


Moving Away from Manual Processes

A photograph showing two men in an industrial setting. Both are wearing white hard hats. The man on the left is wearing a dark suit and is holding a tablet computer. The man on the right is wearing a grey and blue work jacket. They are both looking at the tablet. The background is a blurred industrial environment with yellow and grey structures.

Update your data management techniques to save time, reduce waste, increase efficiency, and save money.

Change is difficult, and most of us cling to our existing systems and ways of doing things because they are familiar, and they work—sort of. But moving your quality data management processes away from systems and methods that rely on manual manipulation can create measurable benefits for you and your entire manufacturing organization. Updating and partially or fully automating the ways in which you manage quality data helps your organization save time, reduce errors, and avoid waste, scrap, and recalls. Best of all, the switch doesn't need to be painful or sudden. Starting with just a few changes in three areas—data collection, data analysis, and data reporting—can reap surprising benefits.

Take a Fresh Look at How You Manage Quality Data

Manufacturers know how important it is to modernize and automate their equipment and safety processes, and most do so gradually over the years. Yet when it comes to quality data collection, analysis, and reporting, the number of businesses that are still using paper-and-spreadsheet processes is astounding.

Manual approaches—such as recording quality data with pencil and paper, running comparisons by manually manipulating multiple spreadsheets, or storing paper data records and reports in file cabinets or warehouses—are time-consuming, frustrating, and vulnerable to inaccuracies. So why do so many manufacturers continue along in the same old rut?

The simple answer is that they fear making a change will be difficult—and expensive. Yet updating the way you deal with data needn't be painful, pricy, or overwhelming. Rather, statistical process control (SPC) experts like InfinityQS® suggest starting small by taking a fresh look at your data processes in just three areas:

- › Collection
- › Analysis
- › Reporting

Updating the way you deal with data in any of these categories can produce measurable and significant benefits, including fewer data errors, reduced scrap and waste, and faster reporting and response to audits. And you don't need to shut down production, overwhelm operators, or purchase astronomically expensive equipment to start seeing results.

This paper looks at the challenges that keep organizations from moving in the right direction—away from ineffective and costly manual quality data management processes and toward more productive, efficient methods. It examines how you can use affordable real-time SPC software and modern techniques to implement more effective approaches. And it highlights the benefits you can achieve from even small steps along the way.



Manual data management methods are time-consuming, frustrating, and vulnerable to inaccuracies.

Data Collection: Ditch the Paper & Pencil

A recent survey of manufacturers found that 75% of respondents are collecting data manually; 47% are using paper checklists—a practice that can increase the risk of recalls and other problems.

Paper-based data collection is rife with weak spots where errors can sneak in:

- › Reading measurements from scales or other equipment, then manually transcribing those numbers onto paper
- › Transporting the paper
- › Transcribing the data from paper into a software system
- › Repeating the process across shifts, products, and lines
- › Using the incorrect version of a form on the shop floor
- › Introducing calculation errors through simple math mistakes, using the wrong function, or transcribing results incorrectly
- › Recording invalid or inaccurate timestamps
- › Looking up calculation values on tables or graphs
- › Misreading handwriting (Is that a 1 or a 7?)
- › Misidentifying operators through incorrect or illegible signatures (instead of password-protected identity stamps)

Paper-based entry is more prone to error than automated data collection or even digital data entry by operators. Information can be written down or transcribed incorrectly—or overlooked completely. And depending on your industry, one error can lead to catastrophic results.

The Challenge

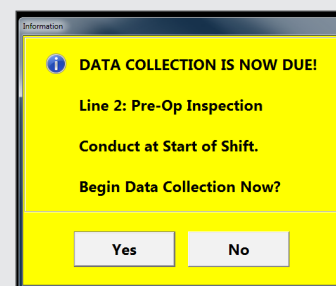
Operations staff who have worked with data in this way for years might worry about losing the hands-on component of paper or dealing with complicated software. You might have contract agreements that require collected data to be formatted in a certain way. Or you might have a variety of equipment that supports varying levels of automation—leaving you to decide that manual collection is simply easier than figuring out how to integrate everything.

However, the way in which you collect quality data significantly affects how useful that data will be moving forward.

If you already have an SPC system in place, you might have set up automatic notifications to remind your quality or operations team to collect data from specific processes or equipment at specific intervals, as Figure 1 shows.

But if data are being recorded on paper, you have no way of verifying that it's been collected properly and on time. Even if collection goes off without a hitch, numbers might be transposed or might cause trouble later when someone else tries to read a handwritten entry. And it's important that all your operations and quality teams have easy, fast access to real-time data—not data from an hour ago that are written down on a piece of paper somewhere across the plant floor.

Figure 1. Automated notifications remind operators to collect data.

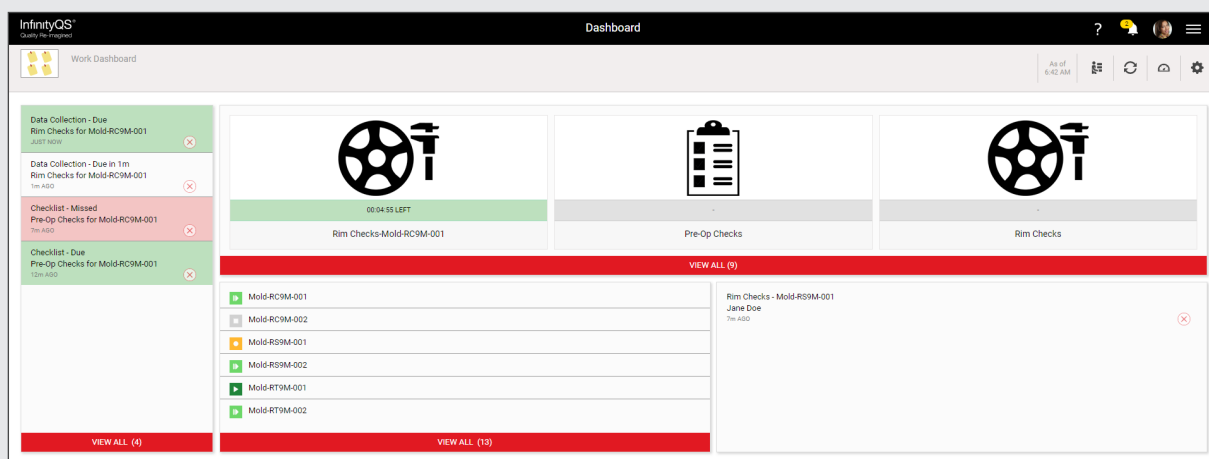


The Alternative

Instead of writing down process quality data, look for a real-time SPC solution that supports automated and semi-automated data collection from a variety of equipment as well as tablet-based data entry for easy, efficient collection of non-automated data. Also, look for a solution that lets you configure automated notifications for timed data collections, alerting you when collections are missed or when entered data are out of spec (which might indicate an entry error).

For example, take a look at the dashboard in Figure 2; it provides an operator with a lot of information in a simple, clean layout. The green timer under the wheel icon at the top tells you the next check for wheel rims will be in 4 minutes and 55 seconds. You can see notifications (left panel) of a check that is due now (green) and one that was missed (red). A pre-notification (white) says a check is coming up. You can also see the alarm bell notification badge at the top right.

Figure 2. A modern dashboard can display a variety of targeted information for operators.



InfinityQS real-time SPC solutions offer **multiple ways to deal with automated and semi-automated data collection**, as well as data that need to be entered directly into the SPC system. **Easy scheduling and automated notifications** help you ensure timely, complete collection. And you can implement these solutions without re-tooling your shop floor or dealing with production downtime.

The Benefits

When you use a real-time SPC solution to help you move away from paper-based data collection, you should immediately begin to see any variances in data collection (e.g., late collections, statistical violations, net content control [NCC] violations). This is true even if the only step you've taken is entering data into a robust real-time SPC product like InfinityQS Enact[®] or ProFicient[™]. Addressing such variances leads to an increase in data integrity, which in turn enables you to:

- › Reduce errors
- › Improve compliance with collection best practices
- › Catch violations (e.g., specification, NCC, checklist, statistical) more quickly, even before a problematic process can affect product
- › Provide immediate access to important information, both on the floor and throughout the life of your data

Operators will also benefit because they won't have to worry about when to perform their next data collection; their time will be freed up to focus on operations.

Data Analysis: Evolve Beyond Spreadsheets

You might be able to review the data you collect on any given day, but how much time do you spend manipulating those data points to make them usable? Can you easily find the most important data as they are collected? Can you view your data in multiple ways, or compare data across production lines or sites—without juggling multiple spreadsheets?

The Challenge

Most SPC solutions claim to unify and centralize data, but that doesn't mean you can easily access and manipulate those data in useful ways. Most systems simply layer a database structure over an old-fashioned flat-file way of storing data.

As a result, you can't compare multiple products, lines, or sites on the same chart, and your ability to delve into the types of details and comparisons that can transform a business is limited. Your quality team will likely spend hours manually importing data into spreadsheets or other external software (as Figure 3 shows) and then performing data manipulation to compare data with different targets and tolerances.

Figure 3. Hunting for data in spreadsheets takes up too much valuable time for most quality teams.

Bakers Initials		Time	Length				Toast Points				Grill Marks				Bubble Size				Product Temperature (Oven Exit)				Corrective Action
			3.25 - 7.25 inches (Target 5.25)				Target 4-5 (see color chart)				Target 4-5 (see color chart)				P = Pass F = Fail				> 190 F				
			L1	L2	L3	L4	L1	L2	L3	L4	L1	L2	L3	L4	L1	L2	L3	L4	L1	L2	L3	L4	
JD		7:00	6.1	6.9	6.5	6.6	4	2	4	3	4	4	4	4	P	P	P	P	190.06	191.60	191.62	191.63	
John		8:00	6.1	6.2	6.6	6.8	4	4	4	4	4	5	5	3	P	f	P	P	190.73	190.90	190.83	190.06	
JD		9:00	6.0	6.9	6.0	6.7	3	4	4	4	4	4	4	4	P	P	P	P	191.43	190.89	191.36	191.36	Adjust Heat
JD		10:00	6.2	6.9	7.0	6.3	4	5	4	4	4	3	4	4	F	P	F	P	190.15	191.55	191.17	191.16	
J.D.		11:00	6.7	6.9	6.5	6.7	4	4	4	4	3	4	4	4	P	P	F	P	190.29	191.06	191.02	190.89	
JD		12:00	6.0	6.6	6.6	6.5	4	4	5	4	4	5	4	4	f	P	P	P	190.07	191.39	191.48	190.99	Switch Tray
JD		13:00	6.7	6.4	6.5	6.1	4	4	4	4	4	4	3	4	P	P	P	P	190.93	190.28	190.28	190.09	
JD		14:00	6.3	6.4	6.0	6.3	4	4	4	4	4	4	4	4	P	P	F	P	190.21	190.37	191.28	191.05	
J.Doe		15:00	6.40	6.82	6.28	6.57	4	5	4	4	4	5	4	4	P	P	P	P	191	191	190	190	
J.Doe		16:00	6.46	6.72	6.64	6.98	4	4	4	5	4	4	5	4	P	F	f	f	190	191	191	191	Adjust Speed
J.Doe		17:00	6.12	6.98	6.49	6.78	4	5	4	4	3	4	4	4	P	P	P	P	191	191	191	190	
J. Doe		18:00	6.74	6.44	6.23	5	4	4	4	4	4	4	5	4	P	P	P	F	190	191	190	191	
J.Doe		19:00	6.69	6.26	6.53	6.01	4	4	4	4	4	5	4	2	P	F	P	P	190	190	190	190	

Production Supervisor:	John Supervisor	Date:	12/2/2016
QA Supervisor:	Supervisor Hal	Date:	12/3/2016

Comments and Corrective Action:
Adjusted heat and speed and switched a new tray during Shift 1 & 2

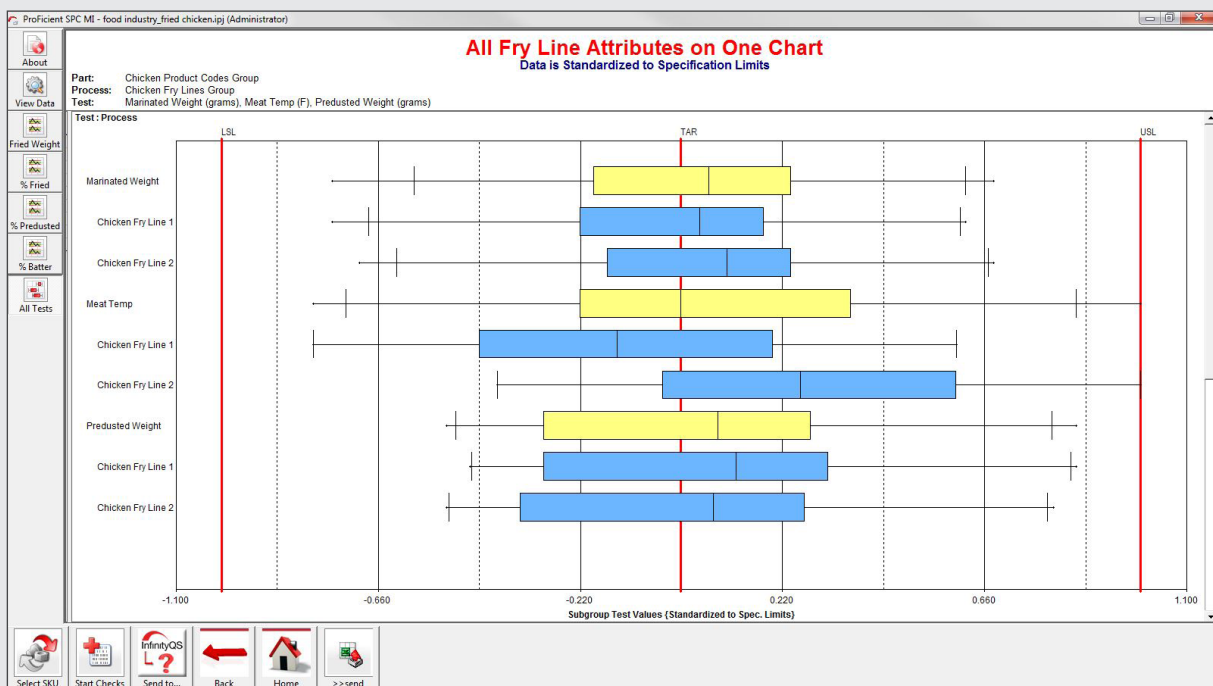


The Alternative

When you collect and enter data into a real-time SPC system like InfinityQS Enact or ProFicient, you don't need to find the data to put into a chart; simply query the software to get exactly what you need, in whichever format works best. In Enact, the software not only defines the essential information behind the scenes, it also surfaces and filters the most important data, according to your role and the priorities you define.

Of course, you can always dig into the details, too. Even better, you can compare data across products, lines, processes, lots, shifts, operators, time (e.g., day, week), departments, sites, and so on—no more flipping back and forth between charts or spreadsheets. The box and whisker chart in Figure 4 shows how easy it is to see the meaning in this kind of comparative information.

Figure 4. Being able to directly compare products and processes in one view makes it quick and easy to prioritize actions and drive improvement.



The Benefits

With SPC software that can automatically provide extensive, flexible views of your quality data—including multiple chart types, reports, dashboards, notifications, and more—your operations and quality teams can save valuable time. The operations team no longer needs to dig through data or travel the shop floor to find the information they need in real time, and the quality team can run analyses and comparisons of any and all data, without hours of manual spreadsheet or software manipulation.

Plus, when your automation efforts include a full real-time SPC solution that not only collects quality data but also provides notifications and alerts, you'll benefit from the ability to catch out-of-spec processes immediately. And with a truly robust system like InfinityQS Enact or ProFicient, you'll be able to pinpoint variances that occur even in in-spec processes—before they snowball into problems. When you process thousands of items per minute, this capability alone can save millions of dollars.

Data Reporting: Forget File Cabinets

When you record real-time data on paper, where does that paper end up? When an audit is announced, how difficult is it to locate data that have spent days, weeks, or months in storage? Do you find yourself struggling to compile data from multiple locations and formats in response to customer inquiries, audits, or executive needs? If you collect and analyze quality data manually, the answers to these questions are probably not what you would like.

The Challenge

Many real-time SPC solutions do a decent job of showing you data on the shop floor. But when it comes time to report those data to auditors or communicate your analyses of production and quality trends, those solutions can fall short. This is especially true if your data are stored on paper or in multiple spreadsheets.

The Alternative

A truly **centralized Unified Data Repository** automates and standardizes data storage. As a result, all your data are available—and easy to work with. No more exporting and importing data into offline products just to compile reports. For example, the ProFicient Advanced Reporting Suite and Enact dashboards give you the ability to quickly create charts, graphs, and reports from within your SPC system. Figures 5 and 6 show some of the variety of information you can get instantly in a dashboard.

Figure 5. Reporting in chart form enables users to quickly see information that is most important to prioritize.

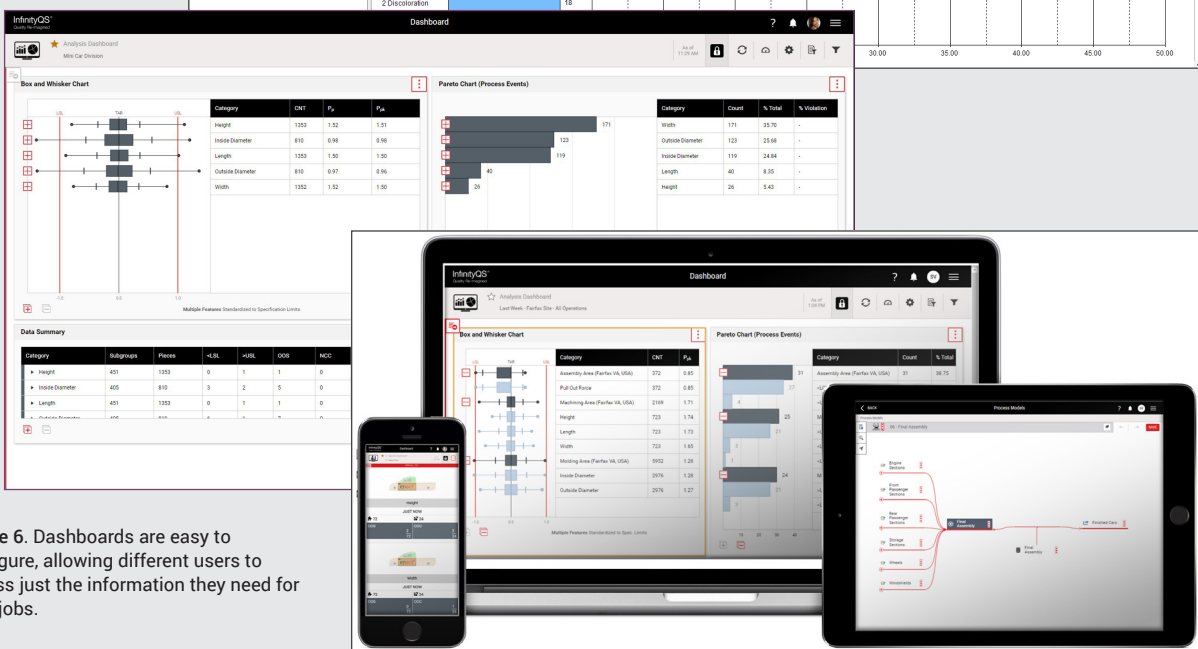
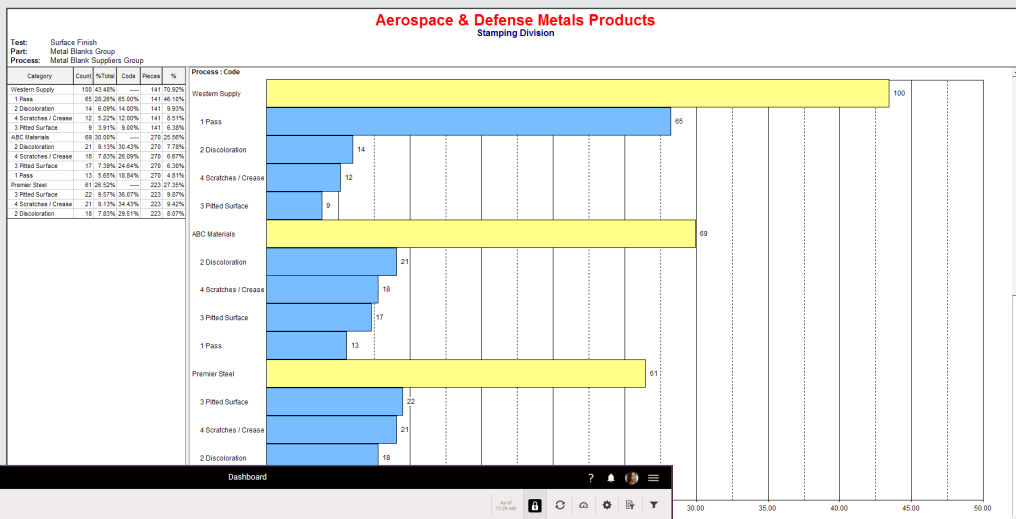


Figure 6. Dashboards are easy to configure, allowing different users to access just the information they need for their jobs.

The Benefits

When your SPC system automatically digitizes and stores data in a centralized, unified way, you maintain access to all your information, no matter when or where you need it.

You'll also find massive time savings when it comes to audits. With the ability to easily locate and access data from any day and time, without sorting through piles of paper or multiple spreadsheets, audit prep becomes much less agonizing. It can take days to retrieve papers from cold storage—but only minutes to pull up data that have been collected and stored automatically and digitally.

Traceability also improves, with the ability to see process quality from any point in time, coupled with details about raw materials, shifts and operators, and specific lines, equipment, and processes. Everyone can access the same data, so communications become easier and more efficient. And customers get immediate responses.

You also gain the ability to respond more quickly and precisely to audit requests. You'll be able to easily provide exactly what an auditor requests, helping to focus and streamline the information-return process and head off costly delays and distractions.

It should take only minutes to pull up data that has been collected and stored digitally.

Go on. Make Your Move.

Are you ready to move away from manual processes and save time, reduce waste, increase efficiency, and save money? Not sure where to start? Take a look at our [Tips for a Successful Switch](#) on the next page.

And remember, expert SPC providers like InfinityQS can help you [evaluate your current quality process](#) and determine [where and how to begin](#).



Tips for a Successful Switch

Step 1: Start Simply

Making the switch away from manual data processes doesn't need to be an all-or-nothing scenario. In fact, SPC experts like InfinityQS suggest that you start with just one data-collection process and a handful of products—something that will have a noticeable impact but that doesn't involve your most complicated line.

Starting in this way enables you to get used to your new procedure and gives you the bandwidth to explore its limits and possibilities without too much stress.

Step 2: Go Start to Finish

After you pick your process and integrate data collection into your SPC program, run the process for several days. If you run more than one product on the test line, go ahead and collect data on several of those products across shifts, and in as many possible scenarios as you can think of. Begin looking at the real-time data, both on the production floor as well as by running charts and reports. Ask yourself these questions:

- › Does everything work smoothly?
- › Can the operations team work with data the way they want?
- › How about the quality team—are they getting what they need?
- › Does everyone who uses the data get the information they need quickly?
- › How accurate and useful are notifications?
- › Which settings do you need to tweak?
- › Are operators happy with the layout and use of the system for data collection?
- › Could any additional data-collection parameters (e.g., lot code, material supplier, machine setting) make the analysis even more powerful?

Another reason to see your initial test process through to the charting and reporting stage: Many SPC products say that they support unified data storage. Yet when you try to compare multiple product codes or data from different devices, you're forced to export your quality data into off-line programs or open multiple spreadsheets or charts.

By taking the time to fully evaluate the way your solution works for one process, start to finish, you can get a much better idea of how it will work for *all* your teams and with more complicated processes.

Step 3: Be Prepared

For many manufacturers who begin integrating their data processes into a real-time SPC solution with automated features, the biggest shock is realizing how many variations exist along their production lines. Manually recording and comparing data from different devices, processes, lines, or sites invariably masks the impact of variances. This is especially true for companies with SPC software that requires manual cross-product or cross-process comparisons.

With a solution that can immediately show visual representations of variances across products, shifts, processes, and so on, you quickly see exactly what falls out of spec. Even more important, you can see in-spec variances, which often lead to a surprising amount of waste (e.g., overfill) or that herald problems like a machine that is beginning to show wear.

And because migrating from paper to a robust solution like InfinityQS ProFicient or Enact can be an eye-opening experience, it can lead to a desire for even more comprehensive data collection, analysis, and reporting. Once you gain true insight into your production data and begin to see the benefits, it becomes easier to see how even more data can offer more and bigger benefits. When you expect this type of world-view change, you can plan and account for it in your implementation timeline and budget.



About InfinityQS International, Inc.

Celebrating its 30th year, InfinityQS is the leading global provider of Manufacturing Quality Intelligence software and services. Powered by a robust Statistical Process Control (SPC) analytics engine, the company's solutions—Enact and ProFicient™—deliver unparalleled visibility and strategic insight across the enterprise, from the shop floor to the boardroom. This extensive deep-dive capability enables manufacturers to improve product quality; decrease cost and risk; improve compliance; and make strategic, data-driven business decisions. Headquartered near Washington, D.C. and with offices in Seattle, London, Beijing, and Delhi, InfinityQS has thousands of customers around the world, including Ball Corporation, Boston Scientific, Graham Packaging, and Medtronic. For more information, visit infinityqs.com.

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