

The AVEVA logo is displayed in a bold, purple, sans-serif font in the top left corner of the page. The background of the entire page is a photograph of a woman in a white lab coat and hairnet working at a control panel in a factory setting. The control panel features a digital screen and several physical buttons and knobs. In the foreground, there are rows of blue plastic water bottles on a conveyor belt.

AVEVA

DATASHEET

AVEVA™ Manufacturing Execution System

AVEVA Manufacturing Execution System manages all inventory, production and quality-related plant activities to produce quality products at the lowest cost. It captures and contextualizes all data related to the transformation of raw materials into finished goods, giving companies enterprise-wide, real-time visibility into plant operations. That visibility lets companies perform data-driven continuous improvement as well as track products and trace materials in minutes. It uses a reusable, model-driven approach to standardize best practices, KPIs and reporting across multi-site operations and can easily scale from edge to enterprise to shorten the time-to-value for operational excellence initiatives.



Overview

AVEVA Manufacturing Execution System offers a complete set of software functions to digitize, standardize, optimize and govern operational processes and work activities across industrial manufacturing plants. It safeguards quality and compliance, and improves businesses' operational efficiency and flexibility so they can remain competitive.

Industry-leading, agnostic connectivity to automation and IIoT devices allows it to meet the real-time production control and regulatory compliance needs of automated production processes and equipment. Automatic electronic record-keeping provides detailed product genealogy and end-to-end material traceability.

AVEVA Manufacturing Execution System synchronizes human and machine actions dynamically with sophisticated digital workflow management capabilities, making it the first choice for fast-moving goods production and repetitive manufacturing processes.

It facilitates business agility and resilience by providing enterprise-wide, near-real-time visibility into plant operations and resources. Integration with advanced planning and scheduling methods gives plants schedule flexibility and enables short-term production management. Rich, contextualized data further improves operational efficiency, reliability and sustainability.

AVEVA Manufacturing Execution System supports multi-site deployments and uses a model-driven approach to the standardization of best practices and operational reporting. So, businesses can use it to accelerate time-to-value and drive productivity at scale.

Key features

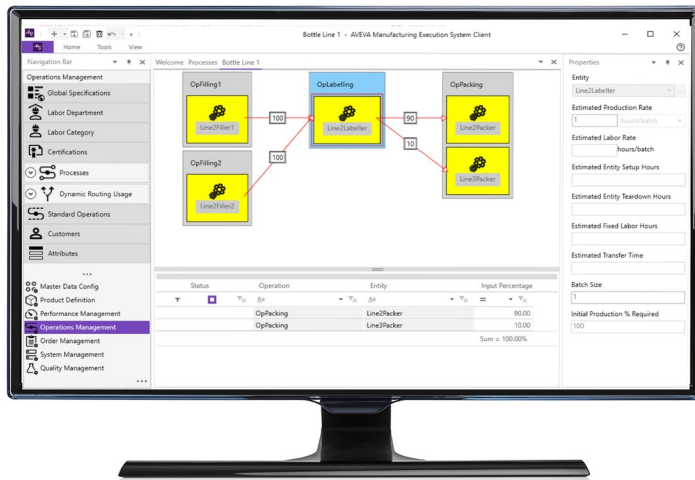
AVEVA Manufacturing Execution System manages human and machine activities, tracks and traces inventory and materials, and facilitates continuous improvement, data analysis and reporting. It enables short-term production planning with real-time visibility into plant operations and resources.

Production management

AVEVA Manufacturing Execution System synchronizes human and machine actions to efficiently execute all scheduled work orders and jobs. It enforces the defined sequence of process operations and work tasks that are dispatched to production equipment or work cells.

The software uses a configurable and sustainable process model to manage the product recipe and production process information, including:

- The sequence of operations
- Bill of material (BOM)
- Equipment capability and setup specifications
- Routings and flow of materials between operations
- Labor certificates
- Data-capture requirements for each operation



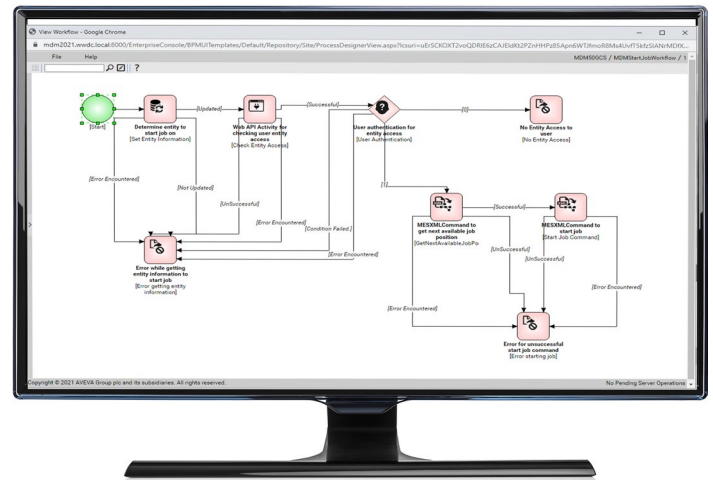
It executes production orders by scheduling instances of a product-specific or product-group-specific master process, which scales to the requested product quantity. Advanced planning and scheduling methods can optimize production schedules for plant throughput and on-time delivery.

It provides workers with real-time access to the production schedule and guides them with work instructions. It minimizes quality losses by enforcing product, process and quality specifications. Real-time visibility into the status of production, inventory and quality helps workers respond to unplanned events, while decision support helps them take corrective actions.

Workflow management

AVEVA Manufacturing Execution System eliminates paperwork and mitigates human error. It manages collaboration and human processes with advanced digital workflow capabilities.

Graphical workflow modeling describes what sequences of activity workers need to perform to execute simple or complex work tasks, quality inspections, data collection or sign-off procedures.



The software can build workflows to validate and enforce the rules and specifications defined in the MES process model for producing the scheduled product. It can guide workers with feedback on rule or limit validation so they can avoid errors, take corrective actions or escalate critical conditions for team collaboration in response to unplanned events.

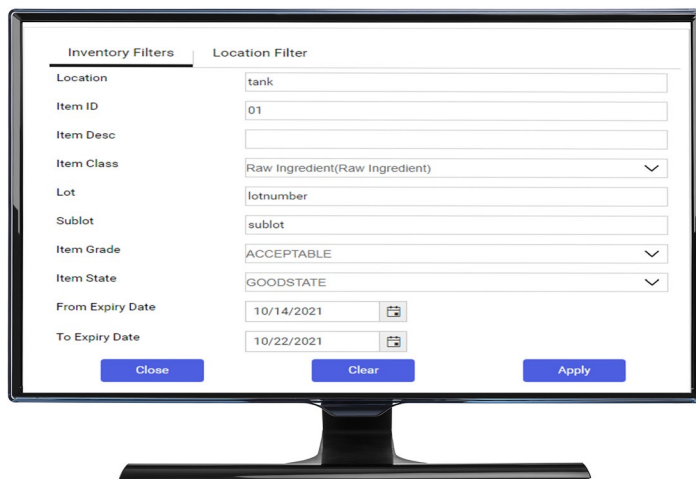
Users interact with workflows and assigned work tasks through a web-based user interface configured with low-code design tools. Responsive layouts work both on desktop screens and also tablets and smartphones.

AVEVA Manufacturing Execution System comes with libraries of preconfigured, ready-to-use, standard MES activity workflows and user interface forms. You can re-configure and enhance them to meet your plant needs, and then use them as your corporate standards across multi-site operations.

Inventory management

Aligning inventory and production activities reduces human error, out-of-spec product and quality losses. AVEVA Manufacturing Execution System enforces the specified BOM and premix recipes and updates material quantities automatically as they change.

It has broad capabilities to manage inventory and storage location. It keeps a track record of inventory operations, such as receiving, pre-weigh and material movements. It maintains a record of the source lot and subplot. It also records – as a fundamental traceability relationship – transfers from a source location to an intermediate storage location or to target equipment. In addition, it documents material-related activities, such as material quality inspections and grade- and state-change management.



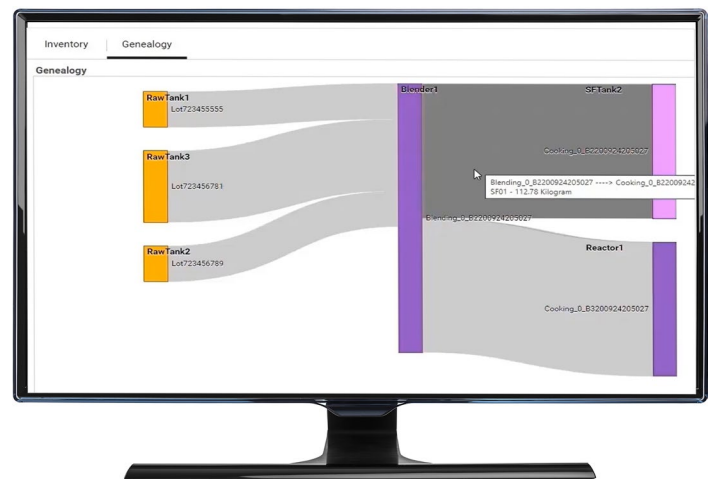
When integrated with control systems and instrumentation, AVEVA Manufacturing Execution System automatically and accurately captures weight or dosing results. Workflows can manage manual material and inventory activities that use barcode or RFID identification of storage equipment and material IDs. They also support fully manual activities using operator prompts and data entry.

Traceability

Reduce the cost of regulatory compliance and protect brand equity with automatic electronic record keeping. Conduct detailed product genealogy and end-to-end material traceability in minutes.

In addition to enforcing manual data collection procedures, AVEVA Manufacturing Execution System integrates with control systems and devices so it can automatically keep records on production and inventory events – including all material consumption and production (WIP/semi-finished and finished products). It delivers a detailed product genealogy and quality record, along with material traceability across storage, mobile storage units and production locations.

Out-of-the-box reporting provides an interactive view into the materials or items consumed and produced at each operation and location of the production process.



It shows the path of raw and semi-finished material from its source to all the points it has been consumed to produce a product. The result is real-time inventory status and WIP visibility, and end-to-end material traceability and product genealogy within the plant, across storage locations, pre-weigh operations and production equipment, from receiving to storage or shipment.

Quality management

AVEVA Manufacturing Execution System safeguards product quality and safety compliance by automating quality inspection and enforcing data collection procedures.

The software applies quality-data sampling requirements according to the quality specification defined for producing a product and related process operations. So, operators don't have to do this distracting, difficult-to-manage task.

It automatically generates sampling plans when a production operation or job starts, and dynamically maintains them in alignment with the production progress and job execution. It can trigger additional quality-data samples for specified process conditions – or trigger them spontaneously in response to unplanned events.

The software enforces manual-entry sample-data requests, triggers data collection workflows, and automates direct data sampling from connected plant equipment and devices. It applies statistical process control (SPC) rules to entered sample data to provide instant notifications of non-conformance for rapid corrective and preventive actions. Quality-limit violation and SPC rule events can trigger either simple notifications or the specified CAPA workflow for enforcing the preventive or corrective action procedure.

AVEVA Manufacturing Execution System offers the full range of industry-standard SPC rules and SPC charts to monitor and visualize sampled quality data and quality KPIs. It highlights samples that violate quality limits and rules. Available SPC charts include X-bar and range or Sigma, X-individual and moving range, moving average and range or Sigma, attribute charts including P, U, Np, C and defects per million opportunities (DPMO).



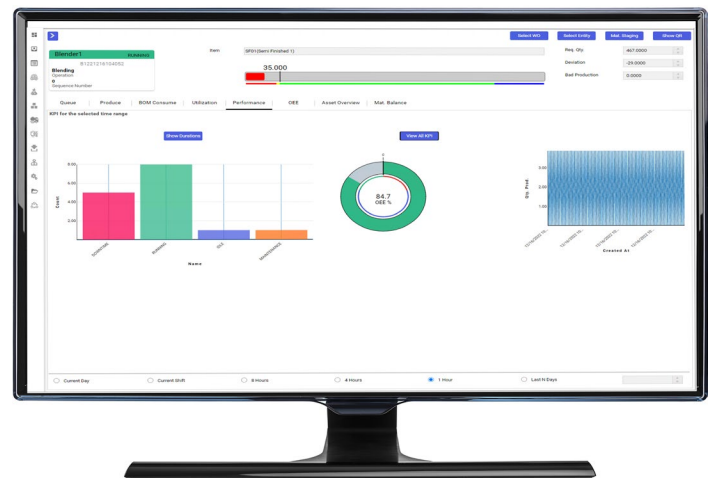
Performance management

Reduce waste and losses, and increase your operational efficiency by monitoring, analyzing and continuously improving your overall equipment effectiveness (OEE) and plant capacity utilization.

AVEVA Manufacturing Execution System performs plant performance management by tracking the progress of work-order execution along with production losses and the reasons for those losses. It dynamically adjusts performance targets based on work-order start quantities and product-specific target production rates. It uses information at the work-order level to accurately calculate OEE KPIs, indicate schedule adherence in real time and validate line performance across multiple pieces of equipment. The real-time tracking of work-order and production execution can categorize unplanned downtime separately from planned downtime, such as product changeover, cleaning or scheduled equipment maintenance.

By integrating with plant control systems, the software captures and displays real-time production data, downtime reasons, and the impact of short stoppage events. This frees line operators from manual data-collection. Operators and supervisors can also manually report downtime events and reconcile data.

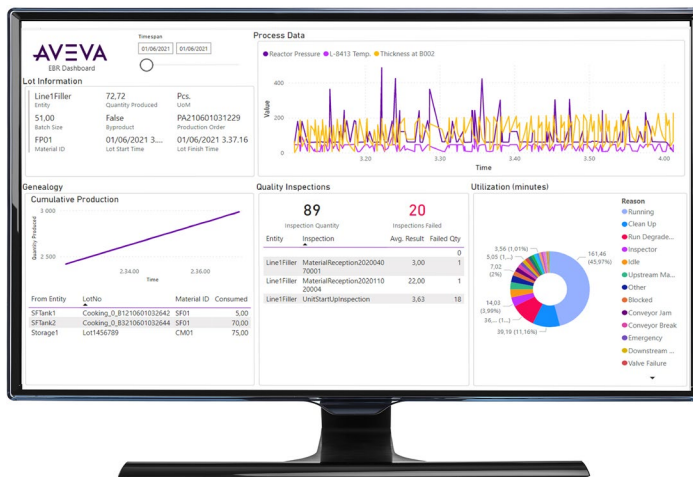
AVEVA Manufacturing Execution System provides a detailed data source you can use to continuously improve operating efficiency and equipment utilization. Dashboards report production performance (e.g., actual versus planned), line OEE and individual unit/equipment OEE, and allow you to drill down into production and utilization events to support root-cause analysis.





Data management, reporting and analysis

AVEVA Manufacturing Execution System makes reporting and data exploration easy by computing a data store and contextualized information model. The model lets you conduct drill-down analyses into short- and long-term operational data along with self-service analysis and responsive reporting. The data store is a Microsoft SQL Server database that makes it very easy and effortless to use virtually all commercial BI and reporting tools as well as services for advanced analyses and machine learning.



The software timestamps all data-collection records, which lets you cross-correlate any process values and event information, whether it's collected within the MES or outside of it (e.g., within a process historian such as AVEVA™ PI System™ or AVEVA™ Historian). You can automate the operational, quality and traceability data exchange with enterprise systems or data lakes to facilitate larger supply chain performance and traceability programs, such as farm-to-fork traceability.

Out-of-the-box dashboards and a set of reports with drill down capabilities provide an interactive view of production and quality results and plant performance measures. Production and performance reporting formats include production results and a number of KPIs delivered with AVEVA Manufacturing Execution System, such as line production, equipment production, utilization by equipment, utilization analysis, overall equipment effectiveness (OEE) analysis, mean time between failure (MTBF), and mean time to repair (MTTR).

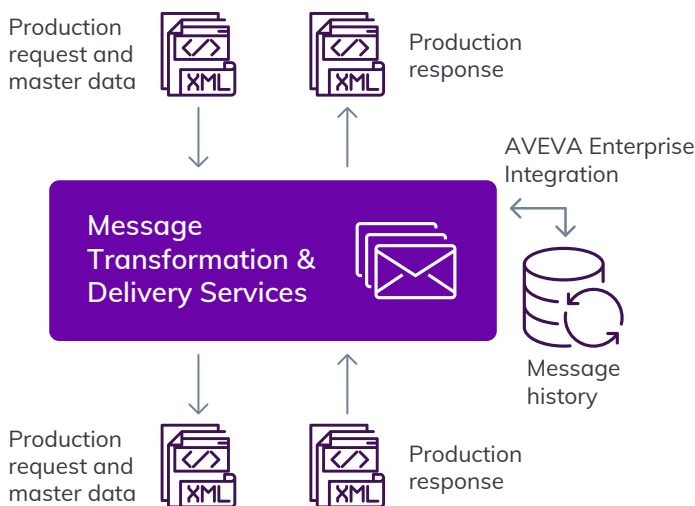
Quality reporting formats include quality characteristic detail reports – which filter sample data on multiple characteristics – and summary reports, which provide details on equipment, product, work order and operation category. AVEVA Manufacturing Execution System reporting comes as preconfigured and ready-to-use Microsoft SQL Server Reporting Services report templates that can adapt to address specific customer reporting requirements.

Enterprise Integration

Integration with enterprise resource and supply chain planning updates business systems with work in process (WIP) and inventory status information in real time. Such visibility into plant operations facilitates agile and responsive supply chain management.

As a complement to AVEVA Manufacturing Execution System, another offering, AVEVA™ Enterprise Integration, automates the exchange of data about production planning and production results between the manufacturing execution system and business applications (e.g. ERP, supply chain management) and with other plant applications (e.g. LIMS, quality, WMS, etc.). It can also automatically synchronize master data updates (in R&D, PLM, etc.) with the manufacturing execution system.

ERP, QMS, SCM, Operational Planning



Standard integration interfaces include B2MML/ BatchML/XML, flat file, message queue, FTP, web API and database tables. The software comes with an extensibility option/toolkit to create reusable custom-message “plug-ins” for integration with legacy applications.

AVEVA Enterprise Integration ensures business continuity for plant operations. It can store and forward messages in the event a business application is unavailable or offline. It also provides administrative tools and utilities to manage situations where transactions fail and need to be reconciled and re-transmitted to a business application.

For workflows that span across people and systems of multiple functional domains in the enterprise, AVEVA Manufacturing Execution System includes workflow activities and interfaces to connect to external applications and data sources – e.g., Microsoft Azure logic apps, web APIs and message queues, SQL queries and file activities.

Plant Integration

To manage execution and data collection activities on automated manufacturing processes and instrumentation, AVEVA Manufacturing Execution System provides native integration with AVEVA™ System Platform. AVEVA System Platform provides an infrastructure that agnostically connects and integrates plant equipment and control systems. Manufacturing execution data collection and validation capabilities transform control system data streams into consistent electronic records for storage in AVEVA Manufacturing Execution System.

The integration is provided as a set of MES templates. You can re-use and enhance these MES templates to create libraries of control-system-neutral equipment templates that can be re-used for all similar equipment types and production processes across any automation landscape.

Multi-site MES standardization

AVEVA offers companies that have distributed multi-site operations support and methods to standardize their technologies and processes. With standardization, a company can share manufacturing practices and make practices and reporting consistent across the organization. That consistency accelerates plant efficiency improvements and helps close the collaboration gap between plant and supply chain operations.

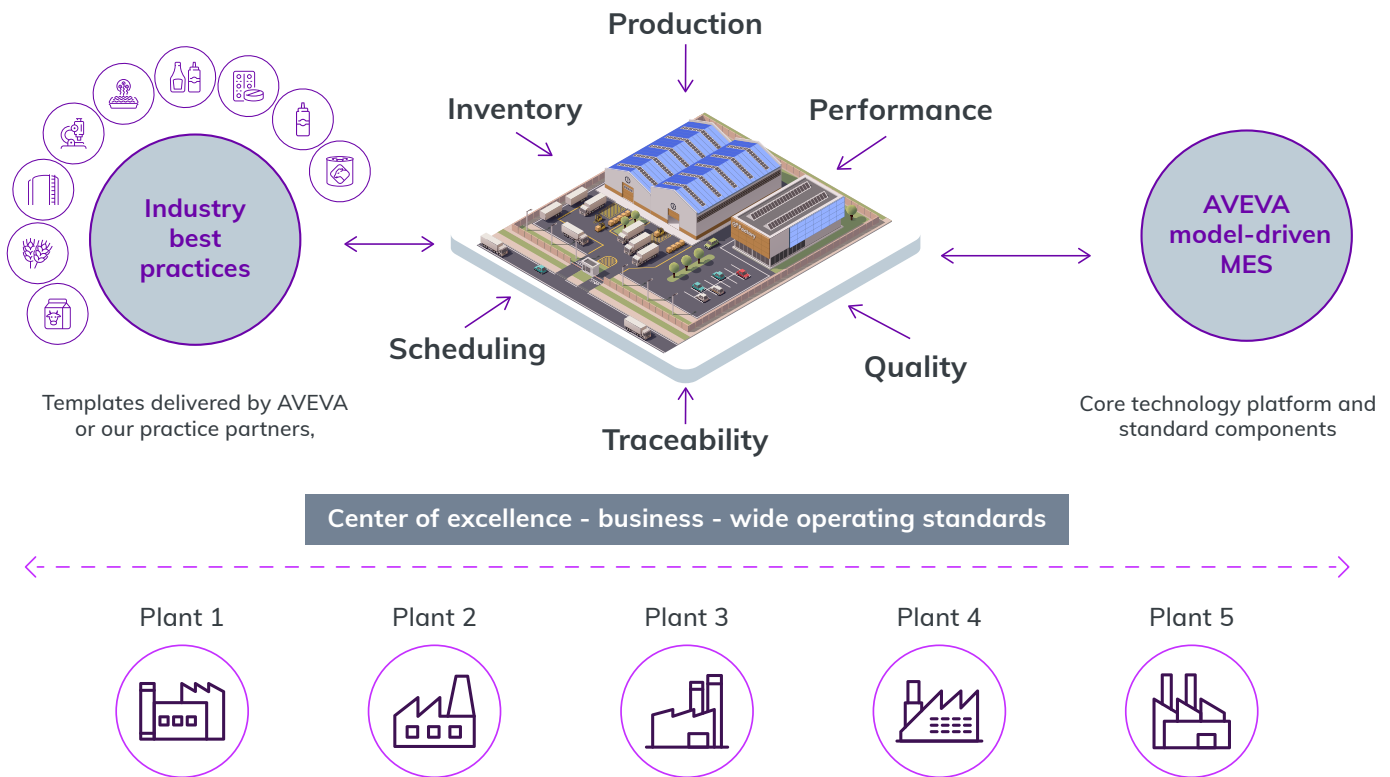
AVEVA's "model-driven" standardization methodology uses configuration environments and reusable templates to digitally capture best practices and create libraries of reusable, corporate standards that can roll out across individual plants. Companies can use these libraries to create consistent reports, reliably compare KPIs and comply with standards.

Useful standardization in multi-site operations abstracts from the variation in individual physical setups and procedures at different plants.

AVEVA Manufacturing Execution System abstracts workflows and data collection procedures from the underlying MES solution architecture so it can adapt to local variations in physical processes and automation systems while still maintaining the corporate standards for lean and continuous improvement practices, KPIs, and production reporting across the enterprise.

AVEVA provides MES standard activity models and user interfaces for commonly required manufacturing execution system functions. Customers can use these to derive and create their own libraries of MES templates that they can deploy to a plant as needed.

AVEVA Manufacturing Execution System and its model-driven approach help standardize best practices that can adapt to physical variations and differences in automation at local plants. This approach works both for multiple, local plant MES deployments as well as for a single, centrally hosted (single instance, "enterprise MES") multi-site MES solution. For single, centrally deployed manufacturing execution systems, a small set of software components connects with automation systems at the edge of the plants, where it automatically collects data and sends it to the central MES application.



Technical specifications:

Operating systems

Server: Windows Server Operating System

Database technology

Microsoft SQL Server, Standard or Enterprise Edition

Browsers

- Microsoft Edge
- Google Chrome
- Mozilla Firefox
- Apple Safari on macOS devices (Runtime only)

Language support

AVEVA Manufacturing Execution System includes support for the following languages:

- English
- French
- German
- Japanese
- Russian
- Simplified Chinese
- Spanish

Additional translations can be added

For more information on AVEVA Manufacturing Execution System software please visit:

aveva.com/mes