Quality assurance for foil sealing seams

with the PYROVIEW thermal imaging camera and PYROSOFT Automation software

Whether it's cereal packaging, frozen food, or shipping bags – we are constantly surrounded by plastic films held together by weld seams. But what we as consumers take for granted as being airtight is a process-critical task in production. Non-contact temperature measurement in real time enables continuous monitoring of seam quality during the production process.

The invisible weak link in the production chain

In the packaging industry, success or scrap is often determined by milliseconds and a few degrees Celsius. Weld seams – also known technically as seal seams – are created through the precise interaction of heat and pressure. The thermoplastic briefly melts, bonds, and solidifies into a tight barrier.

But the devil is in the details: if the temperature is too low, the materials do not fuse sufficiently. If it is too high, the film can burn or become brittle. The consequences are far-reaching: bags bursting open during transport, spoiled food due to oxygen ingress, or costly product recalls. Since conventional, contact-based measurement methods are often too slow for fast production cycles or could damage the product, this is where infrared thermography comes into play.

Figure 1: Whether it's film packaging or shipping envelopes—we are constantly surrounded by plastic films.

Figure 2: Compact and industrial-grade: The PYROVIEW 380L thermal imaging camera is the heart of the monitoring solution and is available in two housing types: "protection" and "compact+"

Thermographic process monitoring

To continuously monitor this process, DIAS Infrared relies on a system solution comprising the **PYROVIEW thermal imaging camera** series and the specialized **PYROSOFT Automation software.**

The focus is on **monitoring edge welds or bottom welds** immediately after the **welding process**. The system does not merely examine a single point, but rather the **entire geometry of the weld**. To ensure a secure joint, defined minimum criteria must be met during the process: a specific minimum temperature (often in the range of 50 °C, depending on the material and speed) as well as a precisely defined width and thickness of the seam.

Three key parameters are monitored:
1. The **dimensions** (width/thickness):
Does the thermal trace of the seam meet the specifications?
2. The **temperature distribution**:
Is the minimum temperature constant over the entire length of the seam?
3. **Total number of pixels**:
A measure of the energetic homogenity of the weld.

Real-time, pixel-precise analysis
What makes the system so powerful is the **algorithmic evaluation of the infrared data**. The camera detects the **heat signature of the seam**, and the PYROSOFT Automation software analyzes it with pixel-level precision.

Based on this data, a **pass/fail decision** is made in milliseconds. Via an **integrated I/O system**,the plant's PLC immediately receives the command to automatically reject defective packages – such as those with seams that are too narrow.

Software as the director of automation
A technical system is only as good as its usability. In practice, systems often have to process different formats and materials. This is where the **PYROSOFT Automation** software really shines. Individual templates can be saved for **different products**. If production switches from the small 250g bag to the large bulk pack, the appropriate parameter set is loaded with a single click or **fully automatically via the PLC connection**.

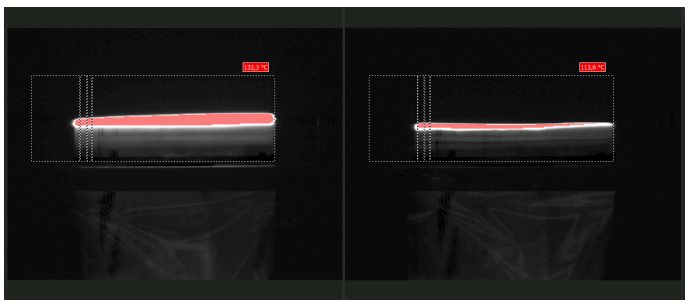

Figure 3: On the left, the thermal signature of a correct weld seam with sufficient width. On the right, a defective seam ("reject"), where the extent of the heat signature is clearly too small.

The **documentation function is essential, particularly for quality verification**. Each measurement result can be saved as an I**R data set, image, or log file**. In the event of a complaint, this allows for precise verification that the weld met all quality criteria at the time of production.

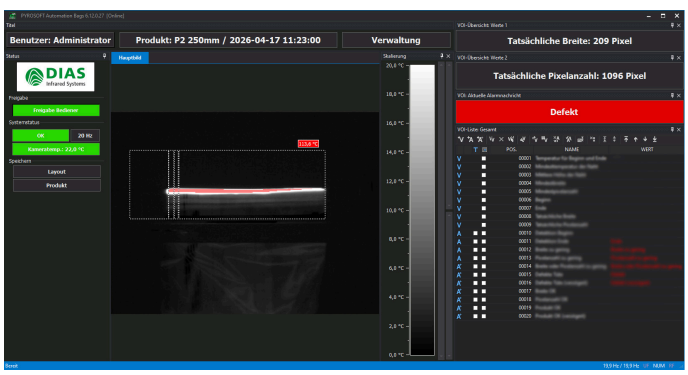

Figure 4: Everything at a glance: The software interface displays the actual number of pixels and width of the seam compared to the target value. Here, the "Defective" status is clearly visible.

Conclusion: An investment in process reliability
Non-contact temperature measurement on weld seams is far more than just a technical gimmick. It serves as insurance against **production downtime and damage to a company's reputation**. By using PYROVIEW cameras and PYROSOFT Automation, quality becomes visible and measurable even during **24/7 continuous operation under harsh industrial conditions.**

Anyone looking to **automate their processes** while **minimizing scrap** today cannot do without **thermographic monitoring**. **Deviations can be detected early** and processed automatically. This makes it an alternative to spot checks, particularly in fast-paced production processes.

Do you have questions about our PYROVIEW thermal imaging cameras or any other concerns?
We'd be happy to provide yiu with advice, with no obligation:
E-Mail: sales@dias-infrared.com, **Phone: +49 351 896 74 10**

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