

Optimizing laboratory operations with guided workflows in OMNIC Paradigm Software

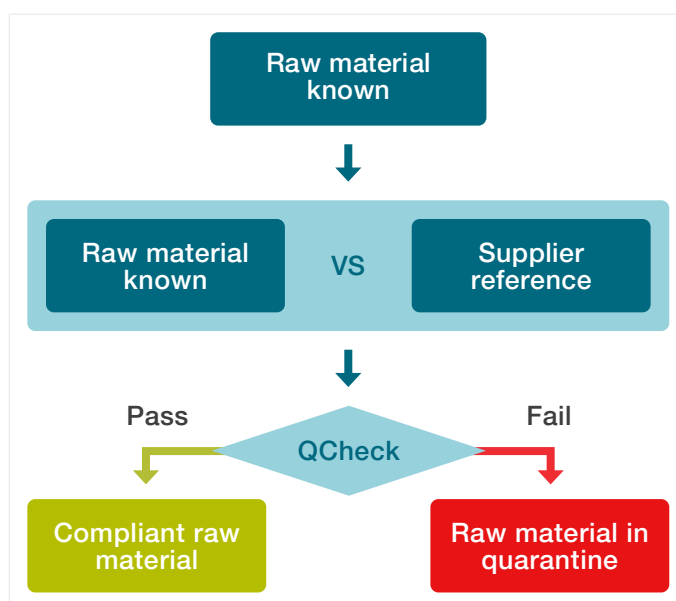
Authors

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Analytical laboratories are increasingly challenged to deliver reliable results while maintaining high productivity, data integrity, and compliance with regulatory requirements. Manual execution of analytical procedures and data entry activities can introduce variability, increase the risk of transcription errors, and compromise sample traceability.

Thermo Scientific™ OMNIC™ Paradigm Software addresses these challenges through configurable workflow automation that guides users through every step of the analytical process. From sample registration and data acquisition to data processing, reporting, and result approval, workflows can be designed to enforce standardized operating procedures and ensure consistent execution across operators, instruments, and laboratory sites.



Reduce the chance of manual errors

One of the key strengths of OMNIC Paradigm Software is the ease with which workflows can be created, deployed, and modified. Using an intuitive workflow design environment, laboratories can rapidly implement solutions to common operational challenges without requiring complex software development or extensive IT support.

For example, manual entry of batch numbers, sample IDs, or standard names is a frequent source of transcription errors that can lead to sample misidentification and compromised data integrity. Barcode readers can be seamlessly integrated into Paradigm workflows in just a few clicks, enabling automatic capture of sample information directly from labels. This simple enhancement eliminates manual typing, improves traceability, accelerates sample registration, and significantly reduces the potential for human error.

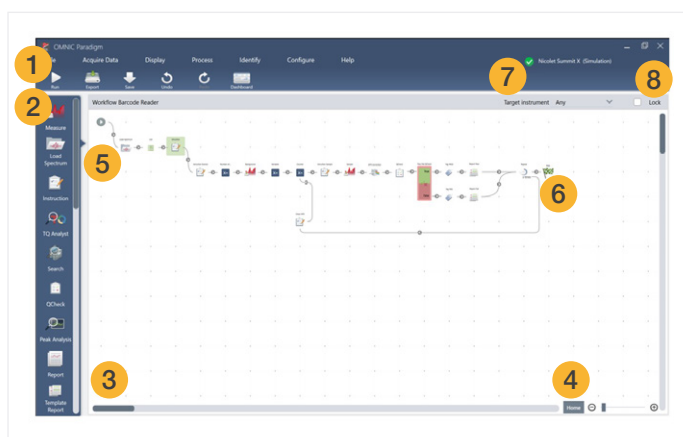


Figure 1. Drag-and-build interface for intuitive workflow creation in OMNIC Paradigm. The main interface elements are: (1) Toolbar; (2) Tile Selection Bar; (3) Workflow Canvas; (4) Tools for adjusting and resetting the canvas view; (5) Start Tile; (6) End Tile; (7) Target instrument on which the workflow will be executed; (8) Option to lock the workflow to prevent further modifications.



Figure 2. Barcode reader integration in OMNIC Paradigm for automated sample identification, reducing manual entry errors and improving traceability.

Standardize processes for consistency across different users

OMNIC Paradigm Software also enables the creation of visually guided workflows that incorporate images, instructions, decision points, and automated checks throughout the analytical process. These image-based workflows provide step-by-step guidance for sample preparation, instrument setup, data acquisition, and result verification activities. By embedding best practices directly into the workflow, laboratories can reduce training requirements, accelerate operator qualification, and ensure that procedures are performed consistently regardless of the user's level of experience.

This approach is particularly valuable in laboratories with frequent personnel turnover, multi-shift operations, or varying levels of operator expertise. Guided workflows help less experienced users perform analytical tasks correctly and consistently, reducing the likelihood of procedural mistakes and out-of-specification (OOS) results while maintaining confidence in the generated data.

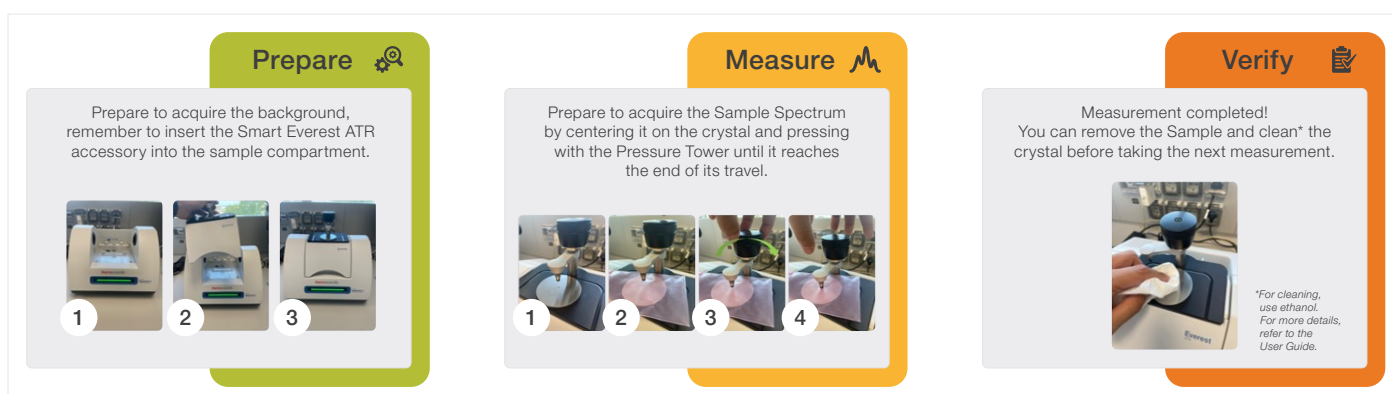


Figure 3. Visually guided OMNIC Paradigm workflow providing step-by-step instructions for sample preparation, measurement, and verification, ensuring consistent operation and reducing procedural errors.

Use guided workflows to support regulatory compliance

For laboratories operating in regulated industries such as pharmaceuticals, biotechnology, and medical devices, Paradigm workflows can also support compliance with 21 CFR Part 11 requirements. Features such as user authentication, electronic records, audit trails, and controlled access to methods and workflows help establish a secure, traceable, and audit-ready analytical environment.

Combined with Paradigm's database architecture and Smart Tag functionality, analytical results can be rapidly searched, filtered, and trended across large datasets. This enables efficient review of historical data, faster investigation of out-of-specification events, improved process understanding, and more informed decision-making.

Summary

By integrating workflow automation, guided user interaction, barcode-driven sample identification, centralized data management, and compliance-supporting features into a single platform, OMNIC Paradigm Software helps laboratories achieve greater efficiency, consistency, and confidence in their analytical results. Guided workflows enable both experienced and newly trained personnel to perform analyses in a repeatable and traceable manner, reducing human error while supporting high-throughput laboratory operations.



Figure 4. Workflow validation interface supporting compliance with 21 CFR Part 11 requirements. (1) Draft workflows can be electronically signed, approved, and archived once finalized. (2) Any modification to a workflow is tracked through workflow versioning, ensuring traceability and allowing previous versions and the workflow history to be retrieved. (3) Workflows, whether in draft, approved, or archived status, are automatically organized and made available from the dashboard for centralized access and management.