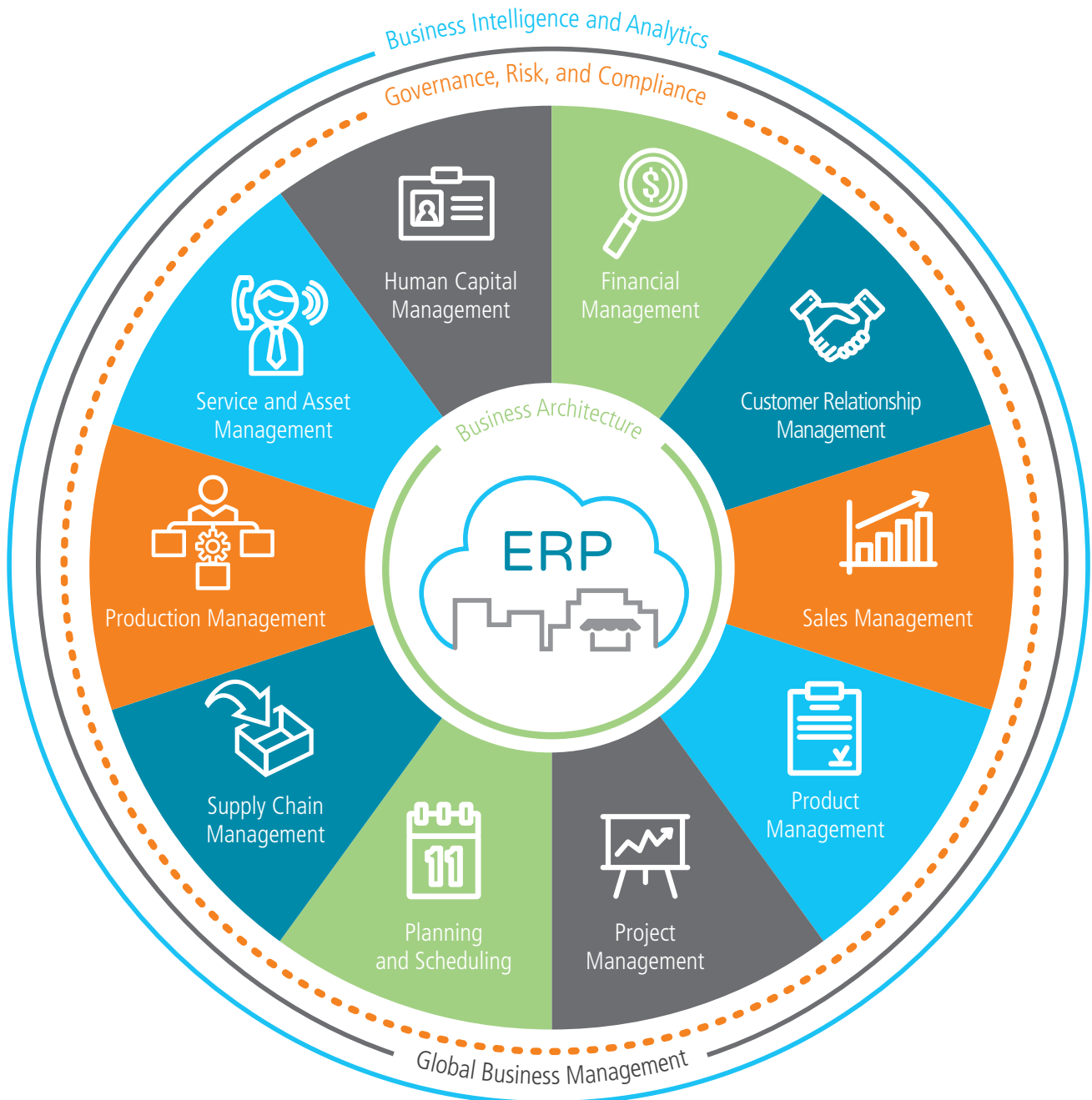




Epicor® Enterprise  
Resource Planning

# Production Management

# Epicor ERP Diagram





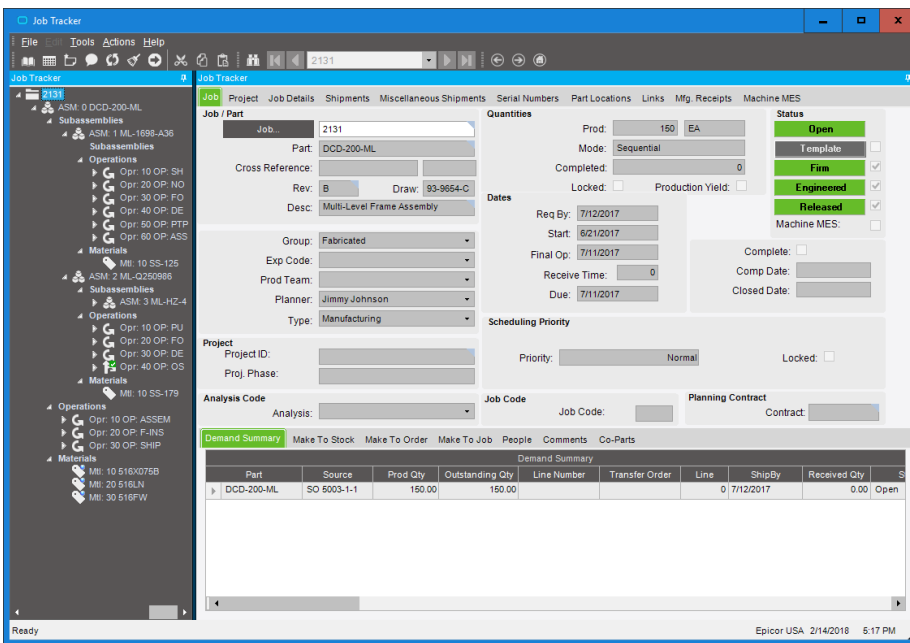


# Production Management



- ▶ Job Management
- ▶ Advanced Production
- ▶ Kanban Lean Production
- ▶ Manufacturing Execution System
- ▶ Advanced MES (Epicor Mattec®)
- ▶ Quality Assurance
- ▶ Enhanced Quality Assurance
- ▶ Advanced Quality Management

Whether you manufacture complex solutions or simple products, you need strong production control in order to build a competitive advantage. As the global marketplace continues to shrink profit margins and customers become more demanding, businesses are looking for agile solutions that can provide the infrastructure they need to respond quickly and efficiently. Epicor offers a comprehensive solution for make-to-order, mixed-mode, make-to-stock, engineer-to-order, and configure-to-order manufacturers; including light assembly features for distribution businesses. Modular in design, the production control suite of modules include Job Management, Advanced Production, Lean Manufacturing, Manufacturing Execution System (MES), Advanced MES, Quality Assurance, Enhanced Quality Assurance, and Advanced Quality Management.



**Figure 7** Job Management—Provides detailed information to the plant floor about every aspect of a job.

## Job Management

The Job Management module, in the Operations Core Package, is a comprehensive production control solution designed specifically for the planning, routing, scheduling, costing, and tracking of goods—including assembled, manufactured, and semi-finished products. It includes innovative tools for better planning and costing with historical run analysis that compares estimates to actuals on a run-by-run basis. Job Management functionality includes:

### Planning Workbench

Access all job related actions in a single view—the creation of new jobs, changing job requirements to match changing demand, and allocating and reallocating jobs to satisfy changing customer demand. The planning workbench allows seamless access to the scheduling board for more detailed job management.

### Job Manager

Quickly review the relationship between production jobs and demand. Make changes to the production plan to accommodate new and changing demand.

## Production Planners Workbench

The Production Planners Workbench is a dashboard that provides an overview of the material shortages of the selected jobs. Although this information is already available in each job, this overview gives the job planner a tool to quickly gather information for multiple jobs at once.

### Job Costing

Compare actuals to estimates online, review job costing for materials, material burden, subcontracting, operations (labor/burden), and compare projected and actual billings for profitability analysis. Job costing can be performed on a job-by-job, customer, part product group, or overall company basis.

### Order-to-Job Linking

Handle one job or one delivery, one job or multiple deliveries, blanket production runs, and internal work orders to build parts to finished goods inventory.

### New/Change Order Notifications

Verify that orders or changes don't fall through the cracks for viewing and selecting new orders and change orders from job entry. Optionally track all job changes via user ID, date and description.

## Drag-and-Drop Interface

Simplify the planning process. Use a tree interface to easily drag-and-drop components, operations or direct materials from another quote, BOM, or previously run job.

## Planned Overproduction of Assemblies

Produce and auto-receive overproduction quantities to inventory.

## Yield Scrap

Everyone has it. Yield Scrap. This functionality offers the ability for scrap reporting at an operation to affect the estimated production quantity of subsequent operations if the scrap exceeds a predetermined scrap allowance. Some users may just want a warning others may want automated predefined actions.

## Assemblies

Produce routings, costing, and tracking of single or multiple-level parts.

## Scheduling

Schedule jobs based on forward, backward, what-if, finite, and infinite capacity.

## Backflush

Backflush labor and/or materials for a single assembly, branch, or an entire job.

## Job Tracker

Review a specific job, and check the status of all assemblies, operations and materials, including subcontract status.

## Productivity

Track and analyze efficiency and utilization figures by employee, operation, work center, and department.

## Quality Control

Extensively track and analyze scrap, rework, and added operations.

## Material Shortage Indicator

Query material availability at the time of job entry to determine whether jobs can be

started within the scheduled time period.  
(See figure 7)

## Advanced Production

Advanced Production deploys batching technology that enables users to group multiple parts or operations together for key production processes. The result of this batching process is a single reporting entity or job for simplified scheduling, tracking, and reporting of labor and materials on the plant floor. This functionality is available in the job planning and resource scheduling functions within Epicor, with both planned and “on-the-fly” grouping flexibility to end users. Additionally, users can select to plan operations sequentially—one operation after another or concurrently—to be complete at the same time for nested operations. Advanced Production functionality includes:

### Support For Co-Product Production

Offers simplified production of co- or dependent products in the same production run.

### Support for Nested Product Production

Offers simplified production of nested or products of the same material or process in the same production run.

## Part and Operation Batching

Easily link multiple operations from the same part or different parts to be run either sequentially or concurrently.

## Visibility of Production Batching

Single source production enables full visibility and tracking of source operations and parts.

## Accurate Cost Control

Material and production costs can be applied accurately to multiple jobs as production is complete. Simplified labor entry allows plant floor employees to enter quantities for multiple parts in a single step.

## Simplified Plant Floor Interface

Single reporting entity enables multiple part quantities to be entered in a single plant floor interface while accurate labor and burden cost is accurately applied to each batched part and operation.

## Concurrent or Subsequent Flexibility

The user can select to either link parts and operations subsequently—to be run one after another or concurrently—at the same time.

## Single or Multiple Operations

The user can select either a single operation for linking or to link an entire job.

## Kanban Lean Production

With increased global competition and the demands of an online supply chain, customers more than ever before are demanding greater product flexibility, smaller and more frequent deliveries, and higher product quality—all at the lowest price. A component of the Job Management module, in the Operations Core Package, Lean Production provides you with the specific functionality your organization needs to meet these challenges and optimize your plant floor

operations, including the adoption of Lean Manufacturing Kanban functionality to pull rather than push products through the manufacturing process. Lean Production functionality includes:

## Manufacturing Without Work Orders (Kanban Flow)

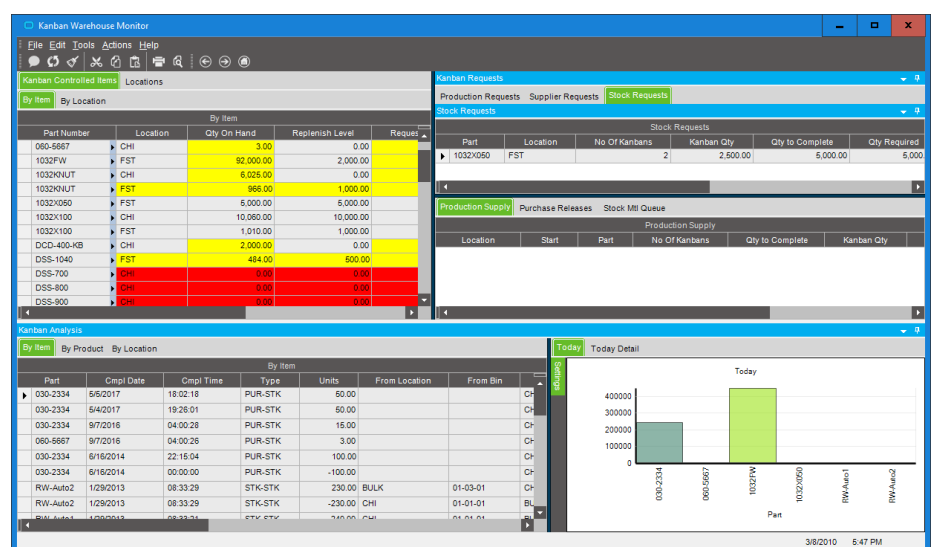
Epicor embedded Kanban functionality (i.e., a signal to manufacture or move product) offers the functionality required to manage several types of systems for Kanban control. As inventory levels or order demand require additional product, Kanbans, such as manufacturing real-time Kanbans, manufacturing flow Kanbans, purchase real-time Kanbans, and stock replenishment Kanbans, are automatically requested. The Kanban manages the stocking and order demand for parts flagged as needing Kanban control. User-defined rules enable parts to be flagged for Kanban control at the part, warehouse, or individual bin or cell location level.

## Cell-based Inventory

Manage, plan, and replenish materials within a cell.

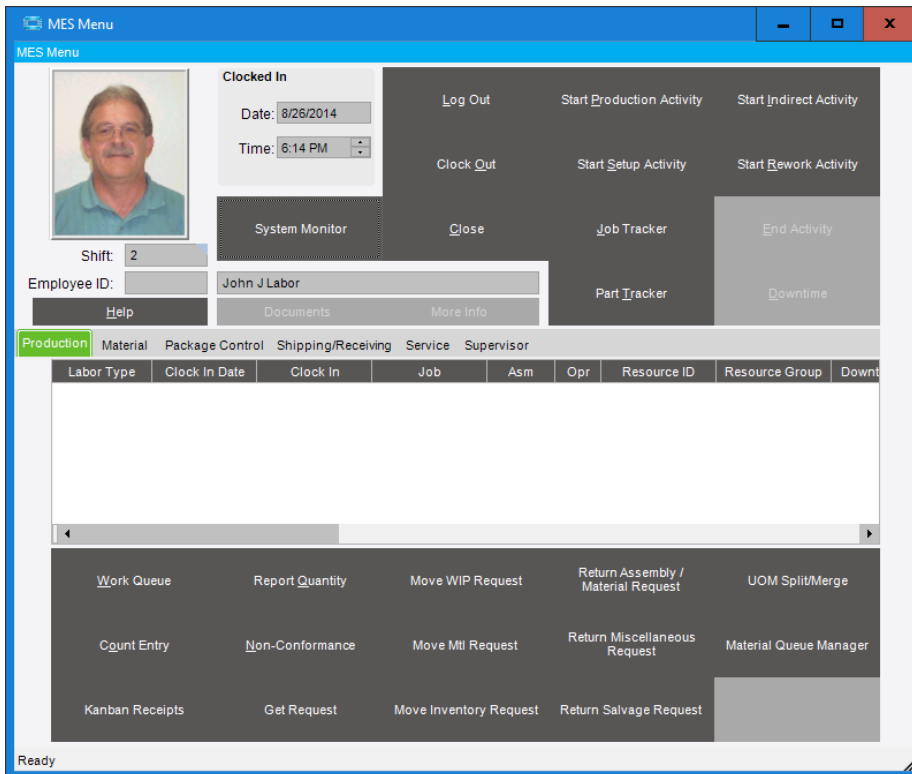
## Real-time Manufacturing Kanban

Eliminate work orders and reduce on-hand inventories as parts are electronically



**Figure 7.1** Kanban Lean Production—Manage electronic queues for Kanban control with the Kanban Monitor. Optionally display on the plant floor information about current Kanban records in a dashboard format.





**Figure 7.2** Manufacturing Execution System—Automatically collect and report the status of Jobs on the plant floor in real time.

triggered for replenishment as needed with real-time manufacturing Kanbans. Instead of planning for each order that is processed, parts are pulled through production as inventory or cell stocking levels fall below minimums. The cell is visually queued to produce based on the Kanban quantity for the part at its warehouse, bin or cell location.

### Manufacturing Flow Kanban

View future demand to dynamically calculate future replenishment Kanbans with the manufacturing flow Kanban. This gives downstream cells and suppliers visibility of future demand (although the actual Kanban events may differ during execution). As Kanbans are acted on, the downstream demand requirement is dynamically updated. All cells and suppliers have up-to-date visibility of future demand.

### Real-time Stock Replenishment Kanban

Move inventory as it is needed in a particular manufacturing cell, shipping area or customer consignment location with the

real-time stock replenishment Kanban using automatic triggering of stocked inventory.

### Real-time Purchase Kanban

Use the real-time purchase Kanban to replenish directly from the supplier and notify purchasing that a stock replenishment is required. Automatically send an e-mail to the supplier requesting additional inventory against an open purchase contract. Inventory can be received to the main stores, or directly to the production floor. Real-time purchase Kanban automates the replenishment of material from vendors and provides for visibility of current supply requests.

### Automated Material Flow

Authorize supplying cells to make a predefined quantity of an item being “pulled” by using operations.

### Measurement of Production Activity Against Lean Performance Metrics

Use the Production Activity function to capture production data automatically

through manufacturing center transactions. The data you capture through this process can then be analyzed as needed against any lean performance metrics you define.

### Lean Metrics

Indicate lean metrics by period, day, week, resource group, even free form parameters such as seasonal. Use the Production Activity tracker to dynamically evaluate the production activity for each resource group against the lean performance metrics you have established for your manufacturing processes.

### Support for Hybrid Approaches to Lean

Employ a phased approach to implementing lean practices for tracking material, MRP and Kanban in a mixed environment. By offering manufacturers the choice, at the part location level, how the part will be managed, manufacturers can more easily migrate to lean, while synchronizing MRP and Kanban execution.

(See figure 7.1)

## Manufacturing Execution System

MES is an easy-to-use, online system for the plant floor that allows plant-based transactions real-time visibility throughout the Epicor solution. Epicor MES enables accurate labor reporting, as well as online transaction tracking, which provides management with a real-time picture of what is occurring on the plant floor by employee and job. Integration with Epicor Job Management, Scheduling, Quality Assurance, and Advanced Material Management eliminates dual entry and provides online, real-time views of the latest plant floor scheduling priorities. In addition, an integration with the Epicor Document Attach Tool allows plant floor access to needed documentation, such as product drawings, process documents, and multimedia videos. Complete module functionality includes:

### Flexible Data Entry Technology

Use touchscreen, mouse, bar code, or keyboard interface to update labor information from the plant floor. Eliminate data entry mistakes and increase transaction speed by simply scanning a bar code tag to complete a transaction.

### Work Queue

Provide employees with prioritized work schedules and make information directly available to the plant floor. MES is optimized for use on the plant floor with the ability to select multiple operations for work at the same time, full sheet views, views specific to current, available, or expected work, ability to target work based on TAKT, pieces, hours, and setup group designations, and advanced search capabilities.

### Multiple Languages

Display the Manufacturing Execution System screens in the employee's primary language.

### Distributed Hours

Automatically split labor hours across multiple jobs being worked on simultaneously by an employee. Likewise, split resource or machine hours when two or more employees work on the same resource.

### Quality Reporting

Capture rework and scrap reason codes, along with miscellaneous employee comments from the plant floor. Use the Quality Assurance options to report setup inspection, first article, piece counts, and more.

### Shop Warnings

Shop warnings appear in various locations throughout the system when certain conditions exist or certain events occur. They are intended to keep supervisors informed of a job's status or an employee's performance.

### Grace Periods/Multiple Shifts

Manage clock-in and clock-out periods with adjustments made for user-defined grace periods. Accommodate split and staggered shifts.

### Trackers in the Plant

Users can access online trackers on the plant floor from within MES. Job Tracker, Order Tracker, Customer Tracker, Shipment Tracker, and more are available based on login and secure access. Shop Tracker shows who's here, who's not here, current work center activity, as well as user-defined alert conditions from the plant floor

### Shipping and Receiving

In combination with the Advanced Material Management module, maximize responsiveness in the warehouse with Shipping and Receiving functions from within MES.

### Inventory Management

In combination with the Advanced Material Management module, maximize responsiveness in the warehouse with Inventory functions such as adjustment, material issues, physical inventory counts from within MES.

### Material Handling

In combination with the Advanced Material Management module, maximize responsiveness of material handlers with material move queues and give operators the ability to request in-process WIP moves of product from one location to another, maximizing control of in process products while reducing delays. Additionally, move WIP products into inventory storage locations or stage WIP at the next resource based on available space and time. Quickly and accurately identify WIP and inventory containers with system generated bar codes. *(See figure 7.2)*

### Advanced MES (Epicor Mattec®)

Advanced MES (Epicor Mattec® Manufacturing System) extends your Epicor system to provide automatic production monitoring and process monitoring, empowering manufacturers with production

data and the ability to eliminate inaccurate and time-consuming manual data collection; so operators can stop measuring and monitoring, and focus on making quality products.

You can achieve informed lights out manufacturing, and get the powerful metrics you need to improve performance—Overall Equipment Effectiveness (OEE), run rates, scrap, yield, energy consumption, material consumption, and much more. Accurate machine-related data, along with operator depth and dimension helps you pinpoint critical issues, reduce waste, and improve quality and customer service. Advanced MES functionality includes:

### Deploy Your Way

Epicor makes it easy to get there—Advanced MES runs on current Microsoft Windows Server® with SQL Server. Epicor Advanced MES has the industry know how to connect to or get a signal from any kind of machine, no matter how timeworn or modern, and the system uses machine interface units (MIUs), open connectivity protocol (OPC), programmable logic control (PLC), and personal computer (PC) interfaces.

### Usability

Advanced MES collects production data automatically—no more manual data collection to worry about. Operators use touch-screen technology to add depth and dimension to the automatic production data, so you get a clear picture of the what, why and when of downtime, cycle time, quality, and scrap. Operator help calls with automatic routing and notifications empower employees to respond quickly, improving productivity.

### Plant Notification

The system also has real-time automated alerts, notifications, escalation and other communications, so the people who need to know are in the know when it matters the most—immediately, so they can take

action to correct a problem, or improve performance on-the-spot. Automated alerts include machine conditions, cycle, process variations, efficiency, and scrap.

### Office, Mobile, and Global

Take the power of Advanced MES with you on a Web-enabled mobile device or tablet with browser-based dashboards, information, and analysis. Plus, it doesn't matter if you have a single operation, or a distributed network of plants internationally, the system is currently available in more than 10 languages, and suitable for language customization.

### Schedule Optimization

Advanced MES helps the plant change instantly based on new requirements with a click-and-drag production schedule. Or, you can watch the schedule update and adjust automatically based on actual machine speeds, production counts, equipment status, conditions, or job specifications. The system makes it easy to plan by showing resource availability based on machine/ part/ tool compatibility, and optimal plans based on prior part performance. What-if analysis combines with built-in machine capacity planning and labor and material forecasting for better planning. Advanced MES supports Kanban scheduling.

### Advanced MES Integration to Epicor ERP

Enhanced integration improves the efficiency and ease-of-use for Advanced MES with Epicor ERP software. Key integration points include:

- ▶ The Epicor ERP user interface includes the Pieces per Cycle operation standards used in Mattec MES.
- ▶ Epicor ERP offers support for machine parameters that can be used by production planners to keep track of machine parameters in both Epicor ERP and Advanced MES. This offers a single point of engineering definition that resides in Epicor ERP.

Some examples include:

- Injection pressures
  - Opening/closing speeds
  - Barrel/mold temperatures
  - Multiple locations/zones
- ▶ Users can clear the Advanced MES schedule from Epicor ERP.
  - ▶ Support for Advanced MES Resource Groups in the process sheet simplifies part engineering for users.
  - ▶ To better control information going to Advanced MES, users can limit the number of operations exported to Advanced MES.

*Note: For information on Mattec Analytics, refer to the "Business Intelligence and Analytics" section.*

### Quality Assurance

Extending your solution with the Quality Assurance module ensures that you gain complete visibility into your quality operations from a top-down view down to the individual item level, allowing you to tie together all quality functions, whether it's scrapping end parts, rejecting raw materials or tracking first article inspections. Accurate costing demands that products moved through quality accurately reflect their value and are removed from the appropriate work in progress.

Additionally, Quality Assurance includes processes for supplier returns with links to Accounts Payable for automated debit processing—closing the loop on traceability of products in and out of quality within the plant. Inspectors have queues of items to inspect with full disposition and corrective action follow-up, while plant floor employees can easily flag parts as nonconformant. Quality Assurance functionality includes:

### Social Quality

Collaboration among the right resources to improve quality often means redundant communication and events. Using social quality groups enables quality events to be resolved faster, and long term quality

improves as a result of this collaboration. Quality no longer needs to be an isolated department. In collaboration with engineering, production, and sourcing, quality naturally improves. Cost of quality is also reduced dramatically.

### Mobile Quality

Access to information at the point of checking and recording quality events reduces inaccuracies and improves efficiency of quality professionals. Whether they are recording inspection results or responding with root cause analysis to a corrective action, information about quality that is inclusive and tied throughout the business improves overall business quality.

### Inspection Workbench

Monitor WIP, review all inspections in priority and automatically take action on those requirements from the inspection workbench. Inspectors move passed parts back to jobs and failed parts into discrepant material report (DMR) processing, or they simply scrap them.

### Nonconformant Records

Create a nonconformant record (NCR) for all nonconformant parts. From a job, shop floor employees automatically create an NCR when they scrap an end part or raw material. Inventory personnel create an NCR when they scrap parts from inventory.

### Non-Netting Bins

Use non-nettable bins to keep parts undergoing inspection or on-hand quantities.

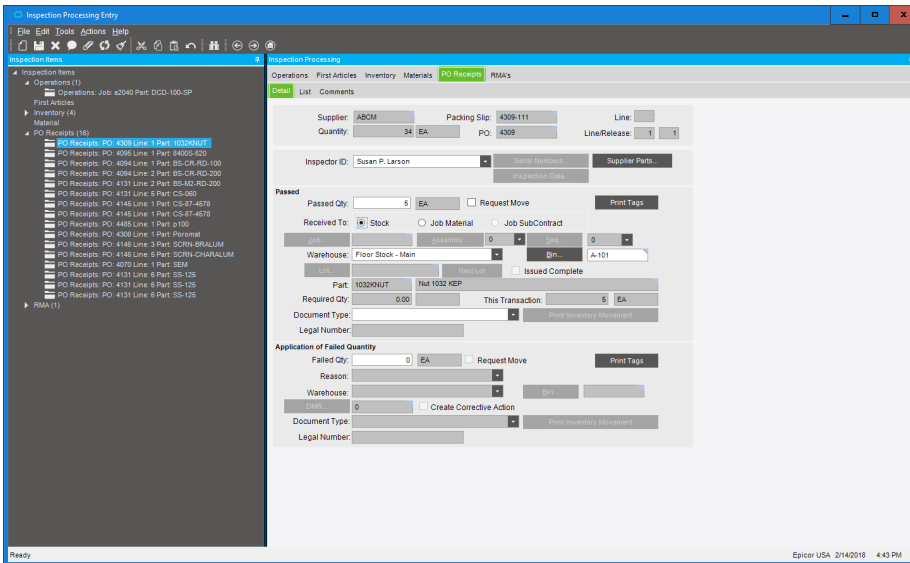
### Discrepant Material Report Processing

After failing inspection, create a DMR to provide the MRB with an online queue of parts that need to be dispositioned.

### Corrective Action

Create and track all preventive and corrective actions online. With due dates, audit sign-offs and unlimited comments, corrective actions provide for follow-up of quality issues.





**Figure 7.3** Quality Assurance—Record and track quality data to fulfill customer requirements and promote continuous improvement.

## Material Review Board

Disposition parts by an MRB after they fail inspection. Online documentation provides an audit trail of MRB actions.

## Cost of Quality

Generate cost of quality reports to identify how much quality problems are costing you, whether parts are scrapped from inventory, a job or receipt inspection.

## Packing Slips

Print a customizable packing slip for all parts returned.

## Debit Memos

Create a debit memo in DMR processing and it is automatically tied to accounts payable.

## Audit Trails

View inventory transaction detail occurring in inspection and DMR processing with the material transaction detail report.

## Certificates of Compliance

Businesses are increasingly requiring detailed compliance documentation. Depending upon the industry, this documentation is commonly referred to as Certificates of Analysis (COA), Certificates of Quality

(COQ), or Certificates of Compliance. To help manage this documentation, Epicor includes the ability to check for Certificates of Compliance at receiving of materials from suppliers, receiving of in process parts from outside operation suppliers, and before shipping products to customers.

(See figure 7.3)

## Enhanced Quality Assurance

Traceability and audit of quality data drives businesses to develop “systems,” many times paper based, to support the collection and use of quality testing data. Enhanced Quality Assurance is designed to extend base Quality Assurance with support for the management of controlled test plans and the results for products, groups of products, processes, and other testing.

It offers the ability to define testing elements or attributes as well as lists of attributes to test which can be used to measure against testing results for pass/fail decision criteria. It includes the data used for Statistical Process Control (SPC) and is easily accessed to build SPC analysis. In essence, Enhanced Quality Assurance gathers the data and makes it available to ensure that your next audit goes smoothly.

## Inspection Plan

Build inspection plans that utilize specification lists and inspection attributes. Define unique business inspection attributes or characteristics. Attributes can be numeric, character, date, check box, combo box, or comments. Sets of attributes define test plan inputs with additional criteria including minimum and maximum values expected as well as combo box choices and document attachments. For optimum control, each specification list is revision controlled. Inspection plans use embedded configuration capabilities to build input screens tailored to each unique test plan and lay out fields and data to match quality department expectations. Default documents can be tied to the inspection plan. For optimum control, each test plan is revision controlled.

## Flexible Inspection Plan Configuration

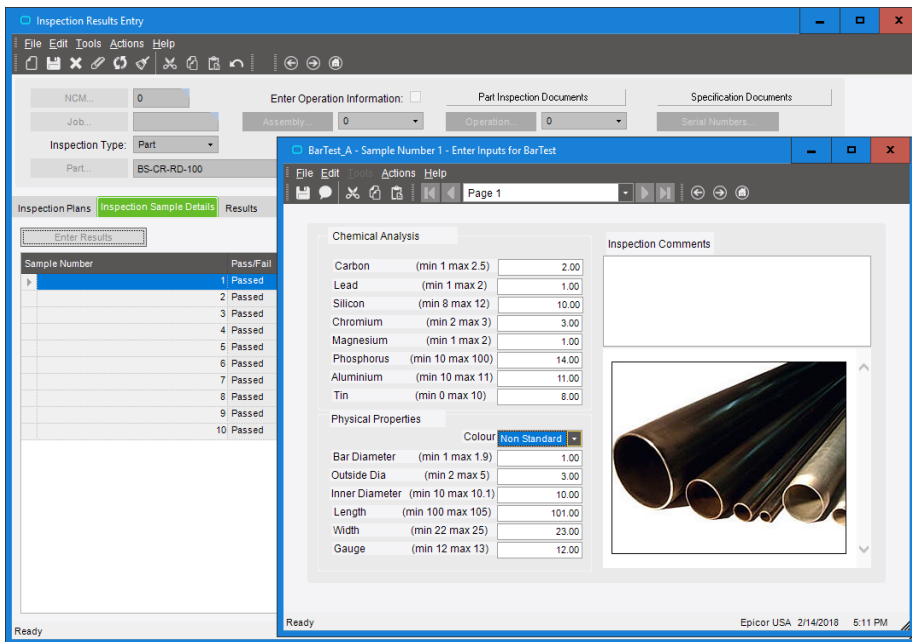
In addition to the dynamic nature of the inspection plan (i.e. results entry form is dynamically built based on the tied specifications list), multiple inspection plan/specification lists sets can be tied to a part, operation, or equipment. This flexibility supports requirements for standardized test plans to sit alongside product or product group specific test plans with results entry and collection of data for both during inspection.

## Flexible Results Collection

Collect and store results data for each sample alongside appropriate job, part, inspection plan, serial number, lot number, purchase order data, and more. Results data can be used to produce compliance documentation and is available for audit purposes on-line through the Inspection Results Tracker.

## Support for Inspection Types

Make first article inspections and store results for audit and analysis. Tie inspection plan/specification combinations to an operation to trigger results entry for the operation during



**Figure 7.4** Enhanced Quality Assurance—Track inspection results data online.

collection of data on the plant floor. Perform receiving inspections on parts subcontracted to a specific supplier. Track results and generate supplier performance metrics with data from sample results.

### Skip Lot Cycle Definitions

Optionally categorize and setup cycles for receiving inspection with skip lot logic that follows optimum frequency of inspections for suppliers. Whether inspecting all lots or inspecting one and skipping the next ten lots, skip lot ensures that quality control manages the frequency of inspection.

### Resource Calibration Test Plans

Used in conjunction with Epicor Maintenance Management, Enhanced Quality Assurance offers the ability to predefine inspection plans for resource (gauge) calibrations along with managing the last calibration date.

### Training Course Management

Manage employee training events for both onsite and offsite training, including management of training costs. Assign instructors and set schedules for courses. Employees can be assigned appropriate

courses to attend or can request training themselves. Review employee training with the Training Course Tracker for proof of certification to perform work.

### Real-Time Quality Analysis

Whether responding to a bad test result immediately with Business Process Management (alerting a quality manager about a critical result), performing trends analysis or responding to an auditor request with data pulled from a Business Activity Query or reviewing supplier performance utilizing analysis cubes and dashboards. All the data you need is available with a robust tool set to support your unique business requirements.

Complete functionality includes:

- ▶ Statistical Process Control (SPC) data
- ▶ Returned Material Authorization (RMA) inspection
- ▶ Manufacturing execution systems enabled
- ▶ Serial and lot traceability
- ▶ Inspection collect results location
- ▶ Inspection Data Tracker

(See figure 7.4)

## Advanced Quality Management

Epicor Advanced Quality Management (AQM) provides the foundation for significant productivity improvements and cost reductions across your entire enterprise. It unifies the tools for quality processes, thus streamlining compliance for ISO 9001, ISO 13485, AS 9100, IATF 16949, and more. At its core, AQM serves as the hub for everything related to quality management. AQM yields actionable insight into performance, cost of quality and risk-related metrics including real-time visibility on supplier quality, production and customer satisfaction. AQM is an enterprise quality management solution that acts as your intelligence gateway into global performance, delivering objectively and truthfully, the who, what, where, when and why of all things quality. Reporting and analytics are built into the AQM solution. On-the-fly data visualization and deep analysis of multiple measures, across different processes for all levels of the enterprise is included. The complete web-based solution includes these modules:

- ▶ Product Management
- ▶ Nonconformance
- ▶ Corrective Action
- ▶ Customer Management
- ▶ Supplier Quality
- ▶ Document Control
- ▶ Audit Management
- ▶ Risk Management
- ▶ Calibration
- ▶ Maintenance
- ▶ Inspection/SPC
- ▶ Quality Planning
- ▶ Training
- ▶ Supplier Portal

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