


Manufacturers use Sciometric system to identify subtle problems during dispense operations that cause faulty parts at the end of the line



Downstream issues on the production line with leaks, non-secure parts and components, or unwanted noise and vibration can often be traced back to a flawed fluid dispense operation. The Sciometric solution, using digital process signature analysis, allows manufacturers to identify faulty dispense operations as they occur and take corrective action. The result is reduced downtime, scrap, rework costs, warranty claims, and improved production efficiency and product quality.

Dispense operations for sealants, coatings, lubricants and adhesives are common across many manufacturing verticals, from automotive components such as valve covers, oil pan covers, fuel pumps, windshields and various transmission assemblies, to consumer products such as footwear and medical devices that must meet stringent regulatory standards. When defects in dispense operations go undetected, it can result in issues such as leaks, non-secure parts and components, and unwanted noise and vibration.

Despite different applications, many of the same problems creep up during dispense operations. Typical problems are air bubbles that result in voids, incorrect tip size, wrong media or

partial hardening due to issues such as incorrect pressure, exposure, clogged nozzles or tooling alignment. These can lead to product/manufacturing defects that may or may not be detected downstream on the production line before the final product ships to a customer.

Identifying dispense defects is particularly challenging

Compared to other operations on the production line, it can be particularly difficult to identify problems in dispense operations due to the nature of the dispensed materials.

For example, one of the most common issues that often goes unnoticed by manufacturers is trapped air. Certain mechanical problems such as partially blocked, bent, or incorrect nozzles

and process variations in pressure, temperature, time and viscosity can create the ideal conditions for bubbles to form within the bead.

These bubbles can be difficult to detect: The bubble defect is often less than 25 percent of the normal and acceptable pump ripple. This is compounded by the small modulations of the nominal discharge pressure. The result is a potential leakage path or point of failure not easily detected during the assembly process. Sciometric solutions offers a better way to identify deviations from set limits in real-time for more effective defect detection.

Solution

Apply digital process signatures to detect dispense defects in real time, during each operation

The power of the Sciometric system is in our digital signature technology. Using data collected by sensors on the station, the Sciometric system collects thousands of data points that create a digital process signature—a visual representation of everything that happens to a part during a manufacturing operation. Every process has a repeatable signature or digital “fingerprint” when compliant and under control, and anomalies are easily spotted as deviations from the norm (Figure 1).

The Sciometric system identifies defects by comparing the digital signature features for each operation against specified acceptance limits. If the values obtained are within these limits (Figure 2) then the operator is issued a PASS status. If the values obtained exceed these limits, the operator is issued a FAIL status.

Monitor a variety of dispense operations, including:

- Silicone Bead Dispensing
- Silicone Drop Dispensing
- Anaerobic Bead Dispensing
- Anaerobic Drop Dispensing
- 2-Part Epoxy Dispensing
- Rotospray Systems
- Oil/Grease or Other Fluid Monitoring

Typical defects occurring during dispense operations:

- Air bubbles
- Clogged nozzles
- Missed or incomplete purge following nozzle replacement
- Oversized nozzle/wrong tip
- Pressure deviations
- Improper dispense time
- Incorrect amount of fluid
- Debris or semi-cured, hardened material

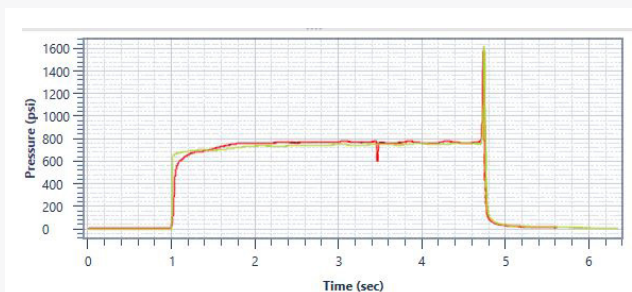


Figure 1: The above waveform overlay view allows manufacturers to quickly identify anomalies (highlighted in red) deviating from the normal trend that represents the proper application process.

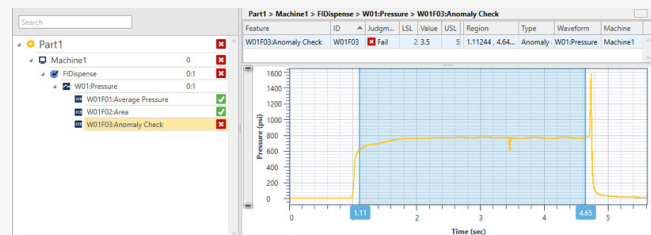


Figure 2: The above shows how a defect is identified during an Anomaly Check, using the acceptable set limits as a window.

The Sciometric system uses digital process signature feature checks to pinpoint specific problems in the dispense operation:

Pressure check: We measure the average pressure during the dispense operation. Using digital process signature technology, this allows us to identify defects such as improper fluid pressure, clogged dispense nozzle, hardened material.

Area check: We measure the amount of fluid dispensed, given a constant consistency of the fluid. Manufacturers can then use digital process signature technology to identify improper dispense time, incorrect amount of fluid, etc.

Anomaly check: We process the pressure signature to accentuate defects, reliably detecting air bubbles, pieces of debris and other inconsistencies that may arise.

Using the Sciometric solution, a dispense operation can be visualized in many different ways, such as:

- Bead location by region (Figure 3)
- Bead width by region (Figure 4)
- Histogram and time-based min/max/avg in a region (Figure 5)

Manufacturers achieve dependable dispense operations

By installing the Sciometric system on dispense operations, manufacturers are empowered to identify defects as they happen, when they are most cost-effective to rectify. The result for the manufacturer is lower scrap and rework rates, reduced liability and fewer warranty claims, and more profitable and efficient operations.

The system can be easily configured to monitor multiple part operations on the production line, collecting all of the information in one place.

With the Sciometric system, these operations are traceable to a serial number, and all digital process signatures are available for analysis in the event of a warranty claim, etc. The result is a cost effective, compact system that offers unprecedented defect detection solutions to the dispensing process.

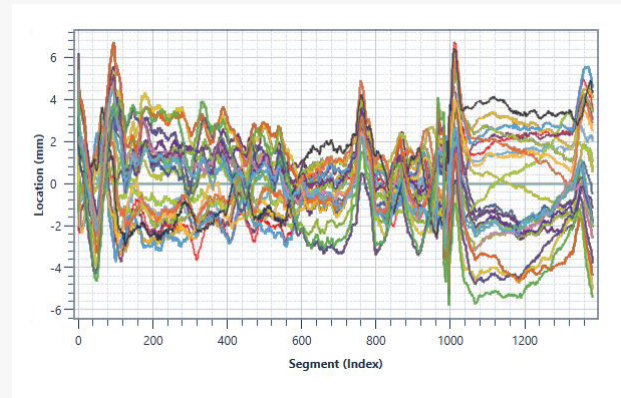


Figure 3: The above is an example of how the Sciometric system allows you to visualize bead location by region using digital process signatures.

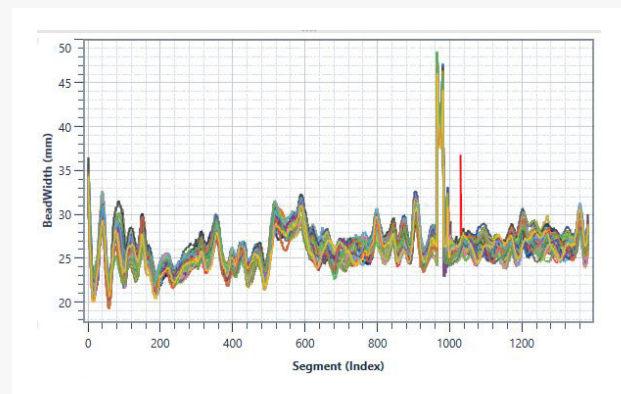


Figure 4: The above is an example of how the Sciometric system allows you to visualize bead width by region using digital process signatures.

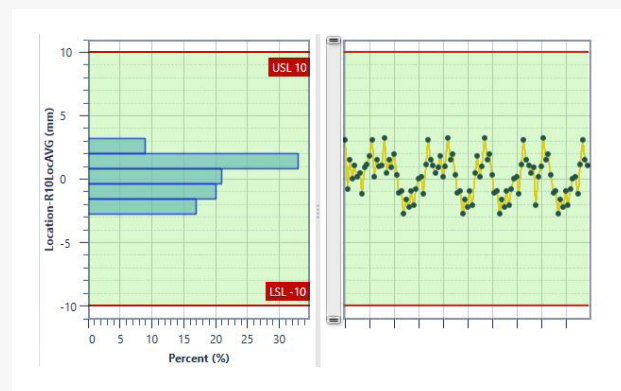


Figure 5: The above is an example of how the Sciometric system allows you to view production data in a visualized histogram and time-based min/max/avg in a region using digital process signatures.

Contact Sciometric to see how our systems could help you improve product quality while saving time and money on your line!

For more information, visit www.sciometric.com or email inquiries@sciometric.com



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