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Quality Re-imagined

SPC for the Food and Beverage Industry

Elevating Production Processes With Quality Intelligence

If there's any industry that can benefit from statistical process control (SPC), it's food and beverage. Businesses across all industries assume risk in some form or another, but the stakes within the food and beverage industry are particularly high. In an industry mired in complex regulatory requirements, the legality of food safety alone is enough to make anyone's head spin. And that's without considering how food safety, quality, and consistency impact a manufacturer's ability to earn the trust of buyers and consumers alike. Not to mention the processes that need improvement within the industry, draining sites of their resources in the form of overfill and costly recall events.

In this white paper, we'll discuss how businesses at every step of the food and beverage supply chain can benefit from a robust SPC software solution. We'll also explore how SPC is perfectly suited to the food and beverage industry, helping with processes like changeover, fill line management, audits, and packaging checks. But first, let's cover some basics.

Statistical Process What?

SPC is a data-driven method that removes the guesswork from quality control. As the industry standard for verifying the safety and quality of food supplier manufacturing practices, SPC provides credible insights about products and processes that validate supplier compliance with industry regulations. All suppliers collect data, but many struggle to make good use of the large data sets they've captured. An SPC software solution helps suppliers mine insights that enable them to reduce risk, improve consistency, and lower operating costs.

This all sounds like a no-brainer, but most food and beverage manufacturers have barely scratched the surface of what SPC software solutions can do for them (that is, if they even have one). Seventy-five percent of surveyed food and beverage manufacturers rely on manual data collection, while half of those polled are still using paper checklists. The chances of an organization mining valuable insights that could improve its manufacturing processes out of binders full of paper records are slim to none.

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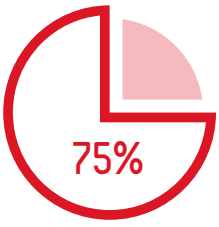

75% of surveyed food and beverage manufacturers rely on manual data collection, while half of those polled are still using paper checklists.

Figure 1: https://www.infinityqs.com/foodandbev5-paper

The Problem With Pen and Paper Systems

The list of risks associated with pen and paper data collection is long, and the propensity for human error is great. The fundamental problem, however, is much less about inattention on behalf of facility employees than it is about a system that sets those employees up for failure. The clunky process of manually recording data, followed by entering that data into a spreadsheet and then performing calculations and analyzing the data, is riddled with the potential for missteps.

> *"The problem with paper systems is less about employee error and more about a system that sets employees up for failure."*

For starters, it's time consuming. When quality professionals are up to their eyes in paper records, they don't have time to think about anything other than putting out fires. As such, the necessary costs associated with paper systems can add up fast, but not quite as fast as the paper records companies must keep on hand in case of an audit. Between labor costs, paper products, and storage space, manual data collection requires a great deal of resources with little return on investment outside of general compliance with food safety standards.

Some additional risks associated with paper systems:

- Data might be misread from the paper.
- Paper is easily damaged.
- Numbers can be accidentally transposed.
- Data written on paper may be illegible or misinterpreted.
- The paper might be lost altogether.
- Paper-based data must eventually be transcribed into a digital format, increasing work for production or quality teams.
- Working with pencil and paper makes it difficult to verify that collections have occurred or catch entries that fall outside of the acceptable range.
- Recording data on paper—or even transcribing paper checklists into digital spreadsheets—increases the difficulty of locating information in response to audit or regulatory requests.

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The Potential of Aggregate Data

If a food and beverage company wants to be successful, it must adopt a holistic view of manufacturing data. Production facilities offer treasure troves of data, but turning that data into valuable information is where it gets tricky. That's why companies need systems that will support shop floor, enterprise-wide data collection, as well as a means of aggregating that data and converting it into a format that's more easily consumable and understandable for managers, engineers, and quality professionals. Data aggregation enables companies to identify the greatest opportunities for minimizing waste, reducing costs, and improving quality.

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In-Spec Data or Out-of-Spec Data?

The answer: Both. All organizations collect data, but most tend to focus only on out-of-spec data. Summed up by the old adage, "Don't fix it if it ain't broke," in-spec data gets buried in the records—rarely, if ever, to be seen again. The problem is that there's some legitimate value in taking a big-picture look at data that's in-spec—especially in tandem with out-of-spec data. In fact, that's where the real transformative potential lies.

Roughly 15 percent of valuable data relates to shop floor operations, including process control, prevention of problems, efficiency improvements, and more. But what about the other 85 percent of data that nobody is looking at—the data that hasn't indicated the presence of any problems? That data is oftentimes saved to a database and excluded from discussions about how to streamline and improve operations entirely. When organizations take a holistic approach to company-wide data, however, the focus shifts from dealing with quality problems as they arise to determining how they can be prevented in the first place. Ultimately, this shift leads to enhanced organizational performance while positively impacting the company's bottom line.

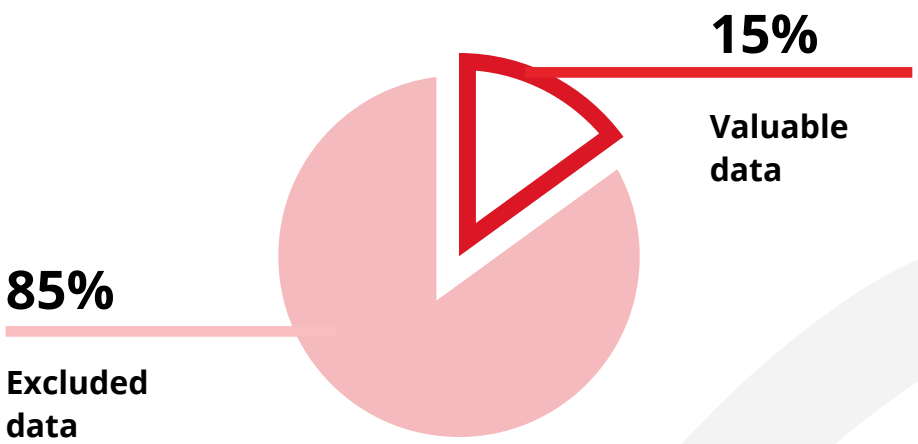

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Figure 2: https://www.infinityqs.com/foodandbev3-fill-line

But Change Is Scary

This sentiment is strong among companies within the food and beverage industry. But that's no excuse for manufacturers to hold themselves back from quality insights that lead to tangible process improvements and cost-cutting measures. As discussed, food and beverage manufacturers are subject to some of the most complicated regulatory requirements of any industry. This alone is intimidating enough to prevent many food and beverage manufacturers from moving forward with SPC.

What seems to be holding most food and beverage manufacturers back from implementing SPC, however, is a concern over pushback from the staff that will have to learn to operate the system. Many manufacturing facility employees are nervous about the learning curve associated with switching to a software-based data collection process. Contract agreements might require collected data to be formatted in a specific way. Or, a mix of device automation—from manual to fully automated—might complicate the collection process across a line or site.

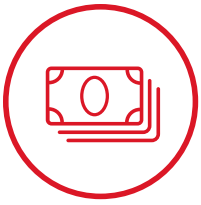
These are valid concerns in the sense that change is always going to be intimidating—especially when there's a learning curve involved. But the benefits of implementing SPC far outweigh the fear of learning something new. At its core, SPC is about simplifying the jobs of quality and production teams. When properly set up to accommodate a specific organization's needs, SPC will free up hours of employees' workdays. Time and energy that was previously spent on reacting to problems can be redirected to preventive strategies that lead to profitable process improvements and quality assurance peace of mind.

> *"Fear of learning a new process prevents manufacturers from accessing transformative insights."*

Accountability, Automated

Food safety and quality are critical to the success of food and beverage manufacturers. Recall events cost companies an average of $10 million every time they happen, but the resulting damage to consumer and buyer trust can be even greater. In an effort to mitigate threats to brand reputation and profitability, manufacturing facilities perform sanitation and compliance checks as a way of getting ahead of quality issues. But the industry's reliance on paper systems to monitor the safety and consistency of the products they produce makes it nearly impossible to anticipate quality problems before they happen.

Response times aren't the only thing that gets held up by paper systems. Manual data collection makes it hard to verify whether production and quality teams are actually doing everything they say they're doing, when they say they're doing it. In a perfect world where quality issues never arise, this wouldn't be a problem. But that's not the world we live in. Deviations from product safety, quality, and consistency are bound to happen, and quality professionals (and shop floor operators) will be held accountable for them. When it comes time to review the data—once the team is able to find it, of course—can its accuracy be validated?



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Quality and production teams have good intentions, but the reactive nature of their jobs when operating within a paper system means their attention is fractured between putting out fires and performing daily tasks. While a swift response to crisis is undoubtedly a top priority in the moment, shifting focus from daily tasks to acute issues subjects manufacturers to the potential for more crises down the road. It's a vicious cycle that many food and beverage manufacturers struggle to break.

SPC solutions reduce risk for food and beverage manufacturers by:

- Validating the identities of individuals collecting the data.
- Ensuring the use of robust passwords.
- Guaranteeing the accuracy of recorded values.
- Sending real-time notifications that alert quality teams to issues.
- Verifying that checks are being performed in a timely manner.
- Providing insight into the causes of and solutions to defects.

A Faster Way to Audit

If the daily demands of safety guidelines and industry compliance weren't enough, audits add another layer of stress, frustration, and anxiety for quality and production teams. The consequences of failing an audit can range from detrimental fines to extended suspensions. And with the number of safety regulations on the rise, quality professionals can expect even more probing questions and procedural guidelines to follow.

The daunting task of preparing for an audit when working within a paper system requires a great deal of time and energy. Auditors ask a lot of questions, and they require manufacturers to provide a lot of data. In the midst of an audit, many manufacturers struggle to locate, compile, and present requested data—some of which covers a vast span of time—within the given time constraints. Efforts to locate the appropriate data are often thwarted by handwritten numbers that are difficult to interpret, and reports are nearly impossible to generate. As a result, many audits take several days or even weeks to complete.

With SPC, quality professionals are empowered to provide data to auditors in hours (or even minutes!) rather than days. Quality intelligence solutions capture data organization-wide, and software-generated reports to satisfy auditor-requested data are just a few mouse clicks away. Auditors appreciate the speed, simplicity, and efficiency of computer-based audit reporting, and quality teams appreciate not having to scramble to piece together paper-based records.

> *"SPC supports a profit-positive business model by lowering production costs, optimizing product quality, and reducing defects."*

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Dollars and Sense

In addition to protecting manufacturers from reactive costs associated with failed audits and recalls, quality intelligence solutions provide insights for process improvements that result in significant cost savings over time. Between waste reduction and the removal of redundancies, SPC supports a profit-positive business model by lowering production costs, optimizing product quality, and reducing defects.

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Watch the Line

When it comes to opportunities for waste reduction, net contents are a great place to start. Manufacturing processes are complex and notoriously variable. It's nearly impossible to ensure that a specific quantity of product is placed inside each of the thousands of packages that get filled every hour on high-speed production lines. To be on the safe side, some manufacturers will fill their packages a bit more than what the label states. While ensuring the amount of product inside a package meets what's listed on the outside engenders trust on behalf of consumers, overfilling results in wasted costs over time. An extra half an ounce of product here and there sounds harmless enough, but the cost of overfill adds up fast.

> *"SPC provides credible insights about products and processes that validate supplier compliance with industry regulations."*

SPC offers a level of precision that can lead to significant savings. Quality intelligence software provides manufacturers with insights that include:

- The consistency of the net contents over time.
- Differences in fills from one machine to another.
- Differences in fills from one product to another.
- Differences in net contents from one plant to another.
- Exactly how much product is being given away.

Look Back

SPC is a great tool for helping manufacturers get their own house in order, but it doesn't have to stop there. The quality of ingredients a manufacturer receives from a supplier will have a big impact on that manufacturer's finished products. Scrutinizing the quality and quantity of incoming ingredients can help make manufacturing processes more efficient while helping make finished goods less costly and more consistent.

Look Forward

Taking a closer look at the end of a production line points manufacturers toward areas upstream that could use some improvement. The incremental processing steps that precede final packaging can have a big influence on quality. By collecting and analyzing upstream data, and combining that information with what is learned with net contents and supplier data, manufacturers can gain greater insights into manufacturing quality across their entire production facility. This enables sites to prioritize quality and engineering efforts that lead to the greatest improvements in the least amount of time. And if data is gathered from multiple facilities, those analytics can provide meaningful information about quality across all facilities.

But to get those insights and information, manufacturers must be actively collecting data. Real process improvements start with intelligent data collection.

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Simplicity by Design

Manufacturers are often apprehensive to adopt a new technology solution because of the complications surrounding implementation. But quality intelligence software was designed to make the process of collecting and analyzing data easier for quality and production teams. As such, it's well worth the learning curve required to get up to speed.

SPC software supports data collection from handheld data collection devices, scales, high-speed checkweighers, scanners, and virtually any machine you might find in a lab or on the shop floor. It can even be configured to fully automate data collection, further simplifying operators' tasks. Additionally, SPC software helps ease the burden of data collection by reminding users when checks are required. The result? No more trying to remember when to collect data, no more wondering if required checks have been performed, and no more missed checks.

"SPC software supports data collection from a variety of devices and can be configured to fully automate data collection, further simplifying operators' tasks."

The Future of Food and Beverage Is SPC

In an increasingly automated and digitized world, manufacturers that fail to adopt leading-edge industry standards will be unable to compete with those that do. SPC implementation involves a learning curve, but the benefits of abandoning paper-based data collection are almost immediate. In addition to providing data-based insights that lead to meaningful process improvements, SPC software enables manufacturers to reduce risk, lower operating costs, and ensure consistent adherence to food safety and quality standards. With features that automate accountability and simplify the task of preparing auditor-requested reports, it's no wonder SPC will soon become the industry norm.

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