Novotek

Proficy Smart Factory

for discrete manufacturing

MES functionality for discrete manufacturing, developed by GE Vernova.

GE VERNOVA

Distributor

Proficy® Software & Services

Proficy Smart Factory for discrete manufacturing

MES functionality specifically tailored for discrete manufacturing.

Discrete manufacturing demands precision, efficiency, and flexibility to handle complex products and processes. With Proficy Smart Factory from GE Vernova, you gain the tools needed to optimize production, reduce deviations, and ensure high quality—from planning to finished product.

Proficy Smart Factory provides complete MES functionality for managing both manual and automated operations, including:

- Traceability of individual units
- Real-time production planning updates
- Route management and BOM
- Quality control and deviation handling

With Assembly Instructions and other documentation, operators can follow work instructions and ensure proper execution. You can also generate comprehensive "As Built" reports to document the entire production process.

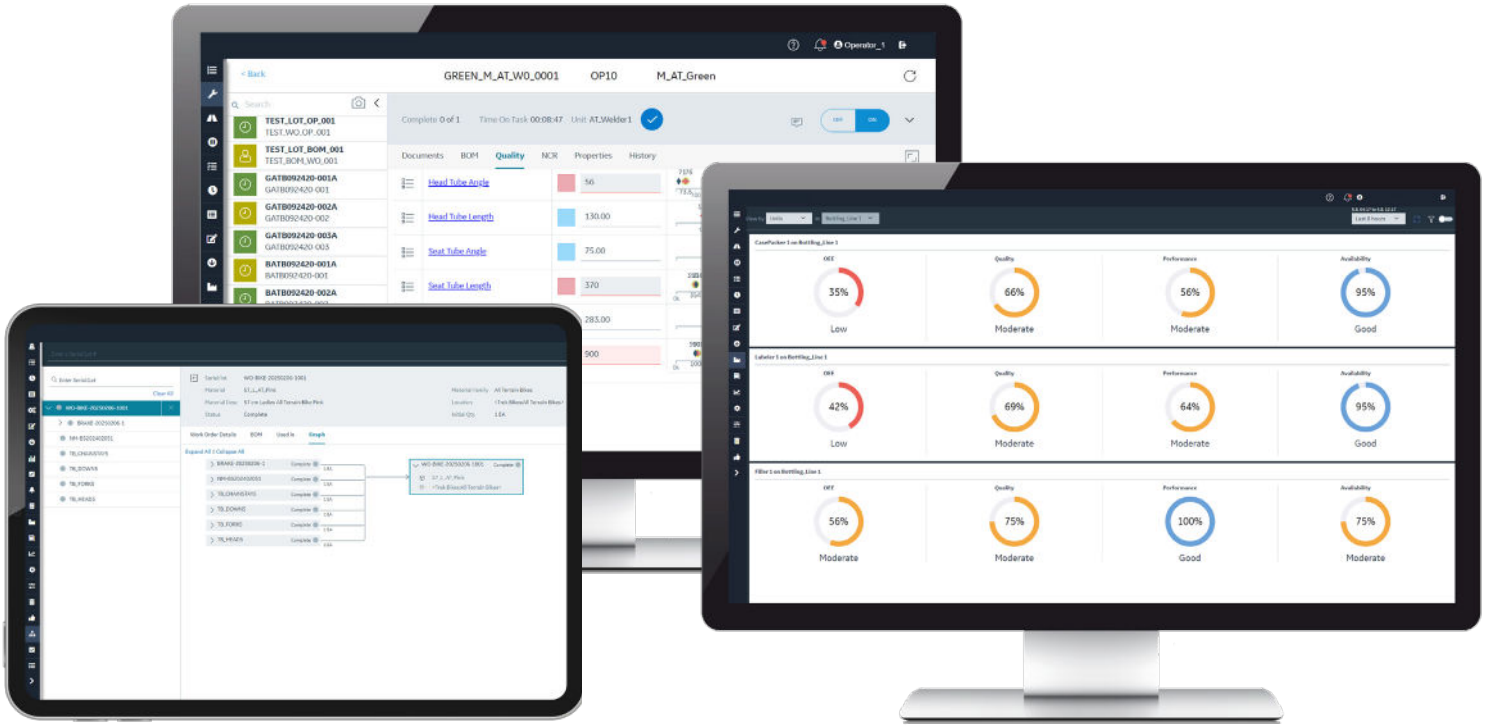
The solution ensures seamless integration between production and ERP, providing access to all necessary information on a single platform, available via PC, mobile, and tablet.

With Proficy Smart Factory, both operators and management gain full visibility for a Lean and first-time-right production.

What is discrete manufacturing?

Discrete manufacturing refers to the production of physical, countable products. Unlike process manufacturing, each product is assembled from components that can often be disassembled or repaired individually.

Discrete manufacturing can be order-based (MTO – Make to Order) or batch-based (MTS – Make to Stock). Typical examples include electronics, the automotive industry, and machine parts.



What are the differences between discrete and process manufacturing?

Different types of manufacturing require different MES functionalities. With Proficy Smart Factory, you get both:

Proficy Smart Factory for Discrete Manufacturing	Proficy Smart Factory for Process Manufacturing
Parts and components	Variables, ingredients & by-products
Component number	Features
BOM & Multi-level BOM	More recipes & formulas
Serial numbers & ECNs	Batch, quality level, strength and sustainability
Build, assemble, produce	Mixing, fine blending & transformation
In some cases, the process can be reversed	The process cannot be reversed
Production order	Process order

Why choose Proficy Smart Factory?

A wide selection of functions for discrete production.

MES Functionality Tailored for Discrete Manufacturing
Proficy Smart Factory is developed to handle the unique factors of discrete manufacturing, ensuring better control, higher quality, and more efficient operations.

Get the tools you need to manage complex orders related to both automatic and manual operations. Optimize production flow, gain precise traceability throughout the production process, and identify and correct issues faster with advanced quality and deviation management. Documentation and guides related to material consumption, tools, and work instructions are always easily accessible.

Efficient Production Planning
The planning tool simplifies production planning, ensuring better utilisation of materials, faster changeovers, and more accurate delivery times.

Real-Time Insights and Advanced Analytics
With access to data and OEE (Overall Equipment Effectiveness) analysis in real time, you can identify and solve problems before they escalate, reducing downtime and improving production efficiency.

Advanced analytics based on AI and Machine Learning enable the detection of process variations and ensure smoother production. You can also utilize advanced analytics to monitor energy and resource consumption, making the right choices for more sustainable production.

With Proficy Smart Factory, we have access to standardized, best practice work instructions across all facilities, avoiding the challenges associated with physical paper.

Mark Tudor
VP, Information Technology
Eaton

Proficy Smart Factory allows us to reduce the number of applications, increase production efficiency, and track the aircraft engine all the way from start to the last bolt.

Rob Amos
Senior Director, Shop Floor Applications
GE Aviation

Get Started

Seamless integration, great flexibility, and ease of use.

Integration between OT and IT
Proficy Smart Factory ensures efficient and paperless information flow between both ERP systems, PLM, and automation systems.

Open Solution
Proficy Smart Factory is based on standard interfaces and can easily integrate with BI tools and other IT applications.

Scalable and Flexible Architecture
Proficy Smart Factory can scale from one or multiple production lines in a factory to encompass several factories worldwide. The solution can be implemented in the cloud, locally, or as a hybrid model.

Quick Implementation
As a modular "out-of-the-box" digitalization platform, Proficy Smart Factory is quick to implement, easy to customize, and requires minimal system maintenance.

User-Friendly Interface
Proficy Smart Factory comes with a unified user interface with easy access via PC, mobile, or tablet. The solution requires no coding. You can choose from existing dashboards or build your own using "drag & drop" functionality.

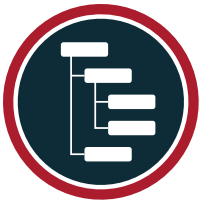
Why choose GE Vernova and Novotek?

Proficy Smart Factory is developed by GE Vernova, a leading player in automation and digitalization. The solution is used in manufacturing companies worldwide and has been named a "Leader" by Gartner within MES.

We at Novotek have been delivering MES solutions to manufacturing companies for more than 35 years, and provide the expertise you need to digitize your production.

Proficy Smart Factory Features for Discrete Manufacturing

Integration



Route Management

Production planning

Traceability

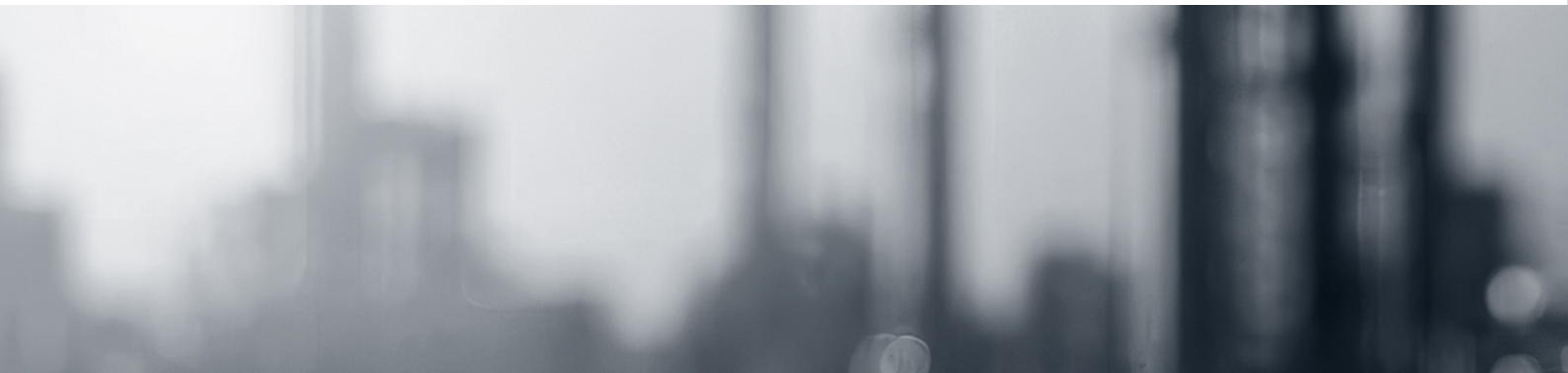
Engineering Change Orders

Reception control

Analytics, AI & Machine Learning

Asset Health

Sustainable production



Order Execution

Quality & Deviation Management

Tool handling

Document management

OEE

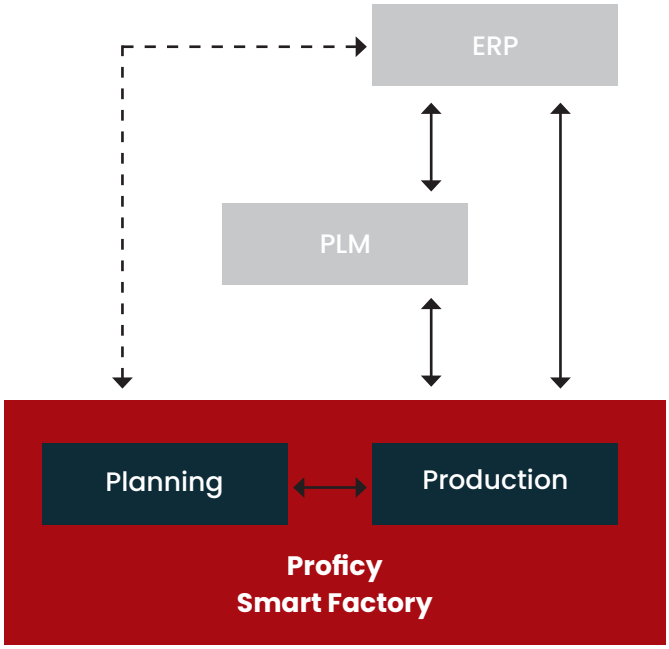
Data collection, storage & distribution

Dashboard Visualization platform

Integration

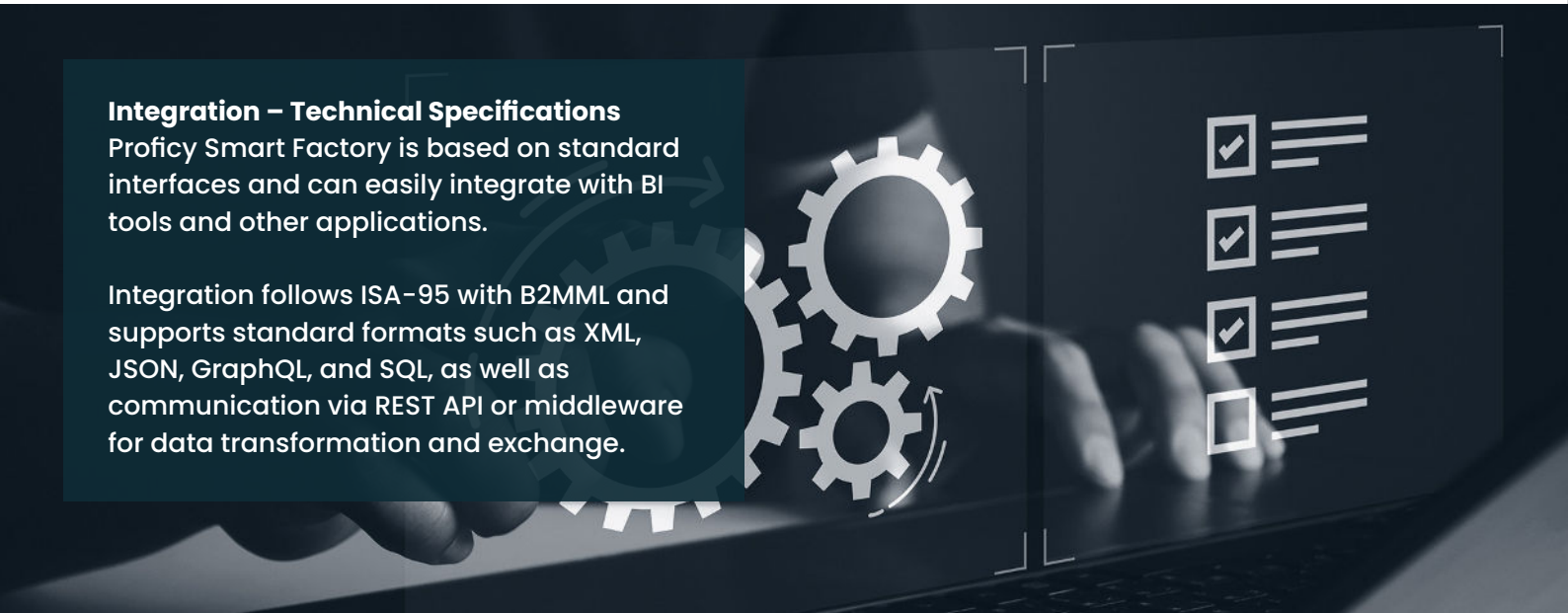
ERP
Proficy Smart Factory integrates real-time production data with ERP, ensuring precise order handling, optimal resource planning, and full traceability. This reduces manual data entry, improves data quality, and allows production to quickly adapt to demand. With bidirectional data communication, production decisions can be made based on up-to-date information.

PLM
Proficy Smart Factory enables an efficient data flow between PLM and production. From the PLM system, production receives mBOM, Route, and 3D work instructions, while changes are managed in a controlled manner. After production, information is sent back to PLM, including as-built BOM, quality data, and design feedback, ensuring continuous improvement and better product traceability.



Data that can be sent from ERP
- Work and process orders
- Master data (material & product information)
- Quantity changes and order cancellations
- Status updates for work orders
- Route and BOM

Data that can be sent to ERP
- Route information
- Serial/Lot information
- Consumption and completion of operations
- Completed work orders
- Status updates after batch inspection
- Overview of scrap and defective materials
- Registration of working hours
- Registration of materials



Integration – Technical Specifications
Proficy Smart Factory is based on standard interfaces and can easily integrate with BI tools and other applications.

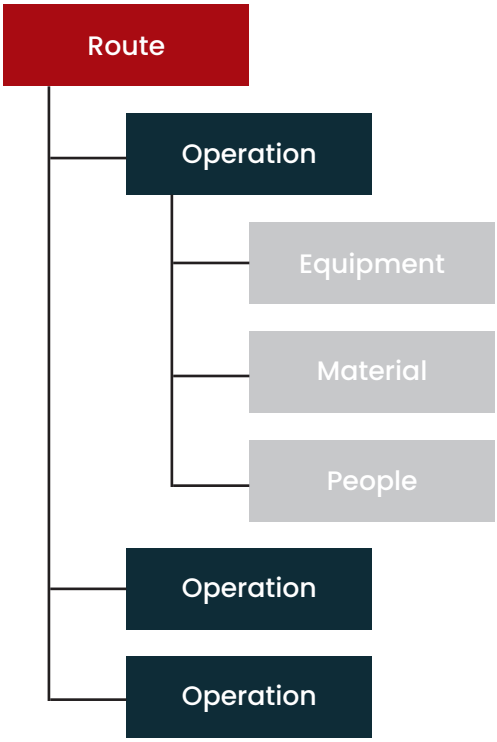
Integration follows ISA-95 with B2MML and supports standard formats such as XML, JSON, GraphQL, and SQL, as well as communication via REST API or middleware for data transformation and exchange.

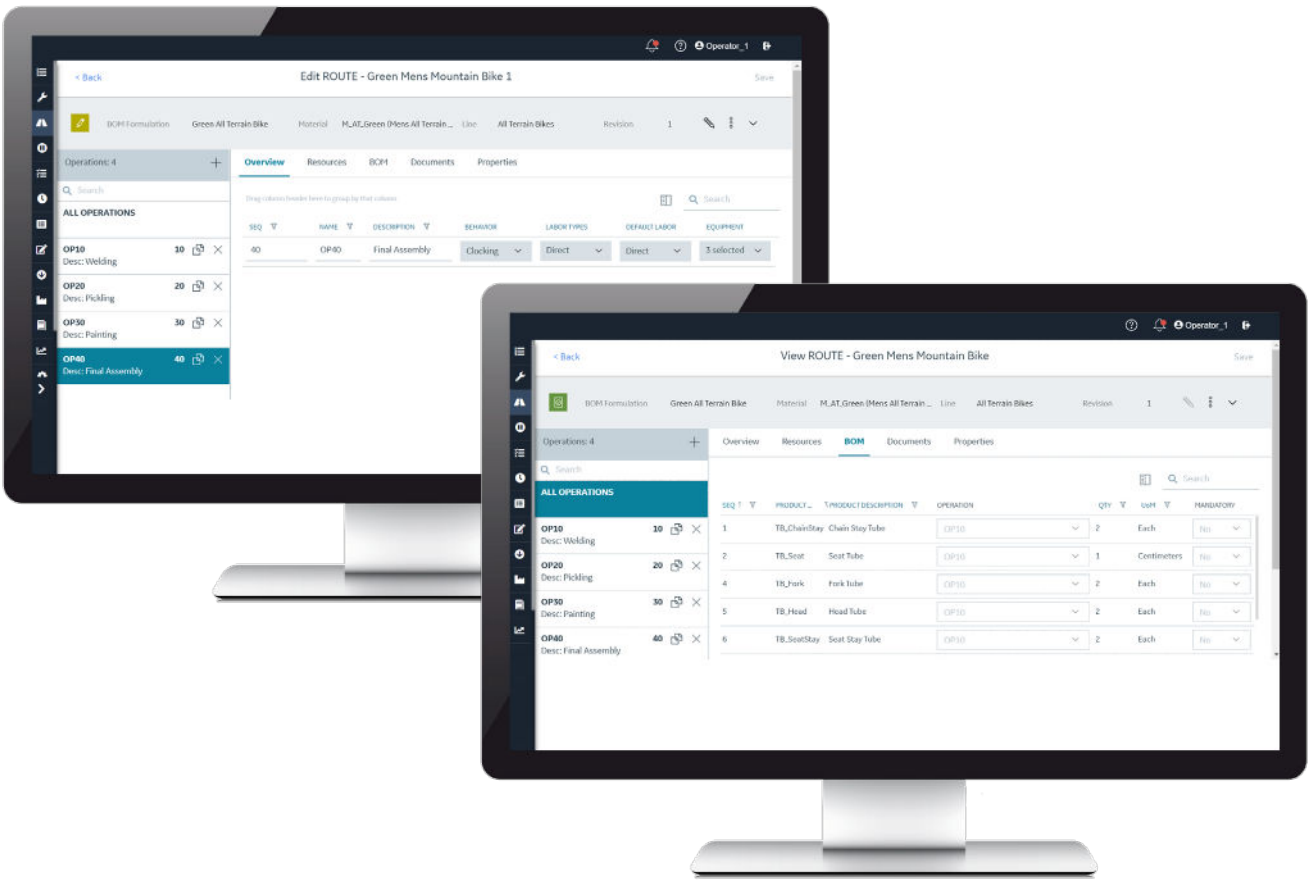
Route Management

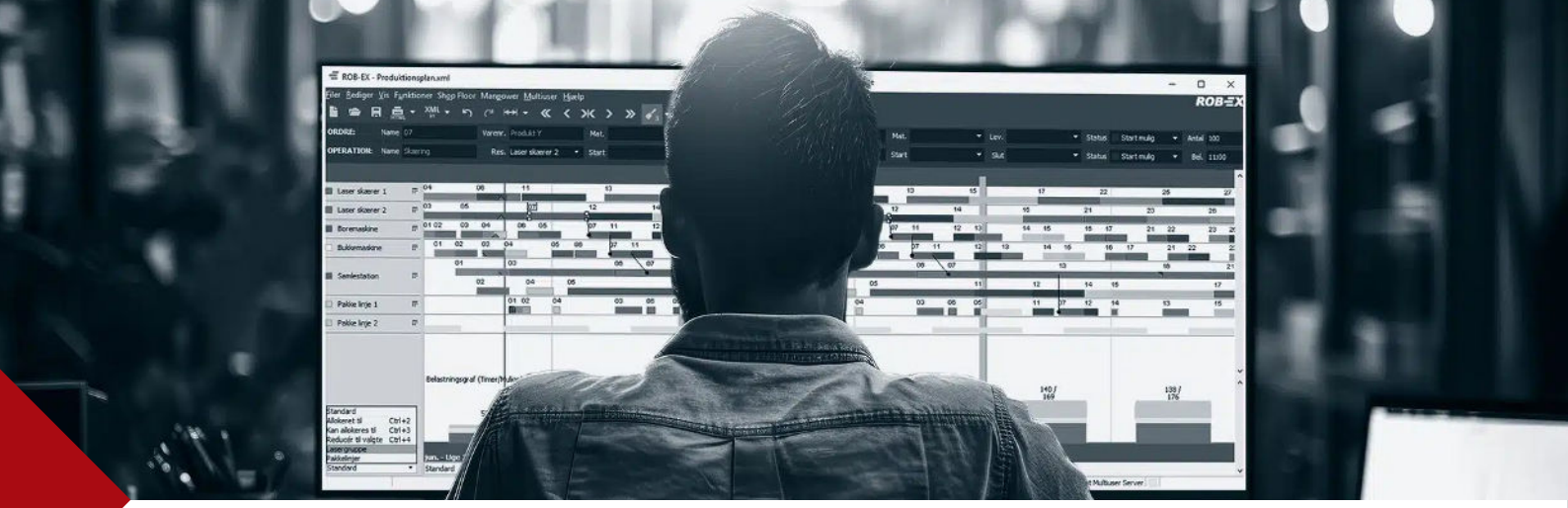
Proficy Smart Factory's Route Management provides a complete overview of the production flow. It displays the planned sequence of operations a product goes through during production, acting as a "roadmap" from start to finished product.

You can easily create, copy, modify, release, approve, revise, and delete operation sequences. Version history is always available. The system also provides information on:

- Materials to be used (BOM)
- Definition of quality parameters to be monitored/ recorded
- Documents describing work operations







Production Planning

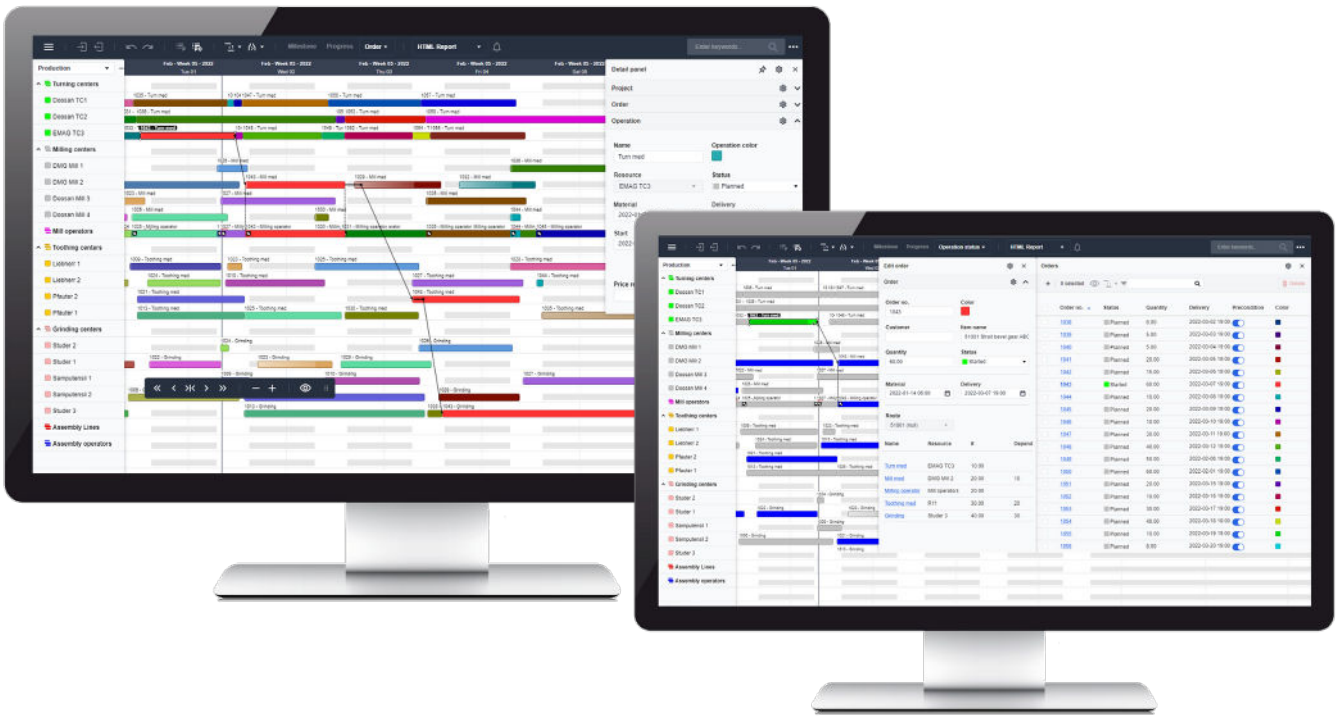
With Proficy Smart Factory's production planning tool, you can quickly and easily plan production and make adjustments based on demand, available personnel, raw materials, and equipment. This ensures optimal resource utilization.

Proficy Smart Factory can also receive production plans directly from ERP. However, for many manufacturing companies, ERP's planning functions are too limited. The production planning tool in Proficy Smart Factory allows for more detailed planning, making the process faster, easier, and more flexible.

Visual Overview
The planning module in Proficy Smart Factory extracts available order data from the ERP system and displays them in a Gantt chart. All orders and underlying operations are visualized in real-time, with an overview of capacity, raw material inventory, work-in-progress, and finished goods.

Planning Strategies
Changes to the plan can be made easily, either manually using "Drag & Drop" or automatically by applying one of the many built-in planning strategies. Re-planning is fast and straightforward, often completed with a single click.

Efficient Bottleneck Management
With a clear visual overview, you can detect bottlenecks early and prevent potential production stoppages.



Order Execution

Proficy Smart Factory's Order Execution function provides full control and visibility over all production orders—from start to finish. Orders are downloaded from ERP or the planning module. With an intuitive order list, you can easily track priorities, status, and progress, ensuring production stays on track.

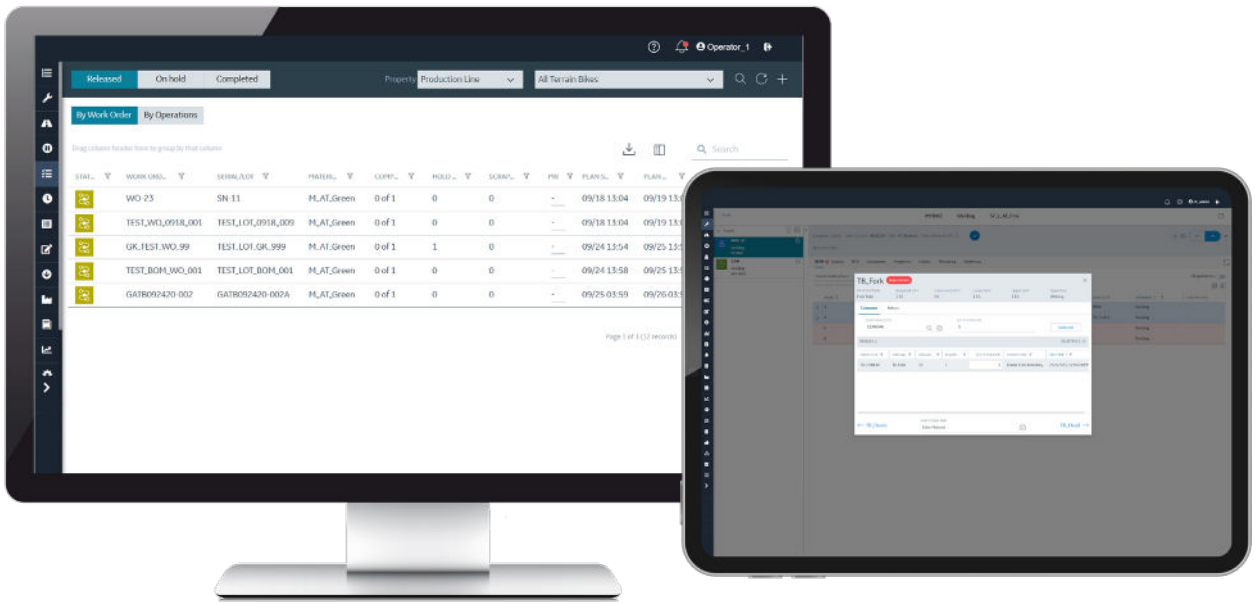
Operators can choose between:

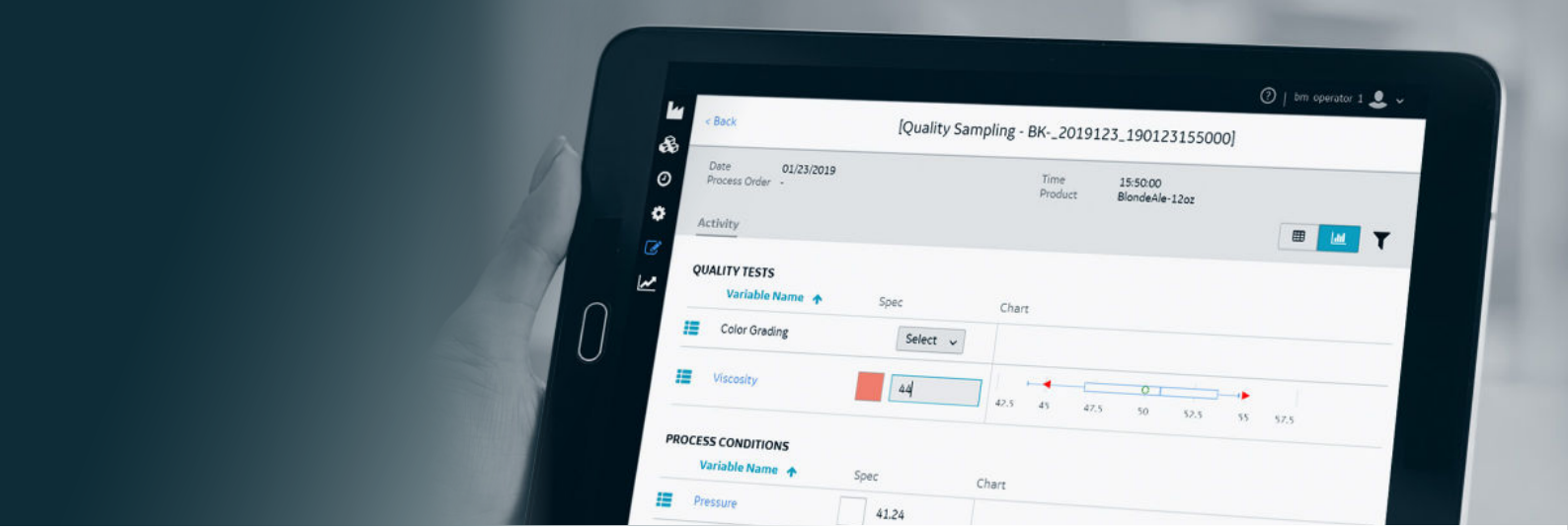
- Work queue – follows the production flow (route) of the product or work order.
- Unit Operations – focuses on performing tasks based on workstations, machines, and equipment.

The "MyMachine" feature allows you to configure which workstations and machines you are responsible for.

Order Execution also includes Clock On / Clock Off / Complete functionality to track work order progress. All critical information such as checklists, Standard Operating Procedures (SOPs), BOM, quality requirements, and inspection guidelines are gathered in one place for accurate and efficient execution.

- Raw materials and components can be registered manually or using QR codes, barcodes, RFID, or scanners/tablets/mobile devices.

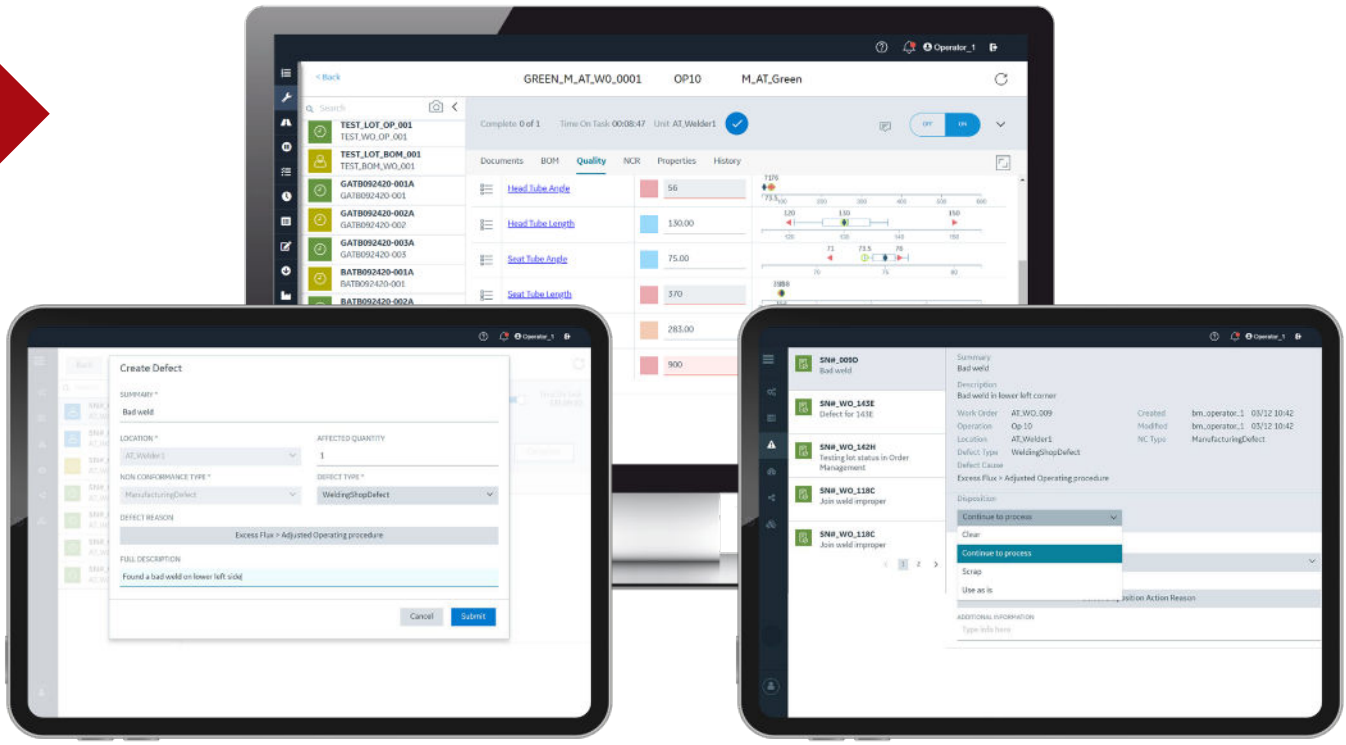




Quality & Deviation Management

Proficy Smart Factory sets the standard for quality management in discrete manufacturing, with tools that ensure high precision and minimize the risk of quality deviations. The software registers both manual and automated process and quality data, linking them directly to product specifications for accuracy at every stage of production.

- SPC (Statistical Process Control) automatically generates trends and control limits based on recent measurements and alerts operators early to potential quality deviations.
- Deviation management includes user-friendly instructions, checklists, and SOPs for quick and effective follow-up.
- Advanced functions allow you to handle complex deviations, identifying and categorizing causes and consequences at multiple levels.
- Corrective action tools ensure proper handling of deviations, including re-work and scrap management.
- The system features an Approval Cockpit for cases where multiple people are involved in the approval process.



Tool Management

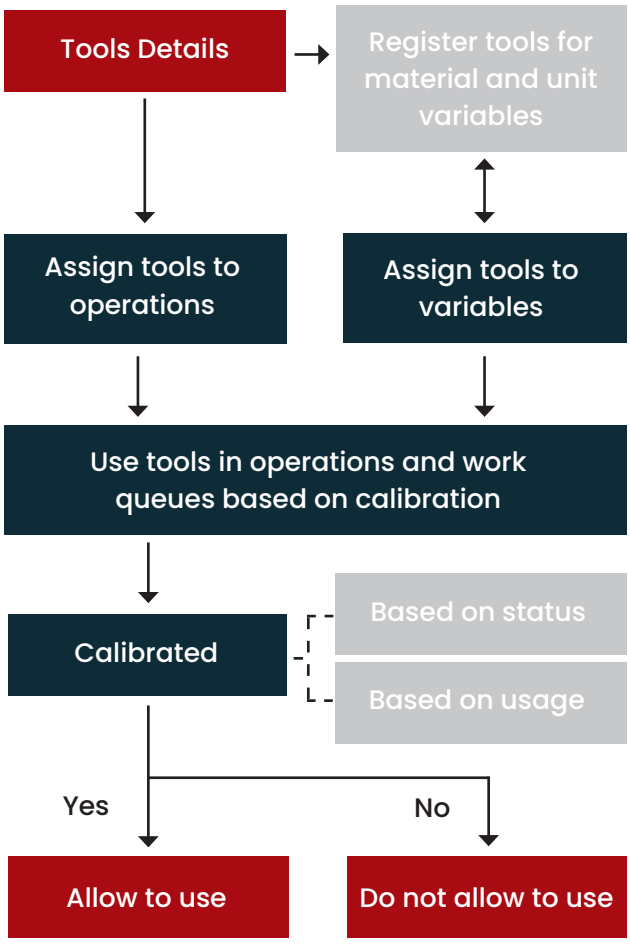
The Tools function in Proficy Smart Factory provides full control over which tools are used in production, ensuring that only calibrated tools with the correct settings are utilized. This guarantees that tools always meet specifications, contributing to consistent product quality.

- **Automated Calibration Alerts:** If a tool no longer has an approved calibration or reaches its maximum usage cycles, the system notifies users to recalibrate or replace it.

- **Impact Analysis:** If a calibration deviation occurs, the system identifies affected products and process parameters for quick corrective action.

- **Complete Tool Lifecycle Management:**
  - Create, classify, and revise tools.
  - Import tools from external systems via ERP.
  - Register tools along with quality variables in the production process.
  - Continuous overview of available tools with the correct calibration status.
  - Full history of tool usage and previous revisions.

With Proficy Smart Factory, your production planning, execution, quality control, and tool management are seamlessly integrated for maximum efficiency, accuracy, and traceability.

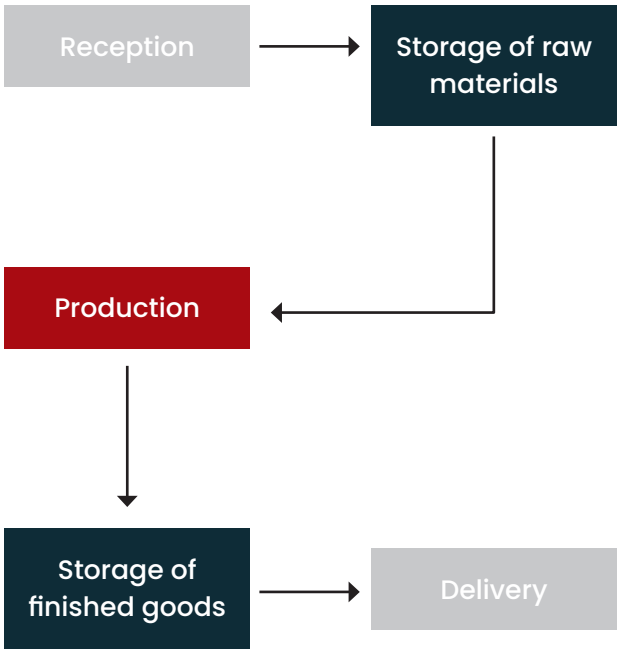


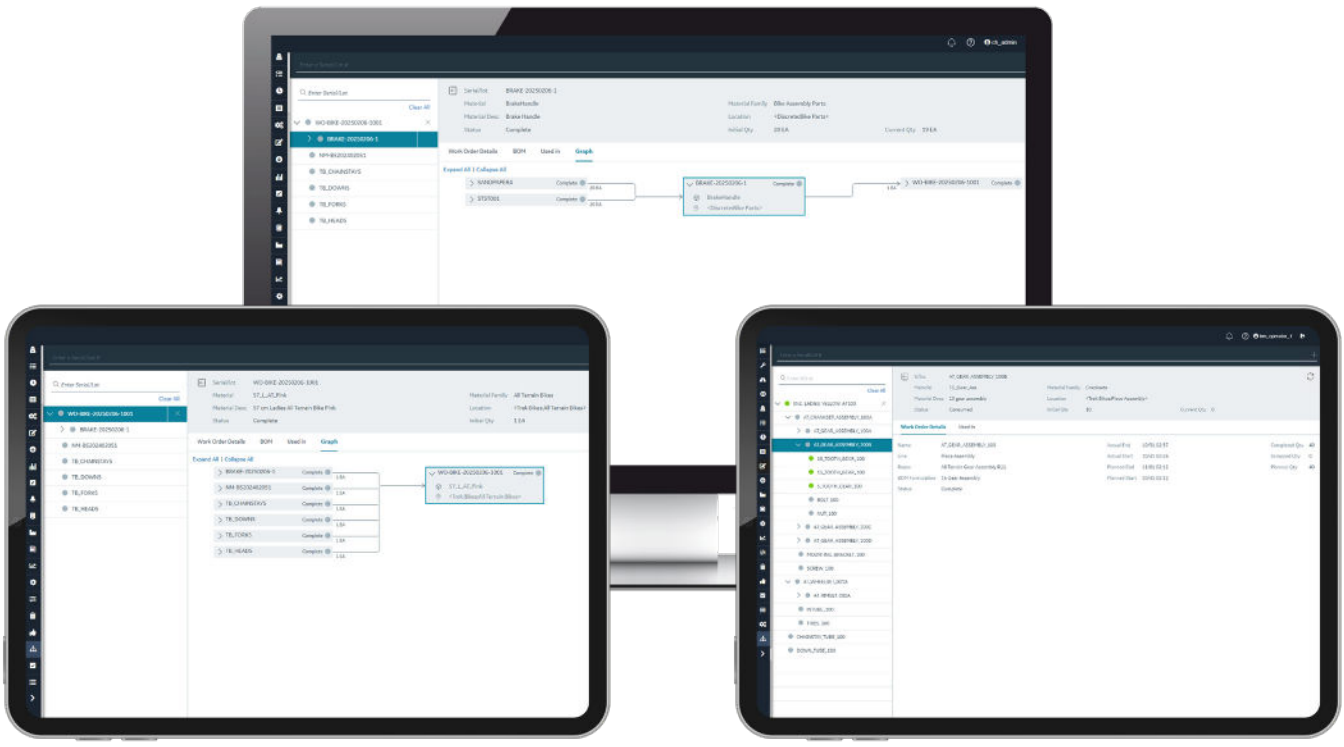
Traceability

Proficy Smart Factory provides detailed traceability throughout the entire production process, from raw materials to finished products. You can track material flow in real time and monitor where and how resources are used in production.

The solution supports tracking of both materials and equipment and records quality parameters to ensure precision and compliance. Using barcodes, QR codes, and RFID, you can easily tag, register, and track raw materials and finished products throughout the facility.

Traceability functions include an overview of the BOM, material consumption, quality data, and the locations where each material has been used. All data is presented in a user-friendly graphical interface, providing quick access to critical information for quality control and analysis.

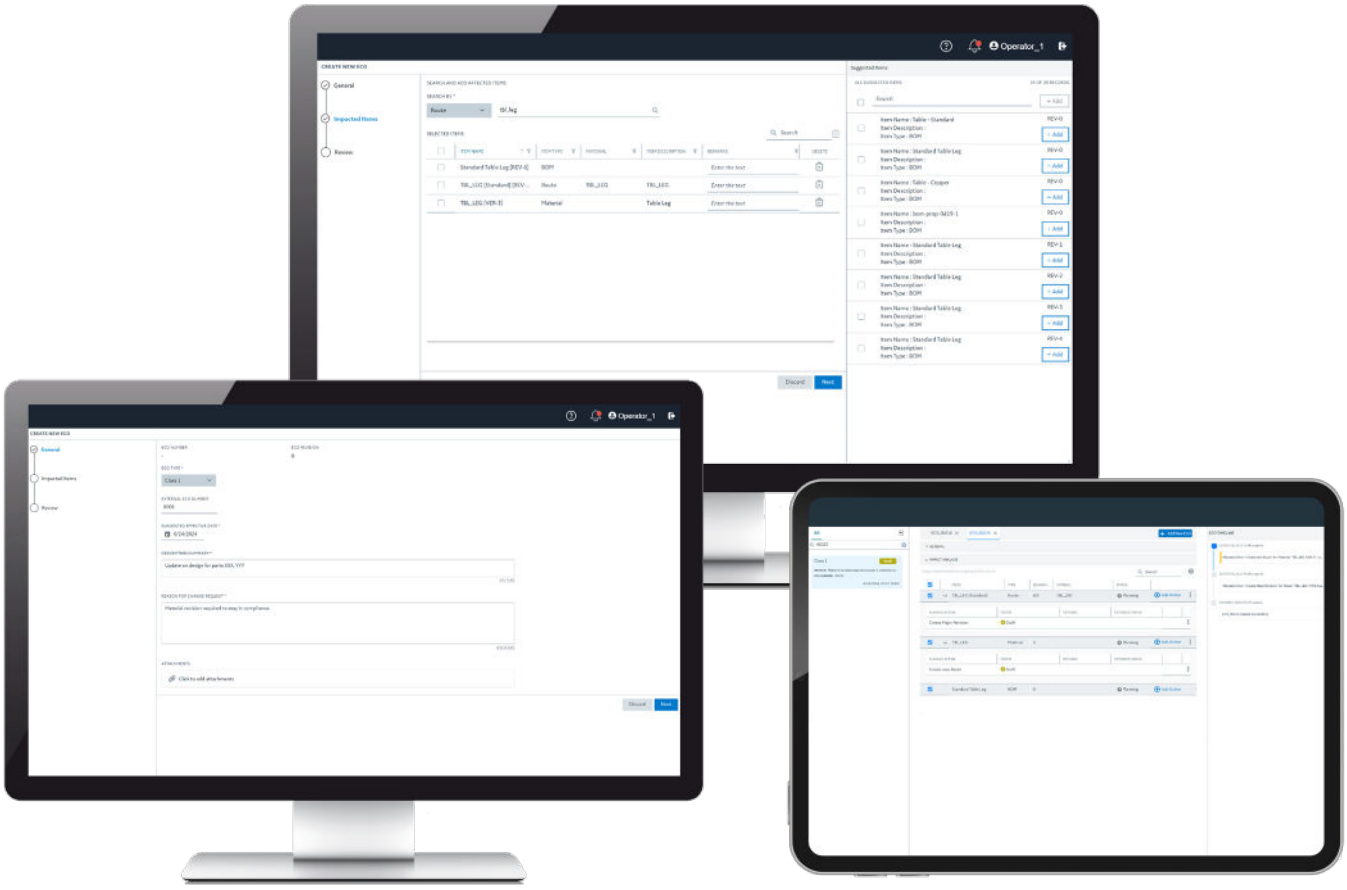




Engineering Change Orders

Engineering Change Order ensures that changes in materials, BOM, and Route are handled in a controlled and approved manner. The system enables updates to both new and ongoing work orders.

Strict guidelines can be set to protect critical processes, and all actions are logged to ensure full traceability. All necessary documentation can be gathered in one place. The system also suggests other affected elements and ensures that necessary actions are identified and implemented.

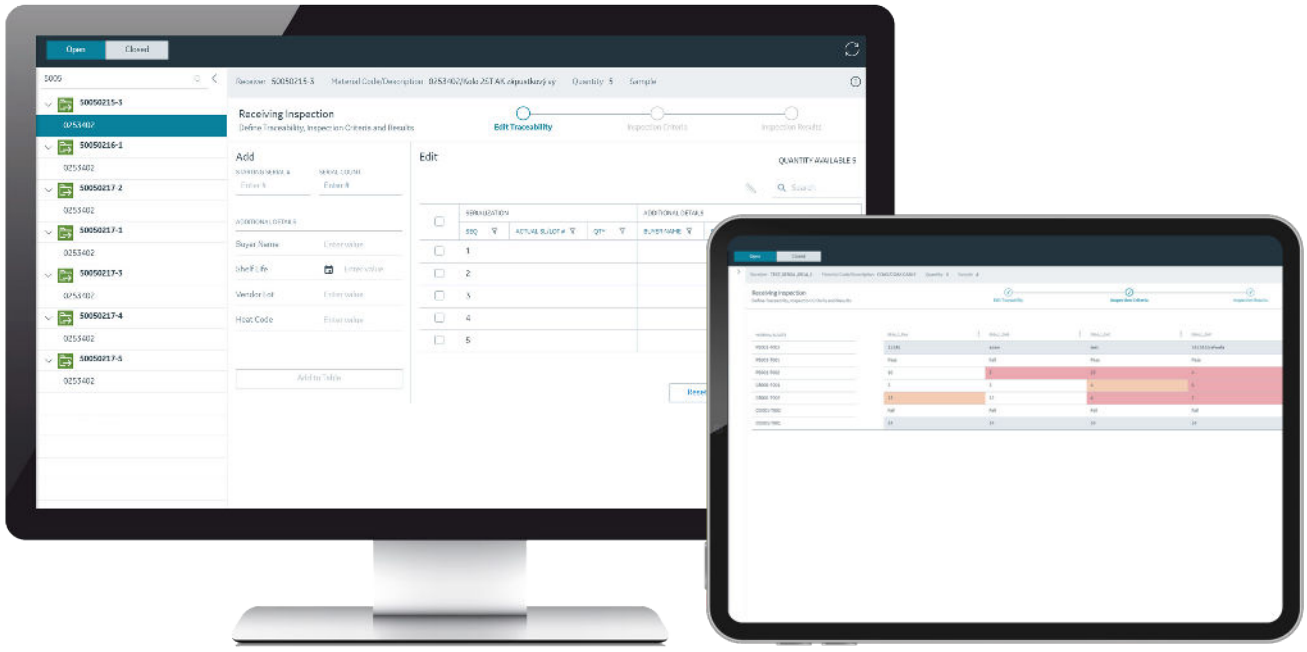


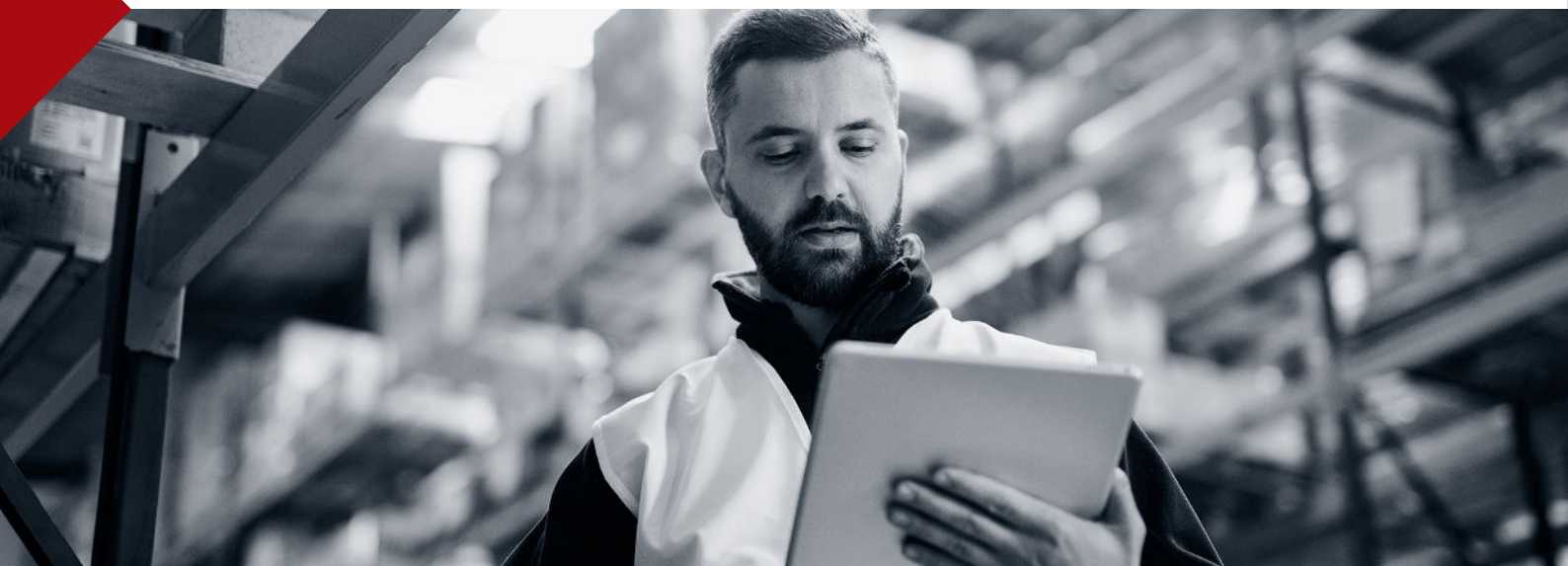
Receiving Inspection

The Receiving Inspection function in Proficy Smart Factory ensures a streamlined and accurate inspection of incoming materials. Serial numbers for BOM elements are generated automatically, and all data is fully integrated with the ERP system for seamless information flow.

The function allows for the creation of Non-Conformance (NC) reports and defines further actions such as rejection, re-inspection, or approval. Through the Approval Cockpit, additional approvals or escalations can be handled efficiently.

The built-in "sampling engine" lets you define the number of samples to be inspected, with flexible frequency control based on variables. Color coding provides an immediate overview of measured dimensions—values within warning limits are clearly marked, while values exceeding specifications receive a distinct visual indication. This ensures quick identification of deviations and reduces the risk of errors in later production stages.





Document Management

With Document Management, you get a flexible and secure solution for storing, managing, and tracking all documents. The web-based user interface provides easy access to documents, regardless of format, with advanced search filters and tagging options.

Document Management includes version control for a complete history of document updates. Access and security settings make it easy to control who can read or edit documents. The system supports both local and cloud storage. Automatic reminders, reviews, locking, and approvals ensure that documents are always up-to-date and approved before use.

Integration with AWS GenAI
Document Management can be integrated with AWS GenAI for advanced, AI-driven search functionality. An AI-driven chatbot interprets the context behind searches and provides content-specific answers. The system handles complex queries with high precision, ensuring easy access to relevant information.

OEE (Overall Equipment Efficiency)

Proficy Smart Factory includes a comprehensive OEE module that allows you to monitor equipment efficiency and quickly identify problems. You get an overview of:

Availability
Measures losses due to downtime. This can be caused by equipment failure, material shortages, product changes, shift changes, or setup time.

Performance
Measures speed losses when production is not running at the planned rate. Causes may include machine wear, raw material issues, or operator inefficiencies.

Quality
Measures quality losses, including all units that do not meet quality standards.

OEE = Availability × Performance × Quality

Efficient Data Logging
Choose between manual, semi-automatic, or fully automatic recording of production efficiency, and automatically calculate OEE. Register production issues such as downtime and scrap, and use analysis functions based on historical data to identify root causes of stoppages and map past issues.

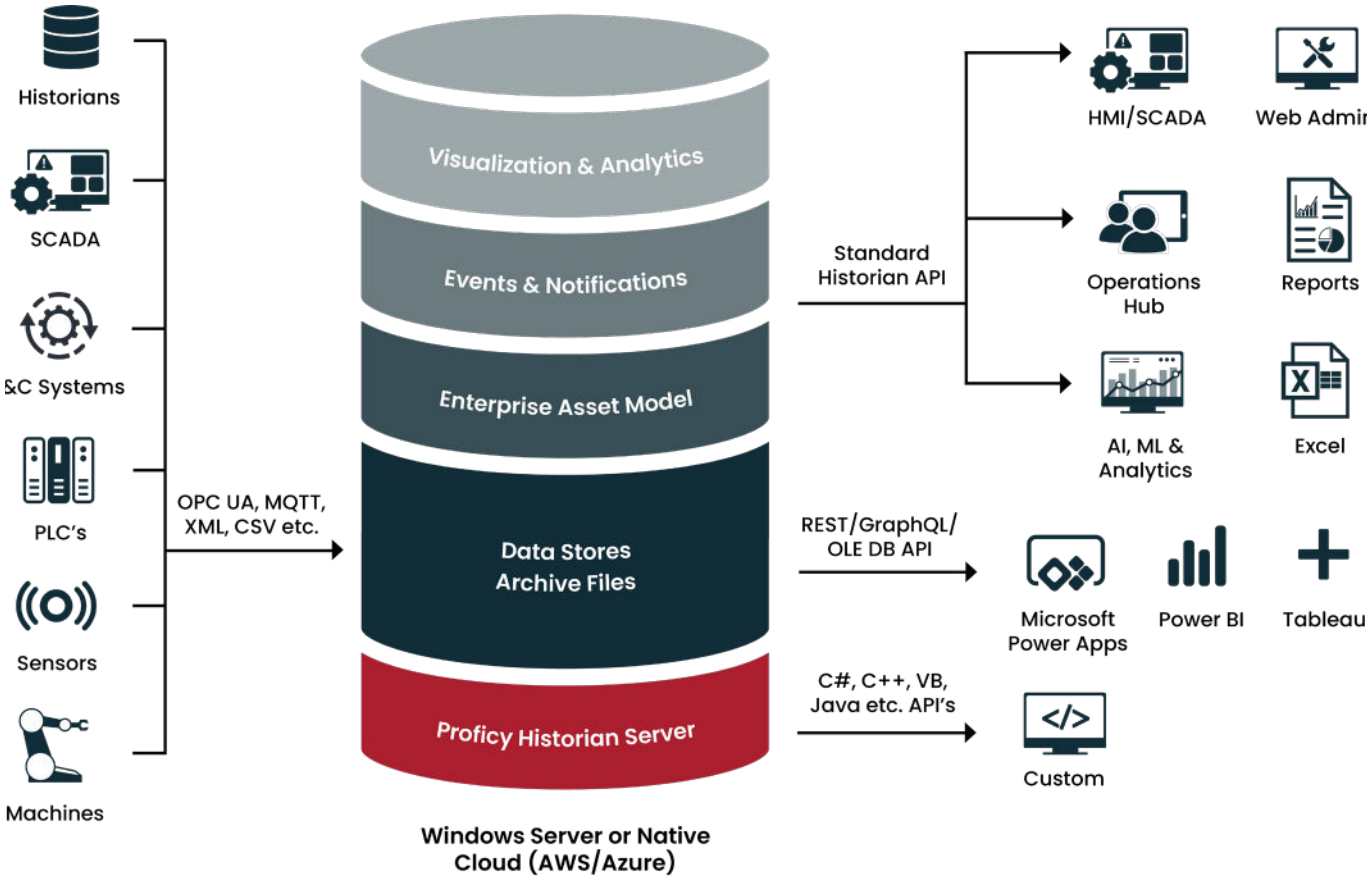
Data Collection, Storage & Distribution

Proficy Smart Factory includes a powerful process database for collecting, storing, and distributing high-resolution process and production data. The process database offers extremely high performance, handling large amounts of industrial data and scaling as needed.

The open interface allows data to be collected from multiple sources such as OPC, MQTT, ODBC, and XML/CSV via Collector. The same interface enables seamless data transfer from the process database to third-party systems such as Excel and Power BI.

High-Performance Technology

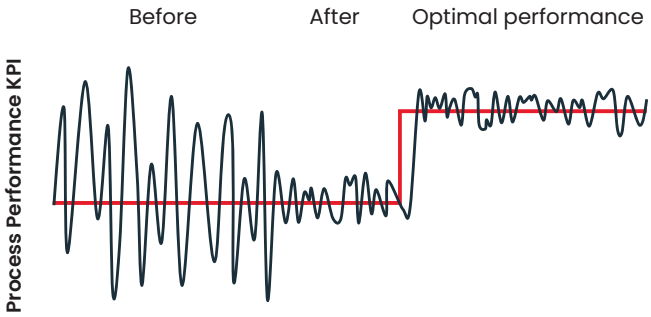
- Scalable from 100 to 100 million tags per server.
- Data can be collected at millisecond resolution and compressed before storage.
- Built-in "Store & Forward" technology ensures critical data is never lost.
- Data is further compressed upon storage, making years of high-resolution data easily accessible.



Analytics, AI & Machine Learning

Combine data from various sources and use AI and Machine Learning to analyze and optimize production. Identify problems, uncover causes, predict future performance, and ensure more optimal control parameters.

With Proficy Smart Factory, you get five analytics functions in one solution: analyze, monitor, predict, simulate, and optimize production in real-time. You can also retrieve historical data and quickly develop, test, and implement calculations, predictive analyses, and optimization solutions to reduce variability and improve the production process. The solution is designed for process engineers and does not require extensive Data Science expertise.



Asset Health

Proficy Smart Factory's Asset Health function monitors and analyzes equipment conditions in real-time to detect anomalies and prevent failures before they occur. The system collects and analyzes high-resolution sensor data, applies advanced algorithms to detect anomalies, and combines data from multiple sources to identify patterns and risk factors.

The solution uses data-driven, multivariate, and non-linear anomaly detection for industrial assets and processes. By analyzing historical data, the algorithm identifies deviations in real time and detects irregularities. This approach can be applied to all types of industrial assets to improve reliability and uptime.

Unlike traditional analytics solutions, Asset Health does not require extensive Data Science expertise and can be easily used by operators and maintenance personnel. Users are notified of irregularities and have access to dashboards with real-time data and support for predictive maintenance based on condition monitoring. The system can be integrated with existing production and maintenance systems for automatic follow-up.

Sustainable Production

With Proficy Smart Factory, you can integrate operational data from the production process with sustainability data. This allows you to track measurable progress toward sustainability goals and meet reporting requirements (CSRD), while optimizing production and ensuring more sustainable manufacturing.

The system uses AI and Machine Learning to monitor and detect patterns related to energy and resource consumption in production. You can track KPIs such as energy consumption, water usage, and carbon emissions at the facility, production line, unit, or equipment level, and measure the resource intensity of each product.

Through IoT-driven analysis, you can uncover hidden patterns, variations, and sources of inefficiency. Identify causes of abnormal resource consumption and propose corrective actions. Alerts can be set for deviations, and control rules can be implemented for automatic adjustment of setpoints.

Visualization, Trending & Analysis

Proficy Smart Factory provides all users with access via a unified web-based client (HTML5). Get access anytime, anywhere—via PC, tablet, or mobile.

Dashboards
The system includes a wide range of "out-of-the-box" dashboards for visualization, trending, and analysis. You also have access to a large library of graphical objects and "drag & drop" functionality, allowing you to quickly and easily create custom dashboards—without coding.

Integrated User Interface
Data from Proficy Smart Factory and third-party applications are presented in a single, unified interface. This makes it easy to monitor, control, and analyze data from various systems.

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