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Some manufacturing scenarios require tracking of serial numbers or batch numbers for a material item, or both. The term batch number is used because Dynamics AX employs the term *lot number* as a system-assigned internal identifier for inventory transactions. A serial number or batch number is typically assigned upon receipt, such as the receipt of a purchase order or the finished quantity of a production order. Subsequent transactions identifying these numbers automatically create tracking history. Several additional capabilities apply to batch tracking for an item, including vendor batch information, batch attributes, and batch disposition codes to indicate restricted usage. The following sections of the chapter reflect these topics:

1. Serial Tracking
2. Batch Tracking
3. Vendor Batch Information
4. Batch Attributes
5. Batch Disposition Codes and Restricted Usage

Many of these topics also involve quality management considerations, such as product testing and quality orders. For example, the test results associated with a quality order can apply to a serial number or batch number. Many of the quality management considerations apply to items with and without tracking requirements. Chapter 18 provides further explanation of quality management.
9.1 Serial Tracking

Serial number tracking traditionally refers to a unique serial number for each unit of inventory. AX also supports a single serial number for multiple units of an item (conceptually similar to lot tracking), but this section focuses on serial numbers for individual units. The explanation starts with the assignment of a serial tracking policy to an item, and then covers the creation of serial numbers.

Serial Tracking Policy  Serial tracking is designated by the Tracking Dimension Group assigned to an item, which must include the serial number. An additional policy—termed serial number control—ensures that individual units will be assigned a serial number. The Tracking Dimension Group has several other policies not typically used, such as sales pricing or coverage planning for specific serial numbers.

Serial Numbering Policies  Dynamics AX supports several different approaches for assigning a serial number to each unit of an item’s inventory. Three approaches are described below, and the third approach requires an additional set of policies (termed the serial number group) for a serialized item.

- Manual assignment of a serial number. You can manually assign a serial number to inventory receipt transactions with a quantity of one, so that receipts for a larger quantity must first be split into quantities of one. Manual assignment allows you to enter the existing serial number on received material.

- Automatic assignment using an ad hoc serial number mask. The existing serial numbers for received material often reflect a pattern. For example, the pattern might consist of the same 10 characters and three unique digits in a numerical sequence, where the three unique digits differentiate the serial numbers. In this scenario, you can use the “Create Serial Numbers” dialogue with AX to specify an ad hoc serial number mask that reflects the pattern. If the pattern has more than one variation, you can split the quantity and use different ad hoc masks.

You can use the “Create Serial Numbers” dialogue as part of registering arrivals for a purchase order, or you can access it beforehand. The dialogue can also be accessed when reporting the finished quantity on production orders, or at any time after order creation. In some cases, the
serial numbers for the finished item must be assigned beforehand in order to track testing results against serial numbers.

- **Automatic assignment using the item's serial number mask.** A mask can help enforce internal guidelines about assignment of serial numbers to an item, where you place your internal serial number on the received material. It represents one policy within the serial number group assigned to the item. The mask may simply reflect a prefix and counter, or include the date, order number, and/or system-assigned lot ID. A second policy determines when to assign the serial number; it is typically assigned when recording inventory transactions.

The set of policies associated with a serial number group can be defined (aka activated) for one or more types of transactions. The types include purchase orders, production orders, kanban orders, sales order returns, and inventory journals, and you indicate the applicable types as part the batch number group’s policies.

**Information about a Serial Number** Information about each serial number for an item consists of descriptive text and a manufacturing date. This information can be viewed and maintained on the Serial Numbers form.

**Serial Tracking History** The history is automatically maintained based on receipt and issue transactions. Using the Serial Numbers form, you can view historical information about a selected item or serial number, such as forward or backward tracking information using a multilevel indented format. Each entry in the indented format indicates a receipt or issue. An entry can also reflect a transfer. A transfer may also reflect the assignment of a different serial number to an existing serial number via the Transfer Journal.

**Serial Tracking on Intercompany Orders** When using intercompany orders in a multi-company operation, the serial numbers assigned to the shipped material (on the intercompany sales order) can automatically apply to the received material (on the intercompany purchase order).

**Printing Serial Numbers on Documents** The serial numbers can be printed on sales and purchase documents based on the form setup policies. For example, the serial numbers can be printed on the sales order packing slip and invoice.
A manufacturing company required RMA processing on customer returns of their serialized electronic items. Each serialized number had a 12 month warranty period (from date of sale) for free replacement. The customer identified an item’s serial number when requesting an RMA, which was used to verify the applicability of its warranty period. The customer shipped the returned item after receiving an electronic copy of the printed RMA. Items were shipped to a repair facility, which verified the serial number and sent a free replacement (when it was within warranty) or charged for the replacement (when it was not within warranty). The repair facility assigned a disposition to each returned item during an inspection process, which determined whether the item was usable, scrapped, or repairable. A scrapped item could also be stripped down for reusing the high value components.

### 9.2 Batch Tracking

Batch tracking provides the foundation for handling batch-related information such as batch attributes and batch disposition codes. Batch tracking involves two sets of policies for an item. The first set of policies indicates that an item requires batch tracking, and the second set of policies indicates how and when the internal batch numbers are assigned. Batch numbers frequently have significance, which requires careful consideration of batch number creation and assignment.

Several additional aspects of batch tracking—such as shelf life information—do not generally apply to discrete manufacturing scenarios, and are not covered within this book.

**Batch Tracking Policies** Batch tracking is defined by the Tracking Dimension Group assigned to an item, which must include the batch number. The batch number dimension has several policies that enforce batch tracking for issues and receipts, and optionally support unique requirements such as batch-specific costing and pricing.

**Batch Numbering Policies** A second set of policies (termed the batch number group) determines how batch numbers are created and when they are
assigned to inventory transactions for received material. A batch number can be created manually or automatically, with two basic timing variations for automatic assignment to received material. An additional consideration includes the quantity associated with an automatically assigned batch number.

- **Manual versus automatic creation.** Automatic creation allows specification of a batch number mask, such as a prefix and counter. The mask can also include the date, order number, and/or system-assigned lot ID. Other approaches to a batch number mask may need to be customized to meet requirements for a meaningful batch number.

  Manual creation means that you define an item’s batch number prior to using it on an inventory transaction, and the batch numbering mask does not apply. For example, an item’s batch number may be created during transaction entry and then assigned to a receipt.

- **Automatically assigning different batch numbers to multiple receipts for an order.** An item’s batch numbers can be automatically created upon receipt of an order, such as a purchase order line or a production/batch order. When reporting multiple partial receipts against the same order, or splitting a receipt quantity, a batch numbering policy determines whether to assign the same batch number or a different batch number to each partial receipt.¹

  As an example, the order quantity for a production order may represent several production runs, and you would report the finished quantity for each production run so that a different batch number will be assigned. Alternatively, you could report the entire order quantity as finished, and use the split function to identify the different quantities representing different batch numbers. However, some scenarios may want the same batch number when reporting multiple finished quantities.

- **Fixed increments associated with an automatically assigned batch number.** Some scenarios require a unique batch number for fixed increments of a receipt quantity, such as assigning unique batch numbers for every 100 units received when receiving a quantity of 1000. This requirement may reflect the item’s packaging characteristics, production characteristics or a quality management consideration. You can optionally specify this “per quantity” increment as a batch numbering policy.

¹The same batch number will be assigned to partial receipts when the numbering policy is simply “assignment on inventory transaction.” Different batch numbers will be assigned by specifying the additional policy “assignment upon physical update.”
Applicability of the Batch Number Group policies. The set of policies associated with a batch number group can be applied (aka activated) to one or more types of transactions. The types include purchase orders, production orders, sales order returns, and inventory journals, and you indicate the applicable types as part the batch number group’s policies.

Another approach can be used regardless of the policies, where you manually assign a batch number to a purchase order line or a batch production order, and the batch number will apply to all transactions for the line item.

Information about each internal batch number can include descriptive text, a vendor batch number and related information (for purchased material), shelf life dates, batch attributes, and a batch disposition code. Subsequent sections explain these aspects of batch-related information.

Viewing the Internal Batch Numbers The key form for batch information—termed the Batch Details form or Batch form for short—provides a list of all internal batch numbers and the related items. It also displays the batch-related information such as shelf life dates and batch attributes.

Combining or Changing Batch Numbers of On-Hand Inventory You can change or combine the batch number for an inventory quantity by using the Transfer Journal, much like you would change or combine inventory in a bin location. You transfer the inventory quantity from one batch number to another (when combining batches), or to a newly created batch number (when changing batch numbers). As part of reporting a Transfer Journal, you can chose to copy the batch attributes to the to-batch. You can also change a batch number (such as correcting an error in the identifier) by using the rename capability.

Batch Tracking on Intercompany Orders When using intercompany orders in a multi-company operation, the batch numbers assigned to the shipped material (on the intercompany sales order) can automatically apply to the received material (on the intercompany purchase order).

Printing Batch Numbers on Documents The batch numbers can be printed on sales and purchase documents based on the form setup policies. For example, the batch numbers can be printed on the sales order packing slip and invoice.
Historical Information about Batch Number Tracking  The batch-trace history is automatically maintained based on receipt and issue transactions. Using the Batch form, you can view historical information about a specified item or batch number, and the on-line inquiry avoids the need for extensive printed reports. In a manufacturing environment, you can view forward or backward trace information using a multilevel indented format that reflects the product structure. Each entry in the indented format indicates a receipt or issue. For example, the batch number for a sales order shipment can be traced backward through the production orders to purchase order receipts. A receipt can also be traced forward.

Batch Tracking and Serial Tracking for an Item  Some scenarios require batch and serial tracking for an item. The two tracking numbers represent separate constructs, and a hierarchical relationship does not exist between a batch number and serial numbers for an item.

9.3  Vendor Batch Information

The vendor batch information normally applies to a purchased item, but it can also be used for other items. The information includes a vendor batch number, a field for the vendor-specified manufacturing date, and two fields for capturing country of origin information. The information is typically assigned at the time of receipt, but you can also update the information on the Batch Details form (by accessing the Reset Vendor Batch Details form).

9.4  Batch Attributes

One or more batch attributes can be assigned to a batch-controlled item, and actual values recorded against an item’s batches. The use of batch attributes requires some setup information.

Setup Information for Batch Attributes  The setup information consists of the following steps.

- Define batch attributes. The identifier and description of a batch attribute are user-definable, and the attribute can be designated as an integer, fraction, date, string, or enumerated list (which requires definition of
possible values in the list). When designated as an integer or fraction, the batch attribute must also be assigned values for a minimum, maximum, and increment as well as a tolerance policy. The tolerance policy has two options—provide warning or prevent entry—concerning the actual values for the batch attribute.

- Define a group of batch attributes. This approach provides a shortcut for assigning multiple batch attributes to an item, and represents an optional step. The identifier and description of a batch attribute group are user-definable, and one or more batch attributes can be assigned to the group. When an assigned attribute consists of an integer or fraction, the values for the minimum, maximum, increment, and tolerance policy are inherited but can be overridden. For example, the attribute’s minimum and maximum values can be overridden each time it is assigned to an attribute group.

- Assign batch attributes to an item. One or more batch attributes or groups can be assigned to a batch-controlled item using the Batch Attributes by Item form. Those attributes consisting of an integer or fraction will inherit values (such as the minimum and maximum) from the definition of the batch attribute, and these can be overridden to indicate item-specific values.

An additional setup step is needed when using the test results from quality orders to update a batch attribute value, since the test must be mapped to the batch attribute. Section 18.4 provides further explanation of quality orders and their test results.

Recording Actual Values for Batch Attributes The actual value for an item’s batch attribute can be recorded after creation of a batch, and subsequently viewed for the batch. When the batch attribute reflects an integer or fraction, the system provides a warning or prevents entry (based on the tolerance policy) when the actual value exceeds the minimum or maximum.

Additional Capabilities Regarding Batch Attributes Several capabilities related to batch attributes do not typically apply to discrete manufacturing scenarios. For example, you can search for an appropriate batch based on actual values of the item’s batch attributes. This is termed a batch attribute search. In addition, a customer may have specific requirements for the values of batch attributes, so that a batch attribute search can be based on the customer requirements.
9.5 Batch Disposition Codes and Restricted Usage

Disposition codes represent an optional approach for managing the inventory of batch-controlled material, since the policies associated with a disposition code can enforce restricted usage. This section describes the setup information for disposition codes, the assignment (and reassignment) of a disposition code to an item’s batch, and the impact on planning calculations. Those scenarios that do not require enforcement of restricted usage can define and use a single disposition code that reflects available material without restricted usage.

Setup Information for Disposition Codes   The user-defined disposition codes must be set up on the Disposition Master form. One disposition code should reflect available material, where the disposition status is designated as available. The number of additional codes will depend on the desired variations in restricted usage, where the disposition status is designated as unavailable. The typical requirements for two additional disposition codes include (1) quarantined material treated as non-nettable and with all usage restrictions, and (2) quality hold material treated as nettable and with some usage restrictions.

The following policies can be assigned to a disposition code with an unavailable disposition status, where the policies indicate aspects of restricted usage:

- **Nettable.** This policy determines whether inventory will be considered available by planning calculations.
- **Restricted usage for sales orders.** You can designate one or more of the following policies on restricted usage:
  - Block reservations. This policy prevents reservation of the batch inventory.
  - Block picking. This policy prevents picking of the batch inventory.
  - Block shipping. This policy prevents shipment (aka packing slip update) of the batch inventory.

---

2 Batch disposition codes represent a different construct than the disposition codes for handling return orders from customers, which are described in Section 12.8.
Restricted usage for transfers. You can designate one or more of the following policies on restricted usage. However, you should not block transfers if you intend to return a purchased batch to the vendor, or move the batch to a different location.

- Block reservations. This policy prevents reservation of the batch inventory.
- Block picking. This policy prevents picking of the batch inventory.
- Block shipping. This policy prevents shipment (aka packing slip update) of the batch inventory.

Restricted usage for production orders. You can designate one or more of the following policies on restricted usage:

- Block reservations. This policy prevents reservation of the batch inventory.
- Block picking. This policy prevents picking of the batch inventory.

Assignment of a Disposition Code to an Item’s Batch Number

The initial value of the disposition code is automatically assigned to a batch number based on two different approaches, as described below.

- Default value specified for the item, as defined in the Item Model Group assigned to the item.
- Default value related to the use of quality orders (if applicable). This approach builds on the use of test groups and quality orders described in Chapter 17. When defining a test group, the default value for a disposition code can be defined for an open quality order, and for the outcome of a failed or passed quality order.

Once an internal batch number has been created, you can manually override the disposition code (by accessing the Reset Disposition Code form). A history of changes to a batch’s disposition code is automatically maintained by the system, and viewable on the History of Disposition Inventory form.

Impact on Master Scheduling and Capable-to-Promise Logic

Master scheduling and capable-to-promise logic will ignore non-nettable inventory, as identified by the disposition code assigned to a batch. The physical non-nettable quantity of an item’s inventory can still be viewed on the On Hand form.
Additional Case Studies

Case 53: Vendor Batch Numbers  A manufacturer used several purchased components that were batch-controlled items. At the time of product receipt, the warehouse workers recorded an internal batch number and the vendor’s batch number. A bar-coded label with the internal batch number was affixed to the product receipt, and subsequent transactions referred to the internal batch number.

Case 54: Country of Origin for Purchased Material  A manufacturer used several purchased components that were batch-controlled items. They recorded the country of origin as part of the vendor batch details for each batch of these purchased items. Most cases involved a single country of origin, although a few required two different countries. This information was used to support government reporting requirements about country of origin.

Executive Summary

Some manufacturing scenarios require tracking of serial numbers or batch numbers for a material item, or both. Each batch may also require batch-related information, such as batch attributes or batch disposition codes to indicate restricted usage. This chapter summarized how to setup and use serial numbers and batch numbers for an item, and included several case studies about system usage.
Quality Management

The concerns of quality management typically extend across every aspect of supply chain management. This broad viewpoint ranges from the definition of item and product structure information through sourcing purchased material, actual production, sales shipments, and returns. These topics have been covered throughout the book. A narrower viewpoint focuses on several aspects of unique functionality for quality management.

The narrower viewpoint includes the definition and enforcement of materials management policies, such as receiving inspection and product testing. Additional aspects include nonconformance reports, the coordination of quality resources to perform inspection and testing, and MSDS documents for hazardous materials. These topics are reflected in the following sections within the chapter.

1. Broad Viewpoint of Quality Management
2. Receiving Inspection and Quarantine Orders
3. Quality Inspection and Inventory Blocking
4. Product Testing and Quality Orders
5. Quality Problems and Nonconformance Reports
7. Coordination of Quality-Related Activities
8. Hazardous Materials and MSDS Documents
9. Sales Order Limitations on Restricted Products
10. Stop Replenishment or Sales of an Item
11. Regulatory Reporting Requirements for Different Countries

18.1 Broad Viewpoint of Quality Management

A wide range of quality management considerations are addressed by out-of-the-box capabilities within Dynamics AX. These capabilities have been
covered throughout the book, as summarized below along with the relevant section number in parentheses.

**Item and BOM Definition**  Item and BOM information provide a logical starting point for quality concerns. Some of the major concerns include the following:

- Item identification (Sections 3.1 and 3.3), including the optional use of variant codes as a part of the item identifier (Section 3.14)
- Specify and enforce authorized units of measure for an item (Section 3.6)
- Specify and enforce approved vendors for a purchased item or subcontracted service (Sections 13.3 and 16.3)
- Approval of authorized BOM versions for an item, including the use of electronic signatures for approval (Section 4.3)
- Approval of authorized routing versions for an item, including the use of electronic signatures for approval (Section 6.5)
- Identify quality factors in production, such as planned component scrap for a BOM line and operation scrap percentages in the routing (Sections 4.4 and 6.8)
- Identify planned changes reflecting continuous improvements in production, such as planned changes to BOM and routing information (Sections 4.6 and 6.12)
- Identify the needed documentation for an item, BOM, routing operation, and other key constructs (Section 3.5)
- Define the BOM and routing for a specific configuration of a configurable item (Section 7.1)

**Serial and Batch Tracking**  Many manufacturing companies require serial or batch tracking for purchased and manufactured items (Sections 9.1 and 9.2). Other considerations include batch attributes and batch disposition codes (Sections 9.4 and 9.5), certificates of analysis (Section 18.4) and integration with a laboratory information management system (Case 93).

**Purchasing and Production**  Several aspects of the business processes for procurement and production involve quality management concerns, as summarized below.

- Specify and enforce approved vendors for a purchased item or subcontracted service (Sections 13.3 and 16.3)
– Define and enforce work flow approvals, such as the approval for purchase orders (Section 13.9)
– Identify scrap or returns to vendor for receipts of purchased material (Section 13.10)
– Identify actual scrap or rework options for finished production quantities (Section 14.9)
– Perform receiving inspection and report disposition via quarantine orders (Section 18.2)
– Assign inventory blocking for quality purposes and the expected availability date (Section 18.3)
– Perform testing and report the test results within different business processes, such as during the receipt for a purchase order or during the production process (Section 18.4)
– Identify and track quality problems via nonconformance reports or cases (Sections 18.5 and 18.6)

Sales  The business processes associated with sales orders, shipments, and customer returns involve several quality management concerns, as described below.

– Employ configuration technologies during entry of a sales order or sales quote to define the valid BOM and routing for a specific configuration of a configurable item (Section 7.1)
– Enforce restrictions on sales order processing, such as preventing order entry for restricted products or for stopped items (Sections 18.9 and 18.10)
– Provide regulatory reports for sales to different countries (Section 18.11)
– Identify hazardous materials and their MSDS documents, and ensure compliance for sending MSDS documents to customers (Section 18.8)
– Specify RMA disposition codes and related policies for handling customer returns (Section 12.8)

Other quality considerations might include best practices in supply chain management, such as ensuring valid delivery date promises on sales orders (Section 11.6), or the correct assignment of purchase prices on purchase orders (Section 13.4).
18.2 Receiving Inspection and Quarantine Orders

An item’s quarantine management policy (embedded within the item model group assigned to the item) enforces 100% inspection for all received material. After purchase order receipt, for example, the system automatically creates a quarantine order for the received quantity. A quarantine order can also be manually created for existing inventory, or selectively created when recording item arrival. A quarantine order prevents material usage until the inspection process has ended. However, planning calculations view the quarantined material as immediately available.

Quarantine orders require the definition of a quarantine warehouse and the bin locations within this quarantine warehouse. A quarantine warehouse can then be associated with each normal warehouse that requires quarantine orders.

A quarantine order only applies to a single item and quantity, and consists of four statuses (created, started, report as finished, and ended). A manually created quarantine order has a created status, and the status can be changed to started. An automatically created quarantine order has a status of started. The optional report-as-finished status supports use of a separate put-away transaction. Each status is summarized below.

- **Created.** A manually created quarantine order represents a directive to move material from the originating warehouse/bin to a quarantine warehouse/bin. The system does not prevent usage, and the quarantine order can be deleted.

- **Started.** The material has been placed in the quarantine warehouse/bin, and cannot be used until the inspection process has been completed. The inspection process can report material as scrapped (via the scrap function), or as having inspection completed. You can split the order quantity in order to report a subset as scrapped or completed. The scrap function immediately reduces inventory and no further action is required. If material must be returned (such as a return to vendor), you can change the status to report as finished (or ended) and subsequently report the returned material.

- **Report as Finished.** This is an optional status to support a separate put-away transaction. By reporting inspection as finished, the system creates a separate arrival journal so you can specify the put-away location before
posting the journal. The user specifies the name of the desired arrival journal, such as the arrival journal for a purchase order.

- **Ended.** The material can be used. The material is placed in the specified site, warehouse, and bin.

Creation of a quarantine order will generate two inventory transactions: a scheduled issue for the normal warehouse (with a status of on order) and a scheduled receipt at the quarantine warehouse (with a status of ordered). Starting a quarantine order will deduct inventory from the normal warehouse and receive inventory at the quarantine warehouse. Reporting a scrapped quantity (with an immediate reduction in inventory), or reporting a good quantity and ending a quarantine order, will reduce the inventory in the quarantine warehouse.

The Quarantine Order form displays a list of existing quarantine orders, and provides the starting point for manually creating a quarantine order, reporting inspection results and status changes. It also serves as a coordination tool for inspection activities.

Since an item’s quarantine management policy represents a requirement for 100% inspection of receipts, it should not be used for items with intermittent or as-required inspection. In these cases, you can selectively indicate the creation of a quarantine order when recording item arrival.

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**Quarantine Orders for Customer Returns**

A customer return can be selectively placed on a quarantine order when recording arrival related to a Return Material Authorization (RMA). An RMA disposition code is initially assigned when recording the arrival, and you can reassign the disposition code on the quarantine order. The disposition code indicates what action should be done with the returned item, such as returning it to stock, scrapping it, or sending it back to the customer. The quarantine order must be split in order to assign different disposition codes to subsets of the returned quantity. Ending the quarantine order will implement the action for the disposition code, such as scrapping the returned material. The logic associated with these RMA disposition codes only applies to quarantine orders for returned items. A disposition code entered for other types of quarantine orders does not have any effect, and is not recognized in the standard RMA reports about disposition codes.
18.3 **Quality Inspection and Inventory Blocking**

Quality inspection of an item’s inventory typically requires blocking of inventory transactions until inspection has been completed. This is termed inventory blocking for short. This section introduces manual assignment of inventory blocking, and the next section covers automatic assignment of inventory blocking in the context of a quality order. The manual assignment of inventory blocking represents a minimalist approach to a quality inspection.

With manual assignment of inventory blocking, you use the Inventory Blocking form to initially identify the blocking and to subsequently remove the blocking. The required information includes the item number, the inventory quantity, and the relevant inventory dimensions such as the site/warehouse/bin and batch number. You also indicate whether you expect the inventory to be usable or scrapped after the inspection process (via an Expected Receipts checkbox), and an expected receipt date when you expect the inventory to be usable. In terms of the item’s net requirements, the blocked inventory is treated as a negative quantity, and expected usable inventory is treated as a positive quantity on the expected receipt date. Planning calculations account for the expected receipt date of usable inventory.

The manual blocking must be removed in order to report further inventory transactions, such as an inventory adjustment to scrap the inventory.

The Inventory Blocking form displays existing inventory that has blocking. It also displays the source of the blocking, such as **manual** for manual assignment of inventory blocking. The source can also be a **quality order**, as described in the next section.

18.4 **Product Testing and Quality Orders**

Product testing entails the use of quality orders to report test results against a group of predefined tests. The explanation of product testing can be segmented into three areas: the definition of tests and test groups, the use of quality orders for reporting test results, and the rules for automatic generation of quality orders. Quality orders have been previously mentioned in the context of typical business processes for purchase orders (Section 13.1) and production orders (Section 14.2), and they can also be employed in other business processes.
Tests and Test Groups  There are two types of predefined tests—quantitative and qualitative—and one or more tests can be assigned to a group of tests.

- Quantitative Tests. Each quantitative test must be assigned a testing unit of measure, so that acceptable values can be assigned when it is included in a test group. A pressure test, for example, might use pounds per square (PSI) as the unit of measure. The units of measure must be predefined along with the desired decimal precision.
- Qualitative Tests. A qualitative test will have an associated test variable (and its enumerated outcomes) when you assign it to a test group. A taste test, for example, may have one test variable for sweetness (with possible outcomes of sweet, sour and okay) and another test variable for color (with possible outcomes of dark, light and okay). You designate whether an outcome represents a pass or failure of the test.

For both types of tests, you can optionally assign a test instrument and applicable documents that describe the test.

Tests are assigned to a group of tests (termed a test group), where the test group has a unique identifier.

- Test Groups. For each test group, you assign a sampling plan, an acceptable quality level (AQL), and an indication of whether the tests will require destructive testing of the sample. Destructive testing will result in an inventory reduction of the sample quantity.
- Sampling Plan. A sampling plan is used to calculate the sample quantity for a quality order, and it can be expressed as an absolute quantity or as a percentage. For example, a sampling plan of 10% for a purchase order receipt quantity of 500 would result in a sample quantity of 50. The sampling plan can optionally require a different sample for each received batch when receiving multiple batches.

When a quality order has been generated, it also results in inventory blocking for the sample quantity until the testing results have been validated. As described in the previous section, the Inventory Blocking form displays the blocking with a source of quality order, and the validation step removes the blocking. You can optionally specify a policy within the sampling plan so that inventory blocking applies to the entire order quantity rather than just the sample quantity.
- **Acceptable Quality Level (AQL)**: An acceptable quality level refers to the percentage of tests which must be passed. An AQL of 90%, for example, means that 9 out of 10 tests must be passed.

- **Tests Within a Test Group**: When assigning a test to a test group, you define the acceptable measurement values for a quantitative test, or the test variable for a qualitative test. Each test can be assigned a sequence number, validity dates, and documents. You can designate which test results should be included in a certificate of analysis report associated with a quality order. An individual test can have its own AQL, referring to the percentage of the sample quantity which must be passed, since test results can be reported for subsets of the sample quantity.

The test group assigned to a quality order provides the initial basis for which tests need to be performed. Tests can be added, deleted, or changed on the quality order.

**Use of a Quality Order**: A quality order defines the tests that need to be performed for an item and a sample quantity of its inventory. It is typically related to a specific order, such as a purchase order, production order or sales order. In addition to communicating the need to perform tests, it provides a mechanism for reporting results against the tests. You can manually create a quality order, or establish quality guidelines within each business process (such as a purchase order receiving process) for automatically creating a quality order. The next subsection explains automatic generation of quality orders.

After reporting the test results for every test within a quality order, you initiate a validation process that assigns a pass or fail status (based on meeting the overall AQL) and closes the quality order. When you try perform the next step in the business process, an infolog warns you when the quality order has failed or has not yet been closed. In addition, you can optionally reopen the quality order and force the validation process to assign a pass status by accepting any error conditions.

You can view information about a quality order (and its test results) from multiple viewpoints. For example, the quality order can be viewed for the related batch number or from the related sales order, purchase order, production order or quarantine order.

You can optionally generate a certificate of analysis that displays the test results for a quality order. A certificate of analysis, for example, could be printed for a batch of material being shipped to a customer. The printed test results will only be displayed for designated tests within the quality order.
You can optionally create a nonconformance report when a quality order identifies defective material. The nonconformance report provides the basis for further investigation, as described in a subsequent section about nonconformance reports.

**Automatic Generation of Quality Orders** You can define rules (termed *quality association records*) for automatic generation of a quality order for incoming or outgoing material. Each rule defines the set of tests, the acceptable quality level (AQL), and the sampling plan that apply to the automatically generated quality orders. Each rule also defines the event and conditions for automatically generating a quality order within a business process for the item. The business process can be related to purchase orders, quarantine orders, sales orders, or production orders, but not transfer orders. These business processes for a quality order are shown in Figure 18.1 and described below.

<table>
<thead>
<tr>
<th>Business Process</th>
<th>Label of the event that triggers a quality order</th>
<th>The actual event that triggers a quality order</th>
<th>Conditions</th>
<th>Destructive Test Allowed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase order</td>
<td>After registration</td>
<td>Post the registration</td>
<td>Site, Item</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Before receipts list</td>
<td>Initial attempt to post receipts list</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>After receipts list</td>
<td>Post the receipts list</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Before product receipt</td>
<td>Initial attempt to post product receipt</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>After product receipt</td>
<td>Post the product receipt</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Quarantine order</td>
<td>Before as finished</td>
<td>Initial attempt to report as finished</td>
<td>Site, Item</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>After report as finished</td>
<td>Report the order as finished</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Before end</td>
<td>Initial attempt to report as ended</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>After end</td>
<td>Report the order as ended</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Sales order</td>
<td>Before picking</td>
<td>Initial attempt to post picking list</td>
<td>Item</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>After picking</td>
<td>Post the picking list</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Before packing slip</td>
<td>Initial attempt to post packing slip</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>After packing slip</td>
<td>Post the packing slip</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Production or</td>
<td>After registration</td>
<td>Post the registration</td>
<td>Site, Item</td>
<td>No</td>
</tr>
<tr>
<td>Batch order,</td>
<td>Before report as finished</td>
<td>Initial attempt to report as finished</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>or Co-product</td>
<td>After report as finished</td>
<td>Update the report as finished</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Route operation</td>
<td>Before report as finished</td>
<td>Create batch/production order</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>After report as finished</td>
<td>Report the operation as finished</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Inventory</td>
<td>None</td>
<td>None</td>
<td></td>
<td>Yes</td>
</tr>
</tbody>
</table>

Figure 18.1 Rules for Automatic Generation of a Quality Order
The figure summarize the events and conditions for generating a quality order for various business processes (termed the reference type). An event is expressed in terms of the relevant document and execution timing, such as after reporting product receipt for a purchase order. These events reflect variations in AX functionality for modeling different business processes. The figure also identifies the actual event that triggers automatic generation of a quality order.

The conditions for generating a quality order can be site-specific or company-wide, and they can apply to a single item, a group of items (based on the quality group assigned to items), or all items. Other conditions depend on the business process, such as vendor-specific conditions for a purchase order or customer-specific conditions for a sales order. A quality order involving destructive tests can only be generated when inventory exists for the event, as shown in the right-hand column of Figure 18.1. The automatic generation of a quality order can be further described for each business process.

- **Purchase Order Process.** The generation of a quality order can occur after posting the registration of received material. It can also occur before or after the posting of a receipts list or product receipt for the received material. A quality order that requires destructive testing can only be generated after posting the registration or product receipt for the received material, because the material must be on-hand in order to automatically deduct it for destructive testing. The need for a quality order can reflect a particular site, item or vendor, or a combination of these conditions.

- **Quarantine Order Process.** The generation of a quality order can occur before or after reporting the quarantine order as finished or ended. A quality order that requires destructive tests cannot be generated for a quarantine order, because it is assumed that the quarantine order functionality will handle scrapping of the destroyed material. The need for a quality order can reflect a particular site, item, or vendor, or a combination of these conditions.

- **Sales Order Process.** The generation of a quality order can occur before or after the posting of a picking list or packing slip for the material being shipped. A quality order that requires destructive testing can be generated at any step. The need for a quality order can reflect a particular site, item, or customer, or a combination of these conditions.

- **Production Order Process.** The generation of a quality order can occur after posting the registration of a finished quantity for the parent item.
It can also occur before or after reporting the finished quantity. A quality order that requires destructive testing can only be generated after reporting a finished quantity. The need for a quality order can reflect a particular site or item, or a combination of these conditions.

- **Route Operation for a Production Order**  When a production order contains a routing operation, the quality order can be generated before or after reporting the operation as finished. The need for a quality order can reflect a particular site, item or quality group, or a combination of these conditions. The need for a quality order can also reflect a specific master operation or the route group assigned to operations.

- **Inventory**. A quality order cannot be automatically generated for a transaction within an inventory journal (such as a profit/loss or counting journal) or for transfer order transactions. A quality order must be manually generated for an item's inventory quantity, and the selected test group determines what tests will be performed.

A rule must be defined for each variation in a business process requiring automatic generation of a quality order. The validity dates for a quality association record enable you to model planned changes in the business process.

### Comparing Quality Orders and Quarantine Orders

Inspection requirements related to receipts and issues are often modeled with a quality order. There are several reasons. Automatic generation can reflect situation-specific conditions in various business processes, and a quality order indicates what should be inspected. A quality order provides a way to record test results and validate the results against the desired AQL. You can designate which test results are included in a certificate of analysis, and which test results should update batch attribute values.

Inspection requirements related to receipts can be modeled with a quarantine order. A quarantine order provides a way to report scrap, and it prevents usage until the quarantine order has been completed. An item’s quarantine policy represents a company-wide mandate to perform 100% inspection of received material. However, a quarantine order can be selectively created when reporting the arrival of an item without a mandated quarantine policy. In some cases, a quality order should be used in conjunction with a quarantine order so that the inspectors know what should be tested, and the material cannot be used until completion of the quarantine order.
The inspection results for a batch-controlled item can be used to assign a batch disposition code, regardless of whether quality orders and quarantine orders are actually used. The policies associated with the batch disposition code can restrict material usage, as described in Section 9.5.

18.5 Quality Problems and Nonconformance Reports

A nonconformance report (termed a nonconformance) describes an item that has a quality problem, where the descriptive information includes the source and type of problem. The problem source is termed a nonconformance type. You assign a problem source and an associated problem type when you create a nonconformance.

Types of Problem Sources for a Nonconformance Report

There are five types of problem sources (aka nonconformance types) that can be assigned to a nonconformance report, and each type can have optional source information.

- **Customer problem.** The source information about a customer problem can include the customer number, sales order number, or a lot number of a sales order transaction. For example, the nonconformance could relate to a specific sales order shipment or to customer feedback about product quality.
- **Service Request Problem.** The source information about a service request can include the customer number, sales order number, or lot number of a sales order transaction. For example, the nonconformance could relate to a specific sales order shipment or to a customer's complaint about item quality.
- **Vendor Problem.** The source information about a vendor problem can include the vendor number, purchase order number, or a lot number of a purchase order transaction. For example, the nonconformance could relate to a purchase order receipt or to a vendor's concern about a part that it supplies.
- **Production Problem.** The source information about a production problem can include the production order number or a lot number of a
specific transaction. For example, the nonconformance could relate to a specific batch order.

- **Internal Problem.** The source information about an internal problem can include the quality order number or a lot number of a quality order transaction. For example, the nonconformance could relate to the tests that are performed as part of a quality order or to an employee's concern about product quality.

**Problem Types**  
The user-definable problem types provide a classification of quality problems for each nonconformance type. For example, the problem types for service requests could reflect a classification of customer complaints, whereas the problem types for an internal nonconformance could represent a classification of defect codes. A problem type can be authorized for one or more nonconformance types (aka problem sources), as defined in the Nonconformance types form. For example, the problem type concerning a defect code could apply to all nonconformance types. You can change the nonconformance type assigned to a nonconformance, and this may require changing the problem type to a valid value for the new nonconformance type.

**Use of a Nonconformance Report**  
A nonconformance is initially created with an approval status of *new*, indicating that it represents a request for action. You can approve or refuse a nonconformance (which changes the approval status to *approved* or *refused*) to indicate that you will or will not take action on the nonconformance. You can also close a nonconformance (as indicated by a separate check box) to indicate that you are finished with it, or reopen a nonconformance to indicate that further consideration is required.

Comments can be entered for a nonconformance by using the document handling capabilities. It is generally helpful to define a unique document type about nonconformances (by using the Document Type form) so that you can enter notes for the unique document type. You can then use the Report Setup form to define your policy about printing notes for the unique document type on the nonconformance report and tag.

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1A user cannot approve a nonconformance unless the user has been assigned an employee identifier (via the User relations form). The system tracks the nonconformance history in terms of the employees who changed the status.
A printed conformance report and nonconformance tag can be used to assist material disposition.\(^2\) You can selectively generate reports and tags based on selection criteria, such as the nonconformance number, item, customer, vendor, or status that are associated with a nonconformance.

- **Nonconformance report.** The nonconformance report displays identification information, such as the nonconformance number, item, and problem type. The report displays the related notes based on your report setup policies.
- **Nonconformance tag.** The nonconformance tag displays identification information, such as the nonconformance number and item. The tag displays the related notes based on your report setup policies. The tag also displays the quarantine zone and type (such as restricted usage versus unusable) that you assigned to the nonconformance in order to guide disposition of the defective material.

**Options for Nonconformance Reports** There are several options for handling the business processes pertaining to a nonconformance report, such as corrective actions, the description of work, additional testing, and related nonconformance reports.

- **Corrective action for a nonconformance report.** You can optionally define one or more corrections for an approved nonconformance. A correction identifies what type of diagnostic should be performed, who should perform it, and a requested date and a planned date for completing the diagnostic. You predefine the user-defined diagnostic types, and assign one to a corrective action. Indicate that you have finished the diagnostic step by changing the status of a correction to end. The status can be reopened. Comments can be entered for a correction by using the document handling capabilities. It is generally helpful to define a unique document type about corrections (by using the Document type form) so that you can enter notes for the unique document type. Use the Report setup form to define your policy about printing notes for the unique document type on the correction report. A printed correction report

\(^2\)The printed nonconformance tag and report will display an assigned quarantine zone (along with information about unusable versus restricted usage) to guide handling of defective material. The zones may or may not correspond to inventory locations or resources. Use the Quarantine zones form to define zones that can be assigned to a nonconformance.
displays identification information about the nonconformance and the related nonconformance notes, as well as the correction information (such as the diagnostic) and related correction notes. The report displays the related correction notes based on your report setup policies.

- **Description of work for a nonconformance report.** You can optionally define one or more related operations for an approved nonconformance. A related operation describes the work that should be performed, expressed as a selected operation (from a predefined list of user-defined quality operations) and descriptive text about the reason for the work. After defining an operation, you can optionally define the miscellaneous charges, items, and time sheet labor hours that are required to perform the work. The calculated costs are shown for the related operation, and the total calculated costs are shown for the nonconformance. The calculated costs and the underlying detail (about items, labor hours, and miscellaneous charges) represent reference information, and they are only used within the quality management function.

- **Defining further tests about a nonconformance report.** You can optionally create a quality order from a nonconformance in order to identify the need for further tests. For example, a quality order may identify the need to test (or retest) the defective material. The newly created quality order displays the linkage to the originating nonconformance.

- **Defining related nonconformance reports.** You can optionally link one nonconformance to another, or create a new nonconformance from an existing one. For example, the linkage can reflect the interconnection between quality problems.

### 18.6 Using Cases for Quality Management Purposes

A quality issue can be identified by a case, and case management provides a multi-faceted approach to manage issues raised by customers, vendors or employees. Each case is uniquely identified by a Case ID. At its simplest, you manually create a case and a description, and then indicate progress (via the case status of opened, in-process, and closed or cancelled) and case resolution (of accept, reject or none). The optional facets of case management serve several different purposes and involve different types of setup information, as illustrated by the following.
Case Category. A user-defined hierarchy of case categories will reflect the types of issues in a given business situation, and you must assign a case category to each case. As a simple example, the top of one hierarchy may be labeled sales, and consist of several case categories related to sales issues and customer service issues. For each case category, you can optionally define additional information about the need for creating an activity (for a case that is assigned the case category), and the need for a follow-up activity after changing the case status to closed. An activity can be a task, action, event or appointment. You can also identify an associated case process or knowledge article, as described in the next points.

Case Process. A user-defined case process identifies the steps to follow when working on a case. A step can be required or optional. Each step can optionally have a specified activity, priority and responsibility. Linking a case process to a case category enables you to standardize your business processes for different types of issues.

Case Details about the Associated Customer, Item or Sales Order. One or more associations can be defined for a case. In the context of sales, for example, the association may reflect a customer, item or sales order, or even a lead, opportunity, prospect or project. The association may reflect a vendor, item, purchase order or invoice in the context of purchasing. An additional case detail involves the source of information, such as a specified customer, vendor or employee.

Knowledge Article. A knowledge article represents a file or document, or a link to additional information. It provides information for diagnosing or resolving an issue.

Service Level Agreement. A service level agreement can be assigned to a case. It indicates the guaranteed response time to an issue, and may also involve reporting time against a case.

Additional facets of case management have broader applications than just the identification of quality issues. For example, cases can be automatically created to identify audit violations based on audit policies. Audit policies consist of rules about purchase orders and vendor invoices (and expense reports), such as invoices to a certain vendor or exceeding a certain amount.
18.7 Coordination of Quality-Related Activities

Dynamics AX provides several coordination tools for quality management personnel, such as schedules, dispatch lists, and recommended actions.

- **Production Schedule for Quality-Related Operations.** The production schedule and job list identify routing operations to be performed by a resource that represents quality resources. The quality resource may include a labor pool of inspectors, a burn-in area, or other resource under quality management control. This may require time reporting (or unit completions by operation) to correctly reflect progress against the routing, availability for the next operation, auto-deduction of material, and actual costs.

- **Dispatch List of Quarantine Orders.** Each quarantine order identifies material placed into inspection or quarantine, but does not indicate what tests must be performed or a scheduled completion date. It may also identify a batch number and the related order (such as a purchase or production order).

- **Dispatch List of Quality Orders.** Each quality order identifies material that requires inspection, and the (remaining) tests that must be performed. It may also identify a batch number and the related order (such as a purchase or production order).

- **List of Inventory Blocking.** The inventory blocking may reflect a quality order or manual assignment.

- **List of Assigned Cases.** The cases assigned to an employee identify the issues raised by customers, vendors and others. The employee can review and take action for each assigned case.

- **List of Nonconformances.** Each nonconformance report (termed a nonconformance) describes an item that has a quality problem, where the descriptive information includes the source and type of problem.

- **List of Corrective Actions (for a Nonconformance).** Each correction identifies what type of diagnostic should be performed, who should perform it, and a requested date and a planned date for completing the diagnostic.
18.8 Hazardous Materials and MSDS Documents

A regulated item requires a Material Data Safety Sheet (MSDS) that can be sent to the customer. The MSDS document for a purchased item may also be received from a vendor. For a selected item, you can define the associated document by accessing the Product Data Safety Sheet form. This form consists of one or more line items uniquely identified by a system-assigned document number. When you add a line item, you define the related information for the item’s MSDS document (such as the effective date, expiry date, version number, and an active flag), and use the document handling capabilities to identify the associated file containing the actual descriptive text. The descriptive text for MSDS documents can also be obtained from a subscription service such as Atrion.3

The requirements for sending an item’s MSDS document may apply to all countries or to selected countries. This item-specific information must be defined on the Material Regulated Countries form.

When entering a sales order line for the item, an infolog warning can be displayed about sending the latest active MSDS document to the customer. This infolog warning occurs when the customer has not yet received the item’s MSDS document, or when a newer version (defined by the document’s effective date) needs to be sent.4 An infolog warning can also be generated when an existing MSDS document is about to expire. You can optionally print the relevant MSDS documents when posting the packing list or invoice for the sales order, and even prevent posting when a document’s expiry date has been exceeded.5 The system automatically tracks when an item’s MSDS document has been printed for a customer, along with the last sent date. The last sent date can also be manually entered. The tracking information (about the actual document number, the related sales order number, and the last sent date) can be viewed on the Product Safety Data Sheet Log, accessed from a sales line for the regulated item. The tracking information provides the basis for displaying the infolog warnings described above.

3See www.atrionintl.com for additional information about their subscription service.
4In the context of sales order entry, the effective date of an MSDS document can be viewed in terms of the sales order delivery date or the current date, as defined by a company-wide policy on the Inventory and Warehouse Management Parameters form.
5These two options are displayed on the Posting Packing Slip and Posting Invoice forms, and the values initial default from the company-wide policies defined on the Inventory and Warehouse Management Parameters form.
When entering a purchase order for a hazardous material item, you can view the tracking information about the item’s MSDS document. The tracking information (about the actual document number, the related purchase order number, and the last received date) can be viewed on the Product Safety Data Sheet Log, accessed from a purchase order line for the regulated item. An infolog warning can also be generated when an existing MSDS document is about to expire.

18.9 Sales Order Limitations on Restricted Products

Restricted products cannot be entered on a sales order line when the customer’s delivery address reflects a non-allowed area, and an infolog warning will be displayed to delete or change the item number on the sales line. As part of setup information, you define a material restriction list for each country (and even the states/provinces within a country), and the item numbers corresponding to the restricted products on the list.

18.10 Stop Replenishment or Sales of an Item

Certain situations require stoppage of all purchasing, sales or inventory activities for an item, such as an obsolete or unsafe item. Three different policies—termed the stop flags—can be used to enforce stoppage.

**Stop Purchasing Activities for an Item**  The purchasing stop flag for an item can be specified as a company-wide policy, and optionally overridden for a specific site. The purchasing stop flag means that an item’s existing purchase orders cannot be received, and that new purchase orders cannot be created for the item. The stopped flag does not impact planning calculations, so that planned orders will still be generated. Note that a different stopped flag can also be specified for a purchase order line item, rather than stopping all purchase activities for the item.

**Stop Sales Activities for an Item**  Certain situations require stoppage of all sales activities for an item. The sales stop flag for an item can be specified as a company-wide policy, and optionally overridden for a specific
site. The sales stop flag means that an item’s existing sales orders cannot be shipped, and that new sales orders cannot be created for the item.

**Stop all Inventory Activities for an Item** The inventory stop flag for an item can be specified as a company-wide policy, and optionally overridden for a specific site. The inventory stop flag prevents any further receipts or issues. The stopped flag does not impact planning calculations, so that planned orders will still be generated.

### 18.11 Regulatory Reporting Requirements for Different Countries

Some countries require annual reports about products delivered to the country. As part of setup information, you define a country-specific list of item numbers that need to be tracked, and the start/end dates for the annual report. An inquiry (termed the Regulated Item Reporting Detail form) summarizes the annual usage for an item, such as the yearly quantity used and produced.

### Additional Case Studies

**Case 93: Integration with a Laboratory Information Management System** A manufacturer employed a laboratory information management system (LIMS) to track characteristics of their production processes and product quality. The system was uniquely tailored to their environment, and the batch number within AX provided the primary integration point between AX and the LIMS information.

**Case 94: Report Test Results During Production** A manufacturer performed different tests during several steps in an item’s production process. The required tests were identified by an automatically generated quality order, which also provided the basis for reporting actual test results. The rules for automatic generation of quality orders reflected different operation numbers in the routing, and different tests were performed at each operation. For batch-controlled items (or serial-controlled items), the numbers were pre-assigned to a newly created production order so that the test results could be recorded against a specific batch number (or serial number).
Case 95: Certificates of Analysis for Sales Order Shipments
A manufacturer enclosed a certificate of analysis with sales order shipments of selected items. The certificate reflected the test results reported for the item, where test results were captured as part of a quality order. The contents of a certificate of analysis reflected each customer’s requirements for selected test results.

Case 96: Instrument Calibration and Inspection Frequencies
The quality manager at a manufacturer wanted a schedule for instrument calibration based on usage and time factors, the tracking of instrument maintenance, and calibration warnings prior to instrument usage. Additional requirements included instrument certificate tracking and risk instrument notifications. The manager also wanted inspection rules about when and how often to perform inspection of incoming material. Some materials required inspection frequencies based on quantities or time factors or both, while other materials required inspection only on the first receipt from the vendor. Skip-lot logic was also required to meet inspection frequency standards for ISO 2859-1, NIST Series 6 and ANSI Z1.4.6

Case 97: Nonconformance Reports for Purchased Material
The quality manager wanted to track problems related to several purchased items. When a problem was identified, a quality specialist created a nonconformance report that identified the problem source by vendor. The specialist also described the problem (via textual comments), assigned a user-definable problem type that provided a classification of the quality problems, and printed a tag that was attached to the material. When the nonconformance report was approved for further action, it was assigned one or more corrective actions that identified what type of diagnostic should be performed, who should perform it, and the requested date for completion. In some cases, a quality order was also created to capture test results about the material. The status of the nonconformance report was changed to closed after work was completed.

See www.erp-solutions.biz for additional information about their quality control applications that support instrument calibration, inspection frequencies, and quality metrics.
Executive Summary

A number of quality management concerns involve the enforcement of materials management practices, such as receiving inspection (via quarantine orders) and required tests (via quality orders). A nonconformance report can identify a quality problem, and drive corrective actions and additional testing. Dispatch lists can help coordinate quality resources to perform inspection and testing. The case studies included certificates of analysis, capturing test results during production and instrument calibration.
Scott Hamilton consults and teaches globally on SCM and ERP issues, and has consulted with several hundred discrete manufacturing firms. He authored *Maximizing Your ERP System* and seven previous books about Microsoft Dynamics AX. Scott has won the rarely given Microsoft MVP award for Dynamics AX, and earned a doctorate in information systems specializing in manufacturing. He is currently employed by Columbus where he consults with discrete manufacturing clients worldwide.

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“I highly recommend this book to anyone involved in the selection or implementation of Microsoft Dynamics AX at any manufacturer. Scott takes the reader on an in-depth exploration of the key concepts and differentiators of Dynamics AX in a highly relevant and ready-to-apply manner.”

*Hal Howard*, Corporate Vice President, Microsoft Dynamics R&D

“Scott’s books have been invaluable for our team to understand supply chain management, and we provide them to key leaders within the division.”

*Bob McCullough*, Senior Vice President for Manufacturing, H-E-B

“The functional depth, scale and knowledge that Dr. Hamilton shares in his books have been tremendously helpful for those of us within the global Dynamics community.”

*Brandon George*, Microsoft Dynamics AX MVP, IDB Solutions

“Extending Microsoft’s strategic focus on the discrete manufacturing industries, Scott describes how Dynamics AX 2012 addresses the industry challenges and provides business value.”

*Rakesh Kumar*, Global Industries Director – Manufacturing, Microsoft Business Solutions

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Front Cover Image: Industrial robots manufactured by Kuka Systems, a Columbus customer
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