

# FOOD & BEVERAGE FILLING LINE



Visibility



Precision



Reliability

## COMPLETE FILL-LEVEL ACCURACY EVEN WHEN OBSCURED BY PACKAGING



1

The seal is the most problematic part of controlling moisture and gas ingress and safeguarding product quality in food production.<sup>1</sup>

### Why choose Flir thermal imaging on your filling line?

Visual inspection is unreliable as much as 40% of the time. While it can detect seal defects  $\geq 75\mu\text{m}$ , according to the ASTM F1886/F1886M standard, this is only with a 60% probability of detection.

Worst still, this margin of error is only applicable when the seal area is clearly visible. For opaque, translucent or patterned packaging, it makes conventional inspection entirely unsuitable and worryingly inconsistent.<sup>4</sup>

In contrast, Flir thermal imaging provides up to 100% in-line inspection coverage, enabling operators to verify every fill in real time.



30%

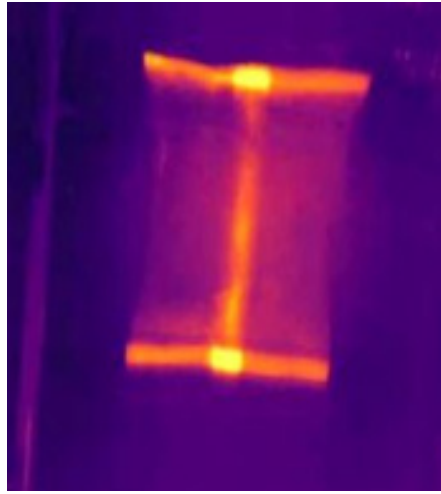
Nearly one-third of all products (30.5%) fail to meet the required specification<sup>2</sup> guidelines, according to real world data from Northwest Analytics. Inaccurate filling, whether under or over target weight, directly drives up costs, creates waste, and can result in rejected batches or recalls.



45%

Packaging errors accounted for almost half (45.5%) of all U.S. food recalls in 2024.<sup>3</sup> This makes packaging and labelling faults and inconsistencies, including underfills, weak seals, and equipment errors, the largest single driver of recall events.





The Flir A70 Smart Sensor Fixed-Mount Thermal Camera, for example, captures precise thermal signatures as sealing jaws close, instantly identifying trapped product or underfilled packs that are entirely invisible to the human eye.

A excellent example in this space is that of Bytronic Vision Intelligence: a leading Flir integration partner which applies this technology in its SealCheck DL system for high-speed filling lines.

By combining Flir's A70 Smart Sensors with AI-driven analysis and automation integration, SealCheck DL delivers continuous, non-contact inspection that ensures total compliance, reduces waste, and safeguards product quality.

## Key values

### ≤100% in-line inspection coverage

As the global food-safety testing market continues to expand at a compound annual growth rate of 8.1%,<sup>5</sup> demand for reliable, data-driven inspection technology is accelerating.

Flir's thermography solutions ensure that every pack is inspected automatically in real time. Flir's A-Series thermal cameras adapt to changing bag geometry, sealing patterns, and speed variations, guaranteeing consistent, full-line verification.

### Instant, reliable detection to boost productivity and reduce waste

Thermal vision identifies contamination, leaks, or voids the moment sealing jaws close, capturing the distinct heat signature of trapped product or irregular seal formation before defects reach distribution.

Automated thermal inspection removes reliance on manual checks, cuts operator error, and reduces product waste caused by undetected leaks or underfills.

### Cost-effective automation for even the most demanding production lines

Flir solutions are scalable across multiple lines, delivering rapid ROI through reduced rework, fewer returns, and less product loss. Integration is seamless via Modbus, OPC UA, and ONVIF S, ensuring compatibility with existing plant controls.

## Key applications

### Detect hidden issues - even in opaque containers

Thermal imaging sees what visible light cannot, revealing underfills, weak seals, and trapped product instantly, even through opaque or multilayer packaging materials. By visualising the true heat profile of each pack, operators can identify inconsistencies that would otherwise remain invisible to optical or camera-based inspection.

### Replace manual inspection with precision automation

Flir's smart thermal sensors deliver on-edge analysis, real-time verification, and full inspection coverage across every unit.

## What can Flir thermal imaging do for your food & beverage production line?

Integrated directly into existing process control systems, these sensors provide continuous temperature validation, eliminating human error and reducing downtime between quality checks. The result is faster throughput and higher process reliability.

### Protect your brand and your bottom line

Continuous, automated inspection prevents recalls, safeguards shelf life, and upholds consumer confidence.

By catching thermal anomalies before they lead to contamination or product loss, manufacturers protect profitability and maintain consistent compliance with HACCP and BRCGS standards.

Every pack leaving the line is verified to meet exacting food-safety and quality benchmarks.

With Flir thermal imaging, food producers gain the visibility, precision, and assurance to deliver sealed perfection—consistently, efficiently, and safely, every time.

#### Sources

<sup>1</sup> Ilhan T. et al. (2021), Understanding the Factors Affecting the Seal Integrity in Heat-Sealed Flexible Food Packages: A Review, published in Packaging Technology & Science.

<sup>2</sup> The Cost Implications of Improving Fill Weight Control – Northwest Analytics

<sup>3</sup> Label errors dominate 2024 US food recalls, costing industry \$1.92 billion – New Food Magazine

<sup>4</sup> ASTM F1886/F1886M – 24

<sup>5</sup> MarketsandMarkets – Food Safety Testing Market Report

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