

CASE STUDY

MAP leak testing

 PBI Dansensor

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MAP leak testing and statistics procedures enhance food quality

When foods are packed using MAP (Modified Atmosphere Packaging) technology, it is crucial that the packaging is not leaking. Even tiny leaks are disastrous for product appearance and shelf life.

Automatic leak detection of packages makes customers say cheese about quality

One of Denmark's leading cheese makers is delighted with the possibilities for in-line leak detection offered by LeakMatic from PBI-Dansensor. LeakMatic ensures that leaky packaging is discovered im-

mediately. And what is more, the cause of any leaks can be identified at once because leak testing is performed as soon as individual packs of cheese are produced.

LeakMatic is a fully automatic in-line leak detector. Using CO₂ as a trace gas, it allows all kinds of MAP packaged food to be tested before leaving the production line.

In conventional production lines, LeakMatic tests all the packages in a carton simultaneously. LeakMatic is therefore available with a variety of test chamber sizes and is capable of performing up to five tests per minute.

Seal integrity – a key factor

One very important aspect of quality assurance in modern food manufacturing is the detection of micro leaks in flexible and non-flexible packaging for a wide range of products such as pasta, bread, cheese, meat and milk.

In most food production facilities, leaking packages are mainly caused by food contamination in the seal or by mechanical problems concerning the pressure, heat and duration of the sealing process. Especially with MAP products, seal integrity is a crucial factor in retaining shelf life.

All cartons can be tested or, as in this case, samples can be randomly selected and moved from the production line to a parallel conveyor containing LeakMatic. The packaging is tested by lowering a chamber over the carton and establishing a user-defined vacuum within the chamber. A highly sensitive sensor then records any change in the concentration of CO₂ inside the chamber. The difference in pressure between the chamber and the package will cause CO₂ to escape into the chamber through any micro leaks in the packaging. So if CO₂ is recorded in the test chamber, one of the packages in the carton must be leaking.

Leak testing of individual packages

But which package is defective? Generally, there are two main types of fault. Either the package has been incorrectly welded or a fault has occurred in the machine that places the cheese slices in the package.

The Danish cheese maker tests about every tenth package for leaks as this gives a reliable result for the packages on the production line. In practice, the individual packages to be tested are pushed onto a parallel conveyor on which LeakMatic is installed. If the package passes the CO₂ test, it is returned to the production line and a new package is loaded into the test chamber. If, on the other hand, the package is leaking, it is pushed into a reject box. All the processes are fully automatic.



Packages are tested on a parallel conveyor containing LeakMatic.



Individual packages are returned to the production line when they have passed the CO₂ leak test in LeakMatic.

Statistics procedures ensure rapid fault finding

The Danish cheese maker uses LeakMatic together with a procedure for handling the production line and the defect cheese packages which ensures that the cause of any leaks occurring is corrected as quickly as possible. The system is set up in such

***Rapid fault finding
reduces costs
and improves quality***

a way that operators are notified as soon as leaks are determined. Fault finding is therefore extremely rapid, occurring immediately after the packages leave the packing and welding module, and leaks are discovered as soon as they occur. Percentage waste is thus reduced and – in comparison with the conventional set up – it is no longer necessary to spend precious time identifying which individual packages in the carton are defective. The frequency and duration of production stoppages are thus greatly reduced.

Helps operators enhance quality

Rapid identification of leaks in the packs of cheese makes it easier for operators to locate the cause and optimise the production line set up, for example by adjusting the module that positions the cheese slices in the package or by altering the temperature in the module that seals the packaging.

LeakMatic thus functions as a reliable system for testing packaging integrity in situations where the operators adjust various parameters themselves – ensuring faster and better production line optimisation.

Fewer leaks – broader smiles

The Danish cheese maker is delighted with LeakMatic, saying that their production lines would not be the same without it. And all new production lines will in future be equipped with LeakMatic. Compared with similar production lines at the cheese factory, the line with LeakMatic has fewest leaks and fewest costly repackings.

The MAP CO₂ test ensures non-leaking cheese packages providing retailers and

consumers alike with constant reassurance that the cheese maker supplies products of exceptional quality. Retailers avoid the inconvenience of having to return defective products and consumers experience that their favourite cheese is always available. And the quality? No doubt about it: it is always excellent.

Background

HACCP - Strategy for quality developed by NASA

To obtain a benchmark for suitability and an acknowledged reference, the Danish cheese maker's statistics procedures were developed to the same strict requirements as those set by NASA on food quality. From the outset, it was important for the Danish cheese maker to determine whether test procedures in which 5-6 packs of cheese are leak tested per minute really could create value by improving quality.

Quality control to prevent food poisoning requires intensive studies. NASA therefore requires that the provisions used in its various operations around the world are produced according to the international Hazard Analysis and Critical Control Point (HACCP) system. This system was developed by NASA in the 1960s as a systematic approach to food safety. In brief, the HACCP system engages a process of testing not only the end product but also the raw materials and its entire process in the food production chain.