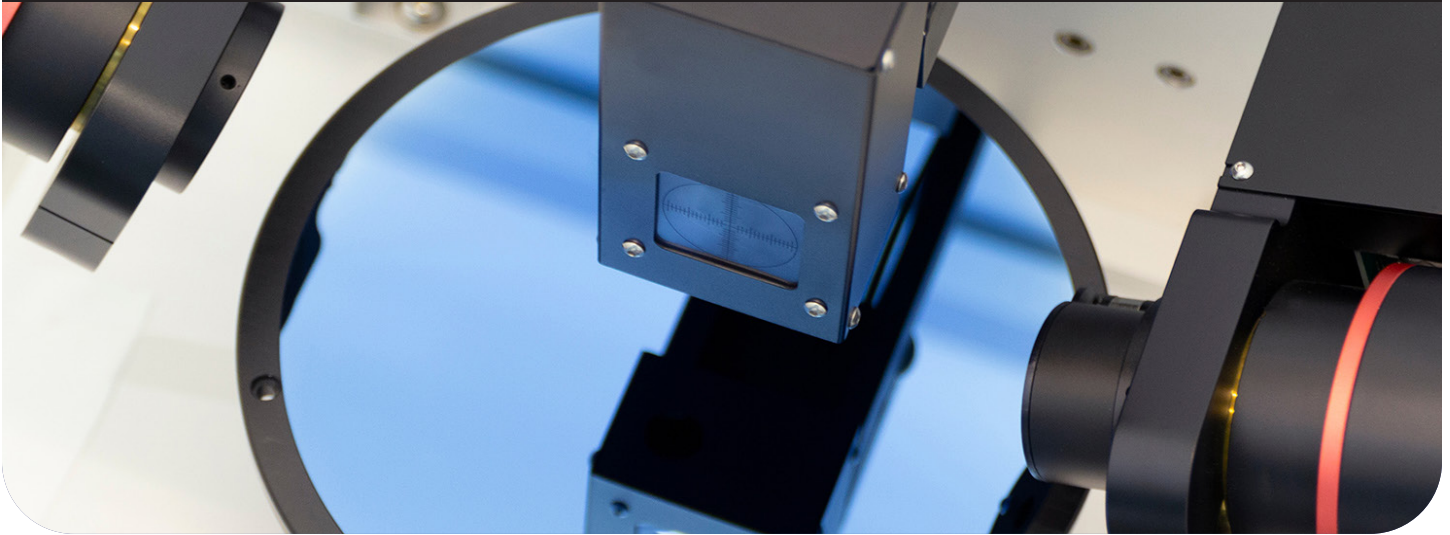


The Role of Repeatable Production Processes in Spectrometer Supply



Precision is paramount in spectrometry. If spectrometers deliver inconsistent results, companies lose time and money.

Ocean Optics' repeatable, ISO 9001-certified production processes help ensure consistent, persistent precision of optical devices that deliver accurate results on demand.

The Challenge: Consistent, Persistent Precision

Inline and near-line spectrometry can help businesses ensure product consistency, but only if installed spectrometers produce consistent results. In some cases, output errors are tied to environmental or operational conditions. For example, excess vibrations from production line processes could lead to inconsistent results, while improper calibration could set the stage for ongoing errors.

In others, spectrometers themselves are the issue. This occurs when suppliers lack the repeatable processes necessary to produce identical units that deliver consistent results. Consider a recent

Materials (Basil) report, **Precision and informational limits in optical spectroscopy**, which speaks to the impact of even small lens aberrations on results. "Aberrations that change the location of the maximum of a peak on the detector, for example, can result in erroneous estimates of the absolute frequency of that peak if they are not properly accounted for."

While companies may be able to correct for these aberrations if detected, the detection itself is difficult. Consider an organization purchasing spectrometers in bulk to help streamline hundreds of production processes. Consistency is a fundamental component of supplier agreements — from NIR to UV-VIS to Raman spectrometers — the expectation is that once configured, disparate devices will leverage the same parameters to produce consistent results.

If this doesn't happen, the downstream results are significant. Using data from one device, companies may make changes to manufacturing processes that supposedly bring products back into compliance. Data from another device, however, which may be on another production line or in another facility, might report a different set of measurements.

This leaves companies with two (or more) data sets and no clear answers.



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The Solution: ASK™ and You Shall Receive

Ensuring highly repeatable production processes starts with in-depth documentation of specific processes backed by robust standard operating procedures (SOPs). It also demands the effective communication of operational and institutional knowledge across facility staff to ensure shared competency at scale. In practice, this means continually evaluating and updating process documents as required, and creating video documentation with step-by-step instructions to reduce the risk of lost knowledge and make it easier to onboard new staff.

All Ocean Optics facilities also leverage automation to both increase production speed and reduce the risk of errors. Factories are paperless and wireless and prioritize alignment with Six Sigma principles for lean manufacturing.

So how do companies ensure they receive the repeatability they need at the scale they want? The answer is simple: Just ASK™.

Applied Spectral Knowledge (ASK™) is the foundation of Ocean Optics' success in customer satisfaction and product quality. ASK™ ties the company's historic strength in product design and development with in-house, cross-functional, category-specific expertise to help companies discover, measure, and manage their operational unknowns.

This approach encompasses five interconnected steps: Feasibility assessments, solution requirements, prototyping, supply at scale, and global support. Let's explore each in more detail.

Feasibility Assessments

The first step of ASKing is determining what must be measured to manage the customer's unknowns. This means pinpointing key indicators or components that require evaluation during the production, quality control, or reclamation process, and then determining the feasibility of these requirements at scale. Working with Ocean Optics experts, organizations can ensure they're on solid ground before getting started with spectrometer production.

Solution Requirements

Next are solution requirements. What does the solution need to measure, and to what level of precision? What margin of error (if any) is acceptable? Form and function are also considered. For example, biopharmaceutical companies leveraging spectrometers for materials reclamation in the post-production process may want to consider the use of Raman spectrometers, which are capable of delivering highly accurate results but without the need for in-solution probes.

Prototyping

Ocean Optics' decades of engineering expertise come into play as prototype design begins. With a wealth of industry experience, our teams are able to convert solution requirements into custom prototypes that reflect specific needs and provide a starting point for ongoing design and development.

Supply at Scale

Once prototyping is completed and approved, supply at scale and speed begins. These processes are possible in part because all Ocean Optics production facilities are ISO 9001 certified. While this certification is voluntary, it provides customers the peace of mind that their priorities are always top-of-mind.

In practice, this means that our production process aligns with the seven quality management principles of ISO 9001:

Customer Focus

This Quality Management Process focuses on both meeting and exceeding customer expectations to deliver sustained success. Benefits include improved customer satisfaction, loyalty, and brand reputation.

Leadership

Leadership speaks to the ability of leaders at all levels to help engage staff and create purpose. Effective leadership can help improve process efficiency and product quality.

Engagement of People

By engaging people, companies following this QMP can improve their ability to create and deliver value. This facilitates a shared understanding of corporate goals and helps retain skilled staff.

Process Approach

A process approach is characterized by activities that are understood, managed and interrelated rather than separate operations. This approach can help identify areas for improvement and optimize overall performance.

Improvement

The improvement QMP takes this approach a step further with an organization-wide focus on improving policies and processes. This can help facilitate root-cause analysis, enhance existing processes, and increase overall customer satisfaction.

Evidence-based Decision Making

Using data to underpin both short- and long-term business decisions can help yield more reliable results, in turn leading to a more effective assessment of current outcomes.

Relationship Management

This QMP speaks to the need for effective management of relationships with business partners and suppliers. Cultivating better relationships provides a foundation for shared goals and more stable flows of goods and services.

Global Support

Spectrometer support doesn't stop with product delivery. Our global network of sales support, distribution, and production locations help ensure that no matter the question or concern, expert help is always available.

Bottom line? To unlock your unknown, just ASK™.

The Benefits: Beyond Standardization

With Ocean Optics, companies can rest assured that every spectrometer produced is fit for purpose and meets exacting quality standards.

Other operational benefits include:

Redundant Reliability

Along with automation, Ocean Optics' factory operations also prioritize the cross-training of employees. By ensuring that at least three employees are trained to manage machinery in each value stream, companies can rest assured that spectrometers will always deliver the consistency and quality they've come to expect.

This at-minimum approach also makes it possible to scale up production processes as needed. Combined with our focus on automation and interoperative tools that can be deployed at any location, additional capacity can be quickly provided for larger production runs.

Reduced Lead Times

The use of automated technologies and specific, repeatable processes has also helped reduce production lead times. Where many spectrometer suppliers can take two weeks or more to produce precise product outputs, Ocean Optics provides production lead times between 2 and 5 days, depending on the complexity and urgency of the request.

Repeatable Customization

When it comes to effective spectrometry, there's no one-size-fits-all solution. For example, while many businesses may benefit from the use of Raman spectrometers for probe-less analysis that aligns with good manufacturing processes (GMPs), the customization of these spectrometers for their specific purpose can help reduce the amount of time required to get the results they need.

At Ocean Optics, customization comes standard. Companies can request the customization of their choice and our teams will create a reliable, repeatable schematic that makes it possible for these custom spectrometers to be produced at any of our facilities worldwide. In 2022 alone, Ocean Optics teams created (and replicated) more than 43,000 customizations.

The Result: Purpose Over Place

As companies seek success in global markets, product consistency is key to success. This consistency depends on reliable measurements at each stage of the production process to ensure everything from chemical composition to color matching.

It must also be repeatable regardless of location. Consider a company with a central manufacturing plant in the United States that has just opened two new production locations in Europe. While it's possible to purchase and ship spectrometers from stateside factories and have them installed in the EU, the time, effort, and costs required to navigate compliance and import regulations make this a prohibitively expensive approach.

This can lead companies to leverage local suppliers that have good intentions but lack the certifications — and therefore consistency required to produce precision instruments.

With Ocean Optics, companies can get the best of both worlds. By adopting a standardization of tools and fixtures along with a point-of-use (POU) inventory approach, our factories are effectively "on wheels" — production can be quickly scaled up in target locations without compromising accuracy or reliability.

In practice, this means that companies can focus on purpose over place. Instead of requiring spectrometers from a specific location to ensure a specific function, they can access the consistency and repeatability of Ocean Optics' processes anywhere, anytime.

Ready to improve spectrometer reliability with repeatable production processes? [Let's talk](#)