

Quality Planning

Basic Data

Quality Management Process

The information and processes related to quality management are defined in several master records.

The material master is used by several logistics applications and serves as an important integrating element. The material master controls:

Material Master

- ❑ quality management in procurement. For example, it references such quality documents as the technical delivery terms and stipulates whether a certificate must be included with the deliveries.
- ❑ the quality inspection processes. Among other items, the material master determines whether a quality inspection must take place, whether the inspection will be carried out with or without an inspection plan, and whether characteristic results must be recorded. This is determined for each inspection lot origin (goods receipt or production, for example) or inspection type (preliminary inspection or production series inspection, for example).

Some processes in quality management depend not only on the material, but also on such object types as vendor or sales organization. For this reason, there are master data and information records related to such object links that provide additional information for quality management. The release of externally procured materials is an example of this; the release applies to a specific material and its vendors. In addition to the information concerning the release and block status of the material, the info record for this object link also contains information on the status of the supply relationship and a reference to quality documentation such as the “quality assurance agreements.” Because the system manages separate info records for each revision level of a material, changes in master data can be reflected by the supply relationship.

Info Records

Material Specification

The purpose of the classification system is to organize materials according to class and make them distinguishable on the basis of class characteristics. Each material in a class is distinguished by its own class characteristic values. The quality characteristics of a material can then be represented in the system as class characteristics.

Quality Characteristics

Batch Attributes The stocks of a material can be managed separately in batches by materials management. The batch attributes can also be documented with the help of the classification system. The material is assigned to a batch class and the material batches are distinguished on the basis of characteristics in the batch class. Each single batch is distinguished by explicit batch characteristic values.

If a company uses the batch management function, it can create material specifications on a company-wide basis by assigning the material to a batch class and allocating specific values to the class characteristics.

Inspection Specification In the material specification, the quality characteristics assigned to the batch classes can be linked with the corresponding inspection characteristics in the QM module. The default values in the material specification can then be used to create an inspection specification, which may supplement or even replace the inspection plan at the plant level.

Batch Selection The material specification also determines which class characteristics will be supplied with the corresponding inspection characteristic values that were gathered in the inspection. The material specification thereby controls the automatic transfer of inspection results to the classified batches. Later, the batches are selected on the basis of the batch characteristic values in sales and distribution.

Quality Document

All quality-relevant documents such as the quality assurance agreements, technical delivery terms or inspection drawings are centrally managed in the Logistics system's general document management facility. The features of the general document management function, especially its status and version management capabilities, ensure that the applicable requirements for quality documents can be fulfilled. The document management function can also manage external documents such as PC files.

The collective use of general master data by a number of corporate functions exemplifies the R/3 System's level of integration.

Which general master data does the QM module use?

Together with other logistics applications, the QM module uses the

- material masters, vendor masters and customer masters
- info records
- document management function
- material specifications

QM-Specific Basic Data

The basic data for the QM module includes

- inspection characteristics
- inspection methods
- catalogs
- basic data for sample determination

This independent master data makes up the building blocks that are used to develop inspection plans efficiently. The inspection characteristics, inspection methods and catalogs are maintained in several languages and are subject to a status management function.

Test Equipment

The test equipment is also a part of the inspection plan's basic data. The basic data for the test equipment, however, comes from the general production tools and resources module and not the QM module. Depending on the task, these production tools and resources can be represented by different master data in the SAP System:

- equipment
- material
- document
- other production tools or resources

The central production tools and resources module supports the management of test equipment; it monitors the distribution, return, and status of the production tools and resources.

The plant maintenance (PM) module supports the maintenance, repair and calibration of the test equipment.

Inspection Characteristic

Inspection characteristics can be stored as master records in the system. The classification system provides a means of systematically defining, retrieving, and reusing the master inspection characteristics. A version management function ensures that all changes are documented.

The master inspection characteristics can be used as building blocks in the inspection plan; they ensure that the inspection plan is developed systematically, uniformly and efficiently. There are central where-used lists and

Versions

Where-Used Lists

replace functions available for maintaining the inspection plans. Master inspection characteristics may also be used as copy models for the inspection plan characteristics.

Quality Characteristics Assigned in the material specification, the master inspection characteristics provide the links to the general characteristics in a material class.

Inspection Method

The procedures for carrying out inspections are defined in the inspection methods. The inspection methods are assigned to the inspection characteristics. Central where-used lists and replace functions assist the inspection planner in maintaining the master data. A version management function ensures that all changes are documented.

Catalog

If text is used to describe a subject matter, for example when recording the inspection results for qualitative inspection characteristics, different words may be used to express the same term. In contrast, if hierarchically organized catalogs are used to describe characteristic attributes, defect types, defect causes, tasks (corrective actions) or usage decisions, all terms will be defined uniformly. This makes it easier to record the data and evaluate it at a later time.

Code Groups The terms in the catalog are defined using codes. These codes, in turn, are organized into code groups. The codes and code groups are accompanied by explanatory text in one or more languages. Codes can be selected from one or more code groups and placed into selected sets. A selected set provides an assortment of answers to a qualitative question. The selected sets from characteristic attributes and usage decision catalogs contain additional information. All characteristic attributes belonging to a selected set include the supplementary information “accepted” or “rejected,” as well as a defect class. All usage decisions belonging to a selected set contain the supplementary information “accepted” or “rejected”, as well as a default value for the quality score and automatic follow-up actions.

The basic data for the QM module is maintained in several languages and is subject to the status and version management function.

What is the primary function of the QM module’s basic data?

The QM module’s basic data provides a means of developing inspection plans quickly and efficiently.

Inspection Planning

Purpose of the Inspection Plan

In the SAP System, the inspection plan defines the inspection operations, the characteristics to be inspected for each operation, and the test equipment to be used in the inspection. The inspection plan is a part of the master data and is related to the routing in production.

The inspection plan should not be confused with the inspection instruction. The requirement to carry out an inspection is documented in the system by the existence of an inspection lot for a specific material. On the basis of the valid inspection plan for the material and the current quality level, the inspector receives an inspection instruction that defines the scope of inspection for each inspection characteristic in this inspection lot. The inspection instruction applies to a specific inspection lot and is not part of the master data.

The inspection plans are assigned to the materials to be inspected. In addition, the plans can also be assigned to vendors or customers, depending on the inspection lot origin. A single inspection plan can be assigned to several materials, vendors, or customers.

Inspection plans are used for specific tasks such as normal goods receipt inspections or model series inspections. A number of different inspection plans with different uses and assignments may therefore exist for a material.

Inspection plans are not needed for inspections carried out in production. The inspection characteristics are stored in the routing, either in the production operations themselves or in dedicated operations intended for the inspection.

An engineering change management function controls the changes made in related master data from several logistics areas. Together with the material masters, bills of material, routings, and documents, the inspection plans are also linked to this change service. In addition to the change number and change description, a change master record also contains a list of the affected types of master records and the date on which the change is to become effective. Additional information concerning the engineering change management function is contained in the SAP brochure "Production Planning."

If several revision levels exist for a material as result of changes, the system can also manage the inspection plans that have been changed accordingly. If inspection lots are created for such a material, the system will automatically select the inspection plans that match the respective, current revision levels of the material.

Inspection Instruction

Plan Assignment

Plan Usage

Engineering Change Management

Structure of the Inspection Plan

The inspection plan consists of the inspection plan header, inspection operations, inspection characteristics, and test equipment.

Inspection Plan Header

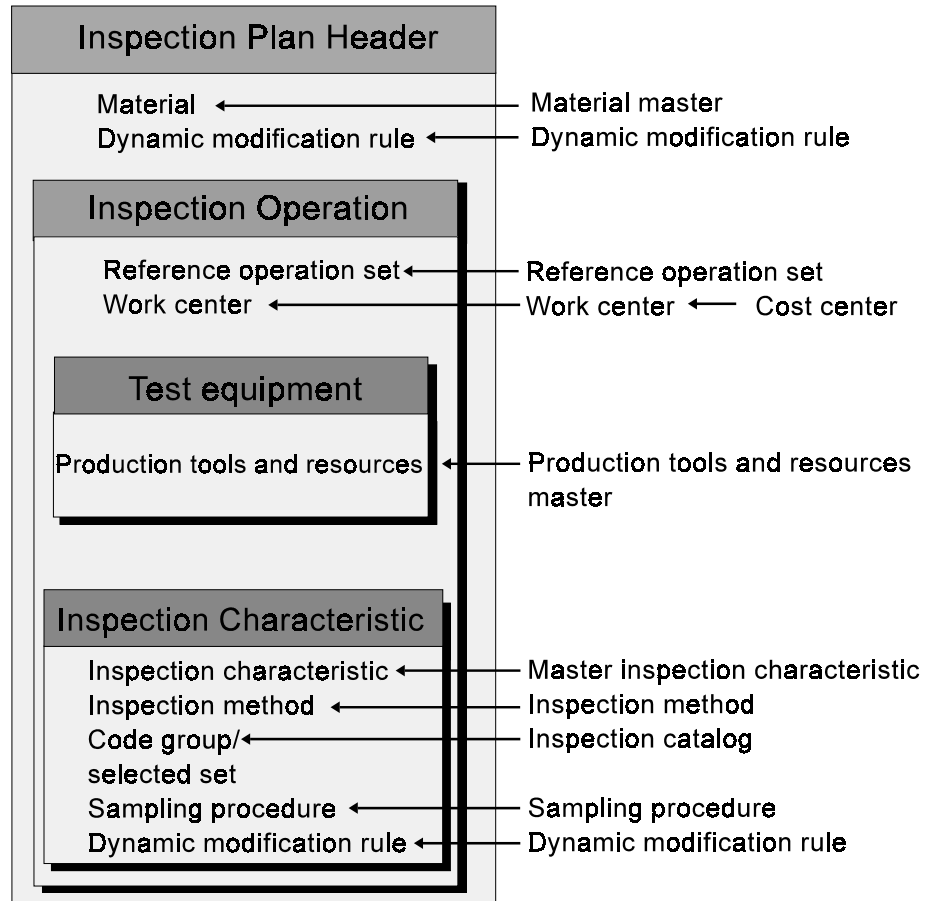


Figure 4-1: The Use of Master Data in the Inspection Plan

The inspection plan header contains a variety of administrative data. This includes the responsible inspection planner group, the plan usage, the processing status, a dynamic modification rule to control the scope of inspection, and the assignment of the plan to materials and, if applicable, to vendors or customers.

Inspection Operation

Inspection operations are subordinate to the inspection plan header. The inspection operation contains the procedural information as well as additional information on the inspection process such as the work center, scheduling dates, and costing information.

Reference Operation Sets

Inspection plans can be created from reference operation sets. Reference operation sets contain operations that can be used as building blocks to create the plan.

Inspection characteristics are subordinate to an inspection operation. The inspection characteristic contains the characteristic description, inspection method, sampling procedure, dynamic modification rule and, depending on the type of characteristic, qualitative or quantitative specifications for the inspection and results recording. It is also possible to include special specifications that will apply under special conditions, for example when the plan is used for a specific material and specific customer. In this manner, the inspection planner does not have to create redundant inspection plans if he wants to specify material-dependent target values.

Inspection Characteristic

The test equipment can be assigned to an inspection operation and an inspection characteristic. It is possible to assign a specific piece of equipment, a material, a document such as a drawing, or any other type of general production resource or tool. A piece of test equipment should be assigned to an inspection characteristic if the characteristic values are to be measured with this piece of equipment.

Test Equipment

The inspection planner determines which physical samples will be used for certain inspection characteristics. Each sample can be assigned a number and these numbers can be allocated to one or more inspection characteristics. When the samples are taken, the system determines the required sample sizes and controls the distribution of the samples to the work centers.

Sampling

The use of a common data structure and user interface to integrate the inspection plan with the routing makes it easier to plan inspections in production.

What this the primary function of the inspection plan?

The inspection plan defines the inspection operations, the characteristics to be inspected for each operation, and the test equipment to be used in the inspection. The inspection plan is part of the master data.

Basic Data for Sample Determination

An important part of the inspection process is the automatic determination of samples. The *sampling procedure* and the *dynamic modification rules* serve as the basic data for determining the samples. The QM module supports sampling procedures with single-step sampling plans for quantitative inspections according to standards MIL-114 or ISO 3951 and for qualitative inspections according to standards MIL-105D, DIN 40080 or ISO 2859. Customer-specific sampling plans - with or without AQL values and rules for automatic stage change up to a skip - can easily be integrated. Industry-specific processes, such as standard Q101 used by automotive industry suppliers, can also be represented in the system.

Sampling Procedures

The sampling procedure defines how the sample size is determined and how the inspection characteristic will be valuated.

Sampling Type The following *sampling types* are supported in the standard system:

- 100% inspection
- sample based on a percentage
- fixed sample
- sample according to a sampling scheme

For inspections in production, there are special sampling procedures available in which the sample size and an inspection interval are defined.

Sampling Scheme Sampling schemes are stored in the system as master records, independent of the sampling procedure.

Valuation Mode The rules for accepting or rejecting a characteristic or a sample are defined in the system as the valuation mode. The valuation mode is defined independently of the sampling type. In the standard system, there are several valuation modes available to the user. These modes are described in more detail in conjunction with the characteristic results recording function in Chapter 5, "Quality Inspection."

Independent Multiple Samples It is possible to plan independent, multiple samples and to record the inspection results from several samples for an inspection characteristic. Each of these samples may contain several values and each is valuated individually. On the basis of the individual sample results, the characteristic result is determined automatically based on the worst-case principle. If this rule does not apply, the user can substitute his own function module to carry out the valuation.

Dynamic Modification

With the help of sampling procedures and dynamic modification rules, the scope of inspection is adapted to the current quality level. The dynamic modification rules apply either to all inspection characteristics in a plan or only to certain inspection characteristics. Dynamic modification can occur on the basis of an inspection lot or on the basis of inspection characteristics. This depends on whether an increase or decrease in the scope of inspection based on a previous inspection is controlled by the valuation of the inspection lot or by the valuation of the individual inspection characteristics. The sample size may vary in any desired steps between a 100% inspection and a skip. It is also possible to switch between the different inspection severities of a sampling scheme (tightened, normal, reduced).

Using the QM module's definable basic data, you can create the most commonly used sampling procedures.

What is the primary purpose of the sample determination basic data?

With the help of the sampling procedures and dynamic modification rules provided for each inspection characteristic, the system adapts the scope of the inspection to the quality level.

