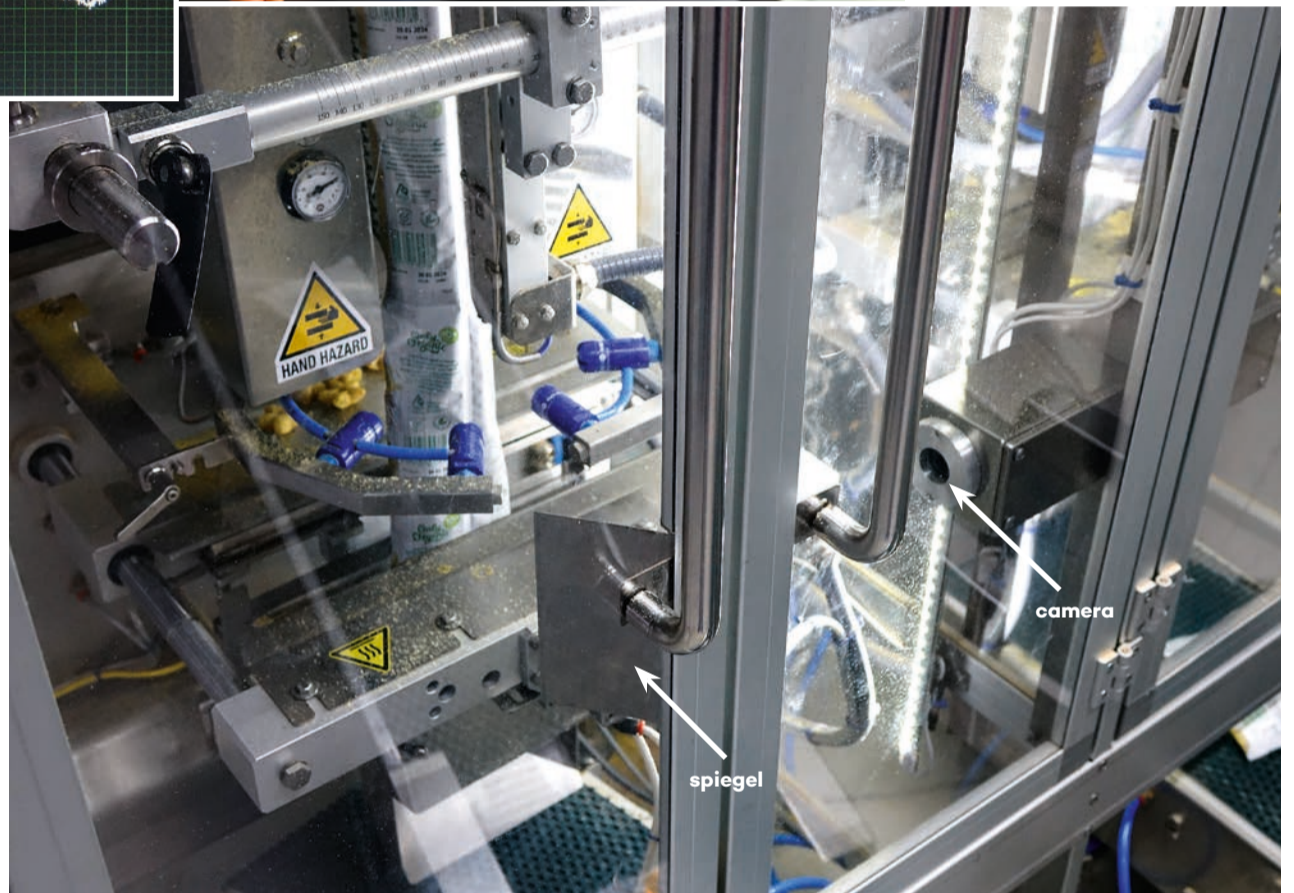
Distance sensors

In order to still be able to supply an inline seal inspection system for the flow wrap machines, Qipack developed a control system that measures the distance between the two sealing bars. This so-called QipScan system measures that distance with distance sensors during the entire sealing cycle. A technique that is relatively cheap due to the lack of the expensive infrared camera and has now been patented worldwide. The sealing process starts with two hot seal bars, that move towards each other and enclose the foil. In doing so, they build up pressure and transfer heat to a tube of plastic foil which then melts and is cut with a knife, after which the tooling opens again.

This entire process can be graphically recorded in a curve using distance sensors. That curve is continuously compared with a predetermined reference curve. In case of significant deviations, the system sounds an alarm and the packaging is ejected. Such a deviation can be caused by a too high or low sealing temperature or because there is product between the foil, explains Van Puijenbroek. 'Fouling between the seal chisels can be seen as of 10 microns. A leaf of lettuce or a crumb of crisps, for



QipScan has detected a contaminated seal.



The sensors are mounted on the moving parts in the machine. The distance sensor is located in the block on the right.

The QipCam inspection system checks with an infrared camera and 'mirror' whether the longitudinal seam is properly sealed. The QipScan (mounted inside the machine) checks the cross seal. Together, the two systems are called a QipFlow system.

'Our systems detect errors that you cannot see with the naked eye'

example, is taken out by the system flawlessly.'

Chart

Van Puijenbroek shows a graph in which the movement of the sealing bars is supposed to be good. A steep vertical downward line is the beginning of the movement where the sealing bars move towards each other. Then there is a dip where the line moves slightly upwards. This is the moment when the sealing bars touch each other, cut the foil and make a short return movement due to the collision. Then the line stays horizontal for a while. This is the sealing moment where the sealing bars put pressure on the foil and transfer heat. Subsequently, a dip can be observed as the polymers merge together and finally the line rises steeply again when the beams separate again. 'It is important

that we measure the entire process. For example, if a piece of cheese gets stuck between the foil, we see this at the beginning of the process because the piece of cheese creates a resistance. Further on in the graph you can no longer see that there is cheese in between, because then it has melted.'

Money-saving technique

'In addition to detecting leaking packaging, our inspection system alerts production employees to errors that may occur,' says Van Puijenbroek. 'This makes them work preventively. For example, they ensure that the sealing bars are clean and that the foil alignment is correct. This means you can solve problems at an early stage and save money.'