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In-Line Thermal Seal Inspection System

Automate Your Inspection, Perfect Your Process

Enhancing Seal Integrity & Operational Efficiency

The TSI System is an advanced, automated solution designed to ensure the highest quality in seal inspection. Utilizing thermal imaging technology, the TSI system detects and rejects faulty seals in real-time, while also measuring your process variability. This dual functionality allows you to not only maintain consistent seal integrity but also gain insights into your production process to achieve greater efficiency and reduce wasted product.

How it works?

1. After products are sealed, they retain heat from the sealing process.

2. The TSI system captures a thermal image of each seal to evaluate its quality.

3. The system classifies each seal as either a **Good Seal (PASS)** or **Bad Seal (FAIL)**.

4. Failed seals trigger automatic rejection of the product to prevent it from continuing down the line.

5. The system categorizes failure types and tracks production performance to help identify areas for improvement.

Features & Benefits

Enhanced Quality Control

Ensure every seal meets the highest quality standards.

- Perform accurate quality checks on every seal.
- Eliminate human error with automated inspection.
- Ensure only perfect seals continue down the line.

Significant Cost Savings

Reduce waste and save money across your production.

- Automatically reject faulty products to prevent costly mistakes.
- Lower expenses by reducing product waste and rework.
- Cut costs associated with recalls and excess labor.

Actionable Insights

Use insights to drive continuous improvement.

- Identify and understand the root causes of seal failures.
- Monitor production line performance to implement improvements.
- Generate statistical reports for data-driven decisions.

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Compatible Packaging

Bottles & Containers

Pillow Bags

Blister Packs
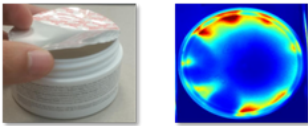

Film Lids

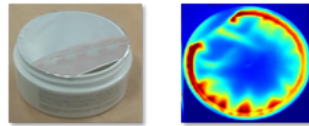
Pouch & Sachet Bags

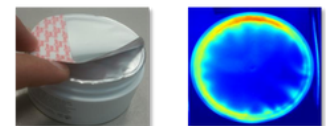**Foil Lids**

Examples of Defects Detected

Screw-On Caps

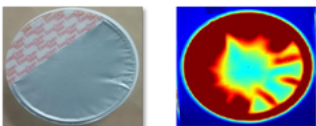Detect caps that have not been fully twisted to the closed position.

Moon Cut/Fold Over

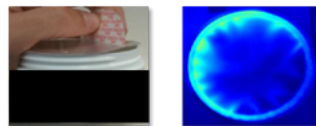Flag seals with improper cuts or folds.

Double Liner

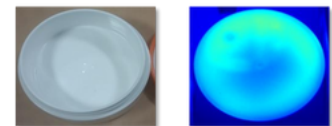Detect the presence of an extra sealing liner.

Overheated Seal

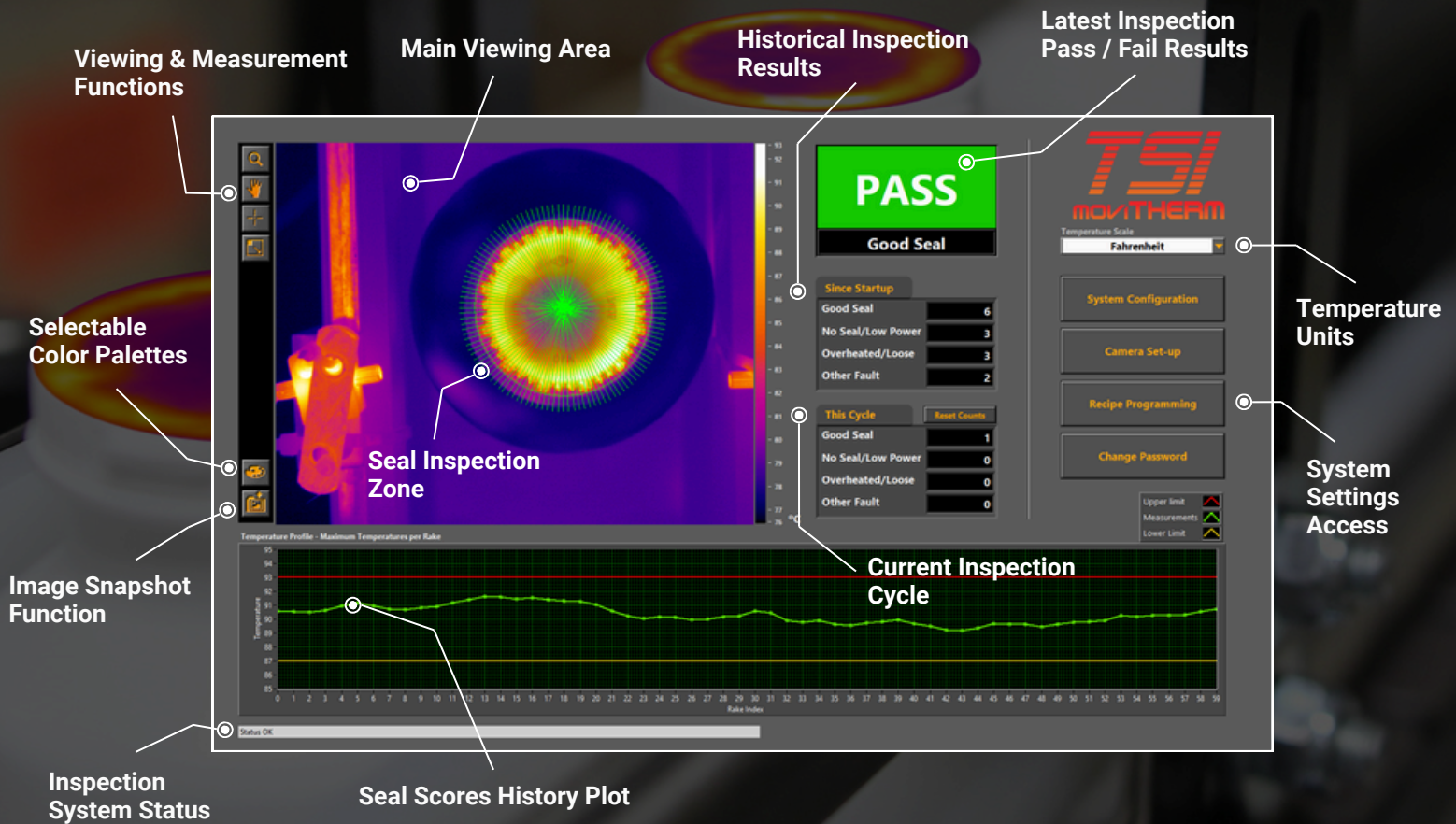Identify seals that have been exposed to excessive heat.

Underheated Seal

Detect seals that have not received sufficient heat to create an adequate bond.

Missing Liner

Identify the absence of a sealing liner.

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SOFTWARE OVERVIEW

Viewing & Measurement Functions

Main Viewing Area

Historical Inspection Results

Latest Inspection Pass / Fail Results

Selectable Color Palettes

Seal Inspection Zone

Image Snapshot Function

Inspection System Status

Seal Scores History Plot

Current Inspection Cycle

Temperature Units

System Settings Access

PASS — Good Seal

Since Startup	
Good Seal	6
No Seal/Low Power	3
Overheated/Loose	3
Other Fault	2

This Cycle	Reset Counts
Good Seal	1
No Seal/Low Power	0
Overheated/Loose	0
Other Fault	0

System Configuration
Camera Set-up
Recipe Programming
Change Password

Temperature Scale: Fahrenheit

## Seamlessly Integrate with Your Production Line

The TSI system is designed for effortless integration into your existing production line. It speaks the most common industrial languages, ensuring compatibility with your current setup. With a standard Ethernet/IP interface and built-in digital I/O for alerting and bottle rejection, the TSI system fits right in. For those requiring strict regulatory compliance, it also offers optional FDA CFR 21 Part 11 compliance for electronic records keeping.

Understanding Seal Process Variability

In heat-sealed packaging, the consistency of your sealing process can greatly influence the effectiveness of our pass-fail seal inspection system. Process variability refers to how much your sealing process deviates from the norm. Think of it like baking cookies: if your oven's temperature fluctuates wildly, some cookies might burn while others stay raw. Similarly, if your sealing process isn't consistent, it creates varying thermal profiles—essentially, the heat patterns our system uses to detect good and bad seals.

The Challenge of Excessive Variability

When your sealing process is stable, it produces predictable thermal profiles. Our system can then easily distinguish between a good seal (one that will keep your product safe and fresh) and a bad seal (one that might fail and lead to product loss). However, if your process has excessive variability, it's like trying to spot a friend in a crowd—everything blends together, making it harder to detect finer defects. While our system can still catch major seal issues, smaller ones might slip through unnoticed.
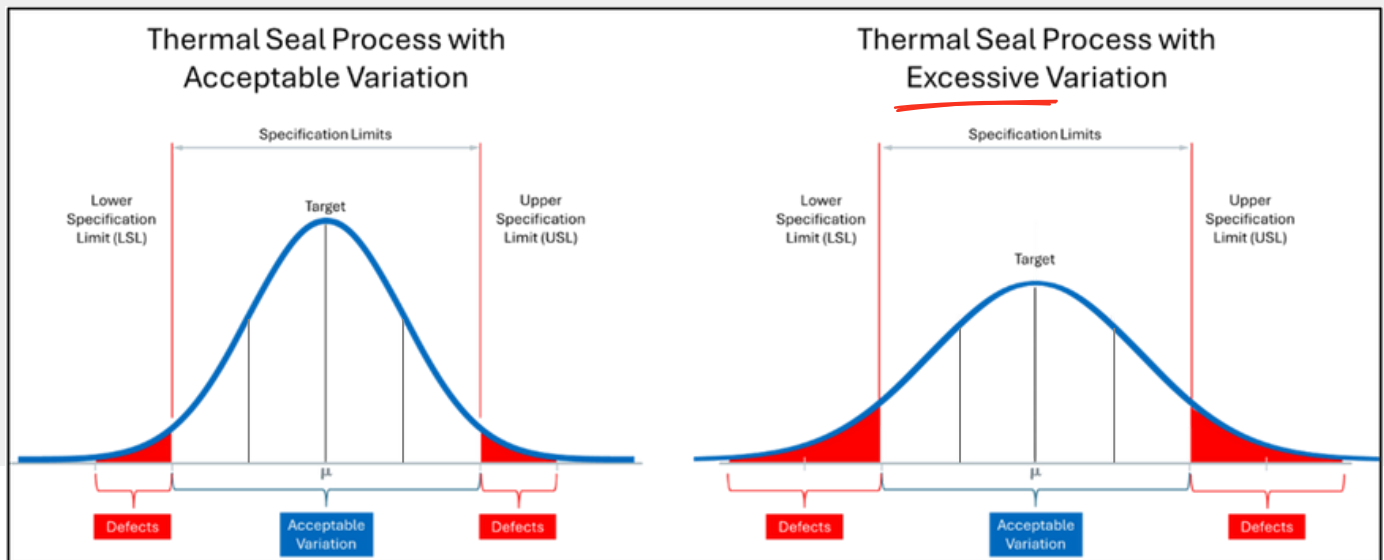
Perfect Your Process with TSI

But there's good news! Even if your process has a lot of variability, our TSI system can help you "dial in" and monitor your process. By providing direct thermal feedback, we can help you adjust and reduce variability to an acceptable level. Once you achieve this consistency, our system will be even more effective, giving you precise pass or fail defect detection, ensuring your products meet the highest quality standards.

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Thermal Camera

Infrared cameras are crucial for inspecting heat seals, identifying even minor temperature differences with high accuracy. These cameras ensure the induction sealing process, where heat creates a hermetic bond, is flawless. Uniform thermal patterns signify a secure seal, while variations might indicate defects or contamination.

TSI Controller

The TSI Controller features a durable enclosure with a user-friendly touchscreen. It integrates smoothly with factory systems via a bidirectional PLC interface supporting Ethernet/IP or Modbus, providing detailed PASS/FAIL outcomes. Additionally, its Image FTP functionality allows for the remote storage of images, enhancing quality control efforts.
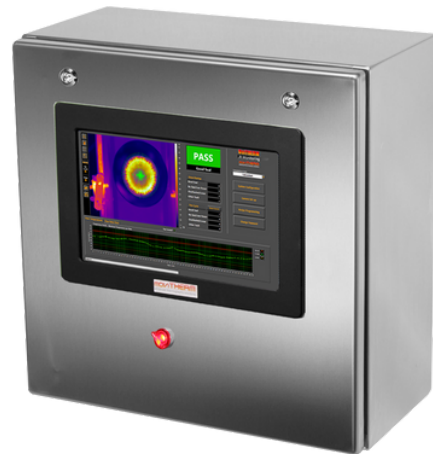
TSI Studio

TSI Studio uses sophisticated proprietary techniques to accurately assess seal quality. Its detailed imaging area and various color palettes enhance defect visualization, while tools like zoom and temperature spotting allow for precise analysis. The software's recipe programmer can manage diverse product types and allows users to test hypothetical scenarios.
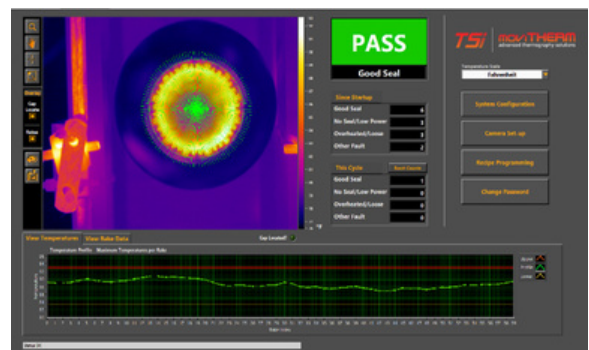
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TSI Stand

The TSI System Stand offers convenience and flexibility, reducing installation and setup time so you can focus on production efficiency. Made from clear anodized extruded aluminum, this stand allows for quick and easy adjustments of system height, camera height, and sensor position. Simply slide the stand over your conveyor, adjust as needed, and optimize your production process with ease.

TSI Signal Tower

Enhance your TSI System with a Signal Tower, providing clear visual and audible alerts. With three LED tiers in red, amber, and green, it offers permanent or flashing lights. Four selectable alarms, 85 dB loudness at 1 meter, and a 360-degree viewing angle ensure you stay informed about your production status. Keep your production line running smoothly with reliable signals.

Bottle Tracking & Crooked Cap Sensing

MoviTHERM's TSI System offers Bottle Tracking and Crooked Cap Detection options. The system can either time the rejector signal based on conveyor speed or, if needed, use an encoder to track distance and trigger the rejector. The Crooked Cap Detection ensures that improperly capped bottles are identified and rejected during the sealing process.

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Phone

(949) 699-6600

Website

www.movitherm.com

Address

173 Technology Dr, STE 150
Irvine, CA 92618, USA