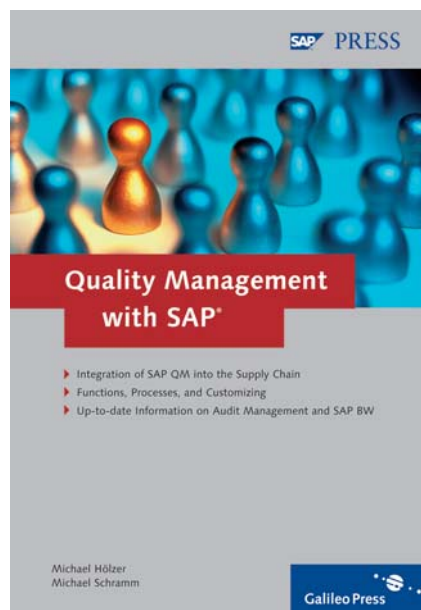


Michael Hölzer, Michael Schramm

Quality Management with SAP



SAP PRESS

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Preface

Quality management has regained its importance with the rise of globalization. Companies are increasingly using integrated SAP functions to support process-oriented quality management, and thus there is great need for real-world information. This has proven to be particularly significant in global companies when the parent company and the subsidiaries or joint-venture partners build up common IT structures and then must structure the processes of quality management in similar ways.

This book will focus in particular on SAP R/3 Enterprise (Release 4.7). We'll describe in detail the interrelationships with the revised quality norm ISO 9001:2000. For the stability study we have used a complete scenario. The high importance of audits in everyday business is addressed in Chapter 12, *Audit Management Using SAP*.

We would like to extend our sincere thanks to the following people who were involved in producing this book. Mr. Alois Schmid updated Chapter 11, *Test Equipment Management*, and contributed his consulting experience in the Plant Maintenance module area. Dr. Kicherer from SAP SI AG also made a contribution. In a supplement to Chapter 9, *Quality Notification*, he describes how FMEAs that meet the requirements of norm QS9000 can be created with an add-on. Dr. Berthold Eilebrecht of the Dr. Eilebrecht SSE company, expertly, supplemented our information in the important area of connecting sub-systems to mySAP ERP, providing valuable details in Chapter 7 on *Quality Inspection*. This area is discussed in almost every QM project. We would also like to thank Mrs. Beate Lindqvist of SAP AG, who supported us in Chapter 10, *Information Systems and Evaluations*, with the supplements on SAP Business Information Warehouse.

Ulm, Germany, August 2005

Michael Hölzer

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Introduction

This chapter describes the structure of the book and how you can make the best use of it. It describes the groups of readers for whom the book is intended. You will find a short overview of each subsequent chapter and learn how the various chapters are related to each other.

Target Groups

The book is geared toward all those interested in how SAP R/3 supports quality management. It is suitable for newcomers to R/3, those changing from a legacy system or from R/2, and those experienced R/3 users who want to expand their existing systems with the quality management module (SAP QM) for productive use. Those already using the QM module will learn more about the functions and options of this module and will find suggestions for its extended use and optimization. Consultants from other module areas will benefit from the overview of the functionality of the QM module, and consultants for the QM module will find useful tips for their work.

Understanding of the basic concepts and processes of quality management and practical knowledge of a PC system with menu-driven user programs are prerequisites for readers.

Topics Covered

Although the subjects of quality management—along with quality planning, quality inspection and quality control—are the actual focus of the book, we also will describe in detail the points of contact with other components in the SAP R/3 system and the business processes in which quality management plays an essential role. You will get tips on how you can map your quality management system with SAP R/3 and structure and describe your business processes. The important functions of vendor evaluation and test equipment monitoring will also receive in-depth treatment. Although these are assigned to other R/3 modules, they are still closely connected to quality management.

Tip We will at times highlight points of particular interest in this way. This sometimes involves menus which are hidden, suggestions for mapping your processes, or alternative implementation options, if a direct solution is not available through R/3. These tips have emerged from the practical experience of the authors, and with their help a few problem cases have already been solved. They are mainly aimed at users.

Customizing Tip In contrast to the target group referred to above, this tip is geared towards specialists who are able to change the Customizing settings. Otherwise, the same explanation applies as for "Tip" referred to above: Important recommendations based on the authors' practical experience have been highlighted in this way. This gives you the chance to employ the most elegant and quickest implementation option for your processes.

Structure of the Book

The book is structured in such a way that it is not necessary to read all the chapters in sequence. It is, however, advisable to begin with this introductory chapter.

The chapters generally begin with the presentation of a general and business-related problem and the requirements of a management system. After that, we describe the solution options using the R/3 system, then elaborate on these with scenarios and examples.

Those who up to now have had very little to do with SAP software should next read Chapter 3, *Overview of SAP R/3*. However, even readers with practical experience will definitely find some interesting information there.

Chapter 5, *Quality Management in the Supply Chain*, links topically with Chapters 6, 7, and 8 and therefore should be read before those three chapters.

Chapters 6, 7 and 8, *Quality and Inspection Planning*, *Quality Inspection*, and *Quality Control* are thematically linked. It is therefore advisable to read these in conjunction with one another.

The remaining chapters are, for the most part, stand-alone, and you can read them independently of each other.

Contents of the Chapters in Brief

Chapter 1, *Implementing Management Systems with SAP*: The demonstration of a quality management system is generally based on norms. Different norms and developments are explained, and we will describe the requirements that emerge from the norm ISO 9001 and the options for implementing them with SAP R/3.

Chapter 2, *Modeling QM Business Processes Using the EPC Method*: You will learn how you can map your business processes by paying particular attention to quality management with the R/3 system. Event-controlled process chains (EPC) are introduced as a suitable tool for modeling and describing flows. Their application will be illustrated by means of examples.

Chapter 3, *Overview of SAP R/3*: This chapter provides an overview of SAP AG. The R/3 system and its modules will be described insofar as is necessary for the interaction with SAP QM. The structure of typical SAP work centers will be addressed, as will the organization of the implementation project, the transfer of data from the legacy system, or the interfaces to external systems. A section will be devoted to the further developments of the SAP R/3 system. The connectivity of the SAP R/3 system on the Internet and intranet will be further extended in the future with SAP NetWeaver. The new strategies will be introduced and explained. You will, in particular, learn how quality management can benefit from these new technologies.

Chapter 4, *Operating SAP R/3*: This chapter will give you a basic introduction to using the R/3 interface. This chapter mainly addresses less-experienced users and those who are new to SAP R/3. The explanations are mainly general and refer to all modules. However, the examples and screenshots were mostly selected from the QM module.

Chapter 5, *Quality Management in the Supply Chain*: This chapter is an introduction to the subsequent central chapters, *Quality and Inspection Planning*, *Quality Inspection*, and *Quality Control*. It shows how quality management is present in each step of the supply chain and acts as a common thread for the supply-chain process. Studying this chapter will make the context of the subsequent three chapters clearer and easier to understand.

Chapter 6, *Quality and Inspection Planning*: This is the first of three central chapters of the book. It contains a description of the necessary basic data and master data, the different task-list types—routing, inspection plan, and reference operation set—and the relevant catalogs. We will provide a detailed description of the creation and function of sampling procedures, sampling schemes, and dynamic modification rules. The control charts and the batch inspection are also included in this chapter. The applications in Materials Management, in Production, and in Sales and Distribution give you an insight into practical use.

Chapter 7, *Quality Inspection*: This chapter describes how to create inspection lots and how you can perform planned (and even unplanned) inspections. You will learn how you can implement your inspection strategy using SAP QM. Quality inspections are run based on practical examples, and the characteristics of Materials Management, Production, and Sales and Distribution are emphasized. At the end of the chapter, you will find information on the integration of sub-systems in quality inspection with SAP R/3.

Chapter 8, *Quality Control*: This chapter provides different options for initiating and tracing management and improvement actions using SAP QM. First, we de-

scribe in detail the use decision, which functions not only as a completion of the quality inspection but also contains the short-term controlling actions such as sorting or post-processing. A central topic in this chapter is vendor evaluation. It can be used to create ranking lists of vendors who have been evaluated according to different criteria. You can plan actions to improve quality and evaluate their success afterwards. In addition, the tools Quality Level, Dynamic Modification, and Statistical Process Control, as well as the recording of quality costs, are presented in detail.

Chapter 9, *Quality Notification*: This chapter describes with precision how you can make optimal use of this exceptional tool in your company. Quality notifications not only allow you to transfer or archive information, but also to plan and trace activities and actions. You can make long-term use of the quality-notification data through convenient evaluation options. This chapter also provides a description of the stability study and the enhancement of the quality notification for the FMEA software.

Chapter 10, *Information Systems and Evaluations*: The various evaluation options using the different information systems represent one of the strengths of the R/3 system. In this chapter, you will obtain an overview of the comprehensive options to retrieve and process data. Finally, the SAP Business Information Warehouse (SAP BW) is introduced on the basis of some examples.

Chapter 11, *Test Equipment Management*: Test equipment is very important for planning and performing inspections and also for complying with the requirements of the quality standard. Therefore, we will introduce solution options here for managing your test equipment and planning and documenting calibration with the R/3 system.

Chapter 12, *Audit Management Using SAP*: Planning, executing, and evaluating audits is supported by SAP Audit Management. It is a component of the mySAP Business Suite. The chapter describes the tools and objects used.

Chapter 13, *Customizing*: Customizing refers to the menu-driven adjustment of the R/3 system to your company's requirements. Although this chapter is not to be regarded as formal Customizing training, it does provide you with an overview of how to make the necessary settings when you customize your R/3 system. Knowledge of this subject is not an absolute prerequisite, but the content described here will help you to better understand the R/3 system and its Customizing options.

Chapter 14, *Migration Concepts*: If another EDP system was used prior to the implementation of the R/3 system, or an existing CAQ (Computer Aided Quality Assurance) system is replaced by the quality-management component of the R/3

system, the issue of consistent data transfer immediately arises. This problem area is also referred to as migration. This chapter provides you with useful tips on how to plan such a data transfer and what needs to be considered.

Chapter 15, *ASAP (AcceleratedSAP)*: Knowing that customers face extreme time and cost pressure as the result of a long introduction phase, SAP has developed and compiled processes and methods that you can use to decrease the implementation effort in certain areas. This chapter describes what you may expect from this accelerated implementation and how your company can more quickly reach its objective of a production launch on the "ASAP roadmap."

Appendix A, *Glossary*: An extensive glossary explains concepts from quality management in general, the R/3 system and the Quality Management module in particular.

Appendix B, *Abbreviations*: A detailed abbreviation directory provides quick help with abbreviations that are used in this book and that appear in the R/3 help texts. However, you will find the module abbreviations in Chapter 3, *Overview of SAP R/3*.

7 Quality Inspection

Quality inspection plays a central role in quality management. If solid foundations were laid in quality planning, quality inspection can begin. Inspection lots are generated by material movements, production orders, or deliveries, or are created manually. Inspection lots then undergo quality inspections based on predefined properties. Along with the inspection-lot completion, important information is transferred to the quality info system and is then available for quality control.

Quality inspection is basically divided into inspection-lot creation, results recording, inspection-lot completion, and appraisal-costs processing. Figure 7.1 shows an overview of the quality inspection process.

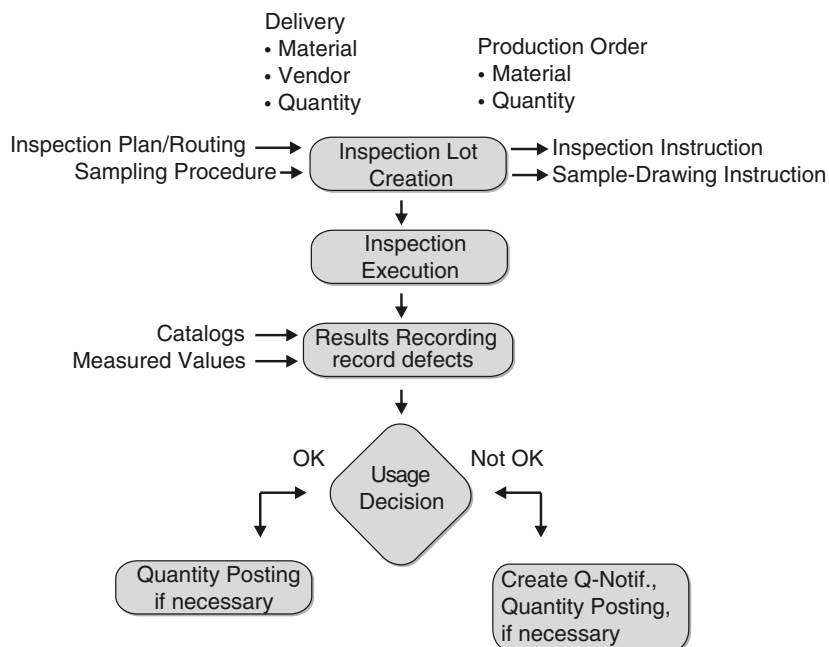


Figure 7.1 Quality Inspection Process

7.1 Basic Principles

First, we will explain a few terms and contexts that are important for understanding the following sections.

Inspection Lot

Inspection lots represent a request to inspect a specific quantity of a material. Inspection lots can be created automatically or manually.

In materials management, inspection lots can be generated through goods movements. Such goods movements are:

- ▶ Goods receipt
- ▶ Goods issue
- ▶ Stock transfer

In production, inspection lots can be generated through recurring batch inspections or through the release of:

- ▶ Production orders
- ▶ Process orders
- ▶ Run schedule headers
- ▶ Goods issues from production

In sales and distribution, inspection lots come about through creating deliveries to customers or receiving returns from customers.

Customizing tip In Customizing, you determine through which events an inspection lot is to be created.

The size of the inspection lot is the entire quantity of a material available for inspection. This is not to be confused with the sampling quantity, which specifies how many parts of the inspection lot are to be inspected. Inspection lots are only created if an inspection type has been entered in the quality view of the material (material master) and has been activated. In the inspection lot the following important data is stored:

- ▶ Inspection specifications
- ▶ Inspection results
- ▶ Appraisal costs
- ▶ Usage decision

Stock Types

The stocks can be assigned to three stock types:

- ▶ **Unrestricted-use stock**
Freely available material that either has already been released or doesn't undergo any quality inspection—identifier: blank or F
- ▶ **Inspection stock**
Material that is currently undergoing a quality inspection—identifier: X or 2

► **Blocked stock**

Material that is currently blocked—identifier: S or 3

An inspection lot may or may not be stock-relevant. This depends on the inspection lot generation and on the inspection-lot origin. Manually generated inspection lots and the inspection lots with the following origins are not stock-relevant:

- 02 Goods issue
- 03 Inspection during production
- 06 Customer returns
- 07 Audit inspection
- 10 Delivery of the customer order
- 11 Delivery without customer order
- 12 General delivery
- 13 Production order for run schedule header
- 14 Maintenance

If a goods movement is a stock-relevant transaction type such as the inspection-lot origin 01 (Goods receipt for purchase order), the inspection lot quantity goes into the inspection stock. Through the *inspection lot stock* in the usage decision, you can transfer the material from the inspection stock to an unrestricted-use or blocked status or also return it to the vendor.

Ship to Stock

Depending on the quality capability of your vendor, you will possibly want to partly or completely skip acceptance inspection. Skipping individual inspections is called *ship to stock* (direct delivery into the warehouse), *inspection skip*, or—in SAP terminology—*skip*. You can control this via dynamic modification rules. If a vendor of a material is located in skip, this means no acceptance inspection is required. The inspection lot is automatically released after a predefined period of time, and the quantity is posted from inspection stock to unrestricted-use stock.

Delivery Certificate

The QM module supports the management of the receipt of certificates which must be part of the delivery. Such certificates can, for instance, include works-test certificates, material certificates, model inspection reports, or inspection confirmations. The certificate receipt is confirmed during goods receipt (see Figure 7.2). If the certificate is missing, you cannot make any usage decision at this stage.

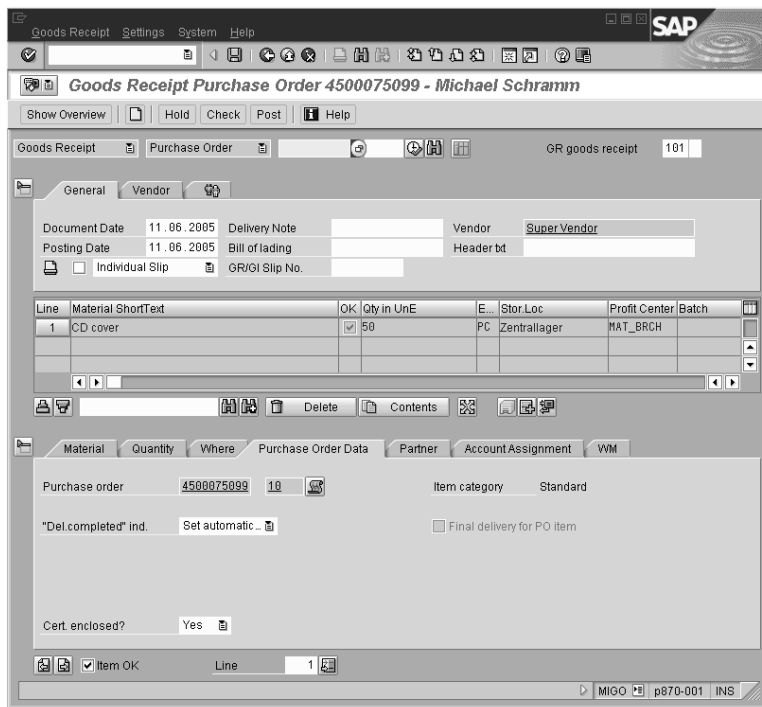


Figure 7.2 Certificate Query at Goods Receipt (© SAP AG)

During the usage decision at the latest, the receipt of the certificate must be confirmed so that the material can be posted to the unrestricted-use stock.

System Status

If you closely examine the display of an inspection lot, you will notice the field **System status**, which displays the inspection-lot status with different four-letter abbreviations. It makes sense to monitor this status, as it reveals important details. It is particularly useful in the search for defects, when the system does not behave as you expect it. You can often find out the reason quickly by monitoring the status. Table 7.1 shows the long text of the status notifications.

You can display the long texts of the status by using the following menu path: **Extras • Inspection lot status**, or clicking on the corresponding icon.

Abbreviation	Meaning	Abbreviation	Meaning
CALC	Sample calculated	PREQ	Plan/specification required

Table 7.1 System Status of the Inspection Lots

Abbreviation	Meaning	Abbreviation	Meaning
CCTD	Inspection characteristics created	PRII	Inspection instruction printed
CHCR	Characteristic must be created	PRSI	Sample-drawing instruction printed
CROK	Certificate receipt confirmed	QLCH	Quality level relevant
CRTD	Created	REL	Released
CTCM	Certificate confirmation missing	RREC	Results confirmed
DEF	Defects were recorded	SKIP	Skip lot
DU	Usage decision has been made	SPCO	Stock posting completed
FLEX	Specifications assigned	SPRQ	Quantity posting required
ICCO	All inspections completed	STIC	Short-term inspection completed
INSP	Inspection active	STUP	Statistics updated
PASG	Plan/specification assigned		

Table 7.1 System Status of the Inspection Lots (cont.)

In order for an inspection lot to receive the status "REL," and to be released for inspection, the following steps usually must be completed (although there are exceptions):

- ▶ The inspection lot has been created (inspection-lot number has been assigned).
- ▶ An inspection plan or a material specification has been assigned.
- ▶ The sample has been determined.

The inspection lot status tells you which steps have been taken. If not all the steps could be performed, the inspection lot does not appear in the results recording worklist. If that happens, refer to Section 7.3, *No Inspection Lot in the Worklist*, which explains what you have to do then.

User Status

With the user status, you can display status information. You can, for instance, display information on whether a supplied material has the status **Model**, **Series** or **Change sample**. This status can also be manually changed by the user.

Status Profile

In addition to the user status, you can enter a status profile in the quality info record (or Q info record). A corresponding status profile enables you to control the inspection type and also the use of a specific inspection plan, depending on the status of a vendor relationship (model, series, etc.).

7.2 Inspection-Lot Creation

In order to create an inspection lot, the basic data for the material must be maintained. For this reason, the quality view of the material master must have been created, and at least one inspection type must have been entered in the inspection data and activated. According to the properties of the inspection type, a valid inspection plan or a material specification must exist. Whether and to which degree a sample is to be drawn depends on the details in the quality view of the material, the quality level, and the details in the inspection plan or routing.

Inspection lots can be created *manually* or *automatically*.

Manual Inspection-Lot Creation

Although we assume that inspection lots are usually automatically created, it can be necessary to manually create an inspection lot. Reasons can be:

- ▶ Subsequent inspection of a released material because of a suspicion of defect
- ▶ Inspection of a material whose gr inspection was skipped
- ▶ Inspection of a material because of a complaint by production or a customer


The process of the manual inspection-lot creation, which we will look at by using a simple example from materials management, begins with the selection of the corresponding menu.

We will make the following selection from the R/3 main menu:

Logistics • Quality Management • Quality Inspection

and

Inspection Lot • Processing • Create


In the initial screen we enter our **Material** (here: 105969), the **Plant** (here: 0001) and the **inspection-lot origin** (here: 01 = goods receipt).  brings us to the screen **Create Inspection Lot Manually** (see Figure 7.3).

The system has already assigned the internal inspection-lot number. This means the only thing we still need to do is to enter the relevant information into the mandatory fields **Inspection-lot quantity** and **Vendor**. Note that the inspection-

lot quantity represents the entire quantity of the goods and that from here you determine the size of the sample according to the sampling plan rules that you have defined in the inspection plan or the inspection percentage record.


The screenshot shows the SAP 'Create Inspection Lot Manually: Vendor Data' dialog box. The window title is 'Inspection lot' and the menu bar includes 'Edit', 'Goto', 'Extras', 'Environment', and 'Inspection processing'. The main title is 'Create Inspection Lot Manually: Vendor Data'. Below the title are buttons for 'Inspection instruction' and 'Sample drawing instruction'. The form contains several input fields: 'Plant' (0001, TGE Werk 1), 'Inspection Lot' (136062), 'Material' (105969, CD cover), 'Insp.lot origin' (01 Goods Receipt), and 'Inspection type' (01 Incoming insp. for GR for purchase order). There are tabs for 'Origin', 'Insp. specifications', and 'Sample'. The 'General Data' section includes 'Inspection type' (01 Incoming insp. for GR for purchase order), 'Insp. Lot Qty' (checked), 'PC' (checked), 'No. Containers' (empty), 'Start date' (11.06.2005), 'Insp. end date' (empty), 'Manufacturer' (empty), 'Vendor' (checked), and 'Purchasing Org.' (0001). The 'Description' section has a 'Short text' field. The status bar at the bottom shows 'QA01 p870-001 INS'.

Figure 7.3 Manually Creating an Inspection Lot for Goods Receipt (© SAP AG)

After you have filled out the required entry fields and confirmed this with , the inspection lot is created, and the sample is determined, provided that a valid inspection plan exists. If no inspection plan exists, the error message "No plan could be assigned" will be displayed. As soon as you **save** the inspection lot, it is available for further processing.

Note that the manual inspection lot for the goods receipt does not change the stock type. If the material is already in the unrestricted-use stock, it remains in this stock type as long as it is not specifically reposted. Here, the manual inspection lot differs essentially from the automatically generated inspection lot of the goods receipt.

You can also create a manual inspection lot for a production order. However, this is only possible if no inspection lot has already been created for the same production order, because no more than one inspection lot can be created per order (unless inspection points or batch inspections are planned). Do not enter any material number in the initial screen. Only enter the **Plant** and the **Inspection lot origin**

(e.g., 03 = Production). Once you have pressed , a screen created in a different way than during the inspection lot is displayed for the goods receipt (see Figure 7.4).



The screenshot displays the SAP 'Create Inspection Lot Manually: Production Data' interface. The title bar includes 'Inspection lot', 'Edit', 'Goto', 'Extras', 'Environment', 'Inspection processing', and the SAP logo. Below the title bar, there are two tabs: 'Inspection instruction' and 'Sample drawing instruction'. The main form area contains the following fields and sections:

- Plant:** 0001 TGE Werk 1
- Inspection Lot:** 20000000500
- Material:** [Empty field]
- Insp. lot origin:** 03 Production
- Inspection type:** 03 In-process insp. for production order

Below these fields are three tabs: 'Origin', 'Insp. specifications', and 'Sample'. The 'Origin' tab is active and contains the following sections:

- General data:**
 - Insp. lot qty:** 0.000
 - Start date:** 18.06.2005
 - Insp. end date:** [Empty field]
 - Order:** 1100035422
- Description:**
 - Short text:** [Empty field]

The status bar at the bottom of the screen shows 'QA01', 'p870-001', and 'OVR'.

Figure 7.4 Manually Creating an Inspection Lot for Production (© SAP AG)

Under **Order**, you must now enter the production order number. The system itself then retrieves the other details such as material number and the quantity from the production order. If an inspection plan exists, the sample calculation can be carried out, and an inspection lot is created.

Automatic Inspection-Lot Creation

It would be advantageous for most companies to configure the QM module in such a way that a goods receipt for a purchase order automatically creates an inspection lot. You can notice this during the goods-receipt posting as there, in the status bar, the notification "Quality inspection in preparation" is displayed briefly. Once you save the goods receipt posting, the inspection lot is created and the inspection documents are printed out.

If the inspection type is configured correspondingly, the goods also can be posted to the inspection stock when the inspection lot is created. In this respect the au-

tomatically generated inspection lot differs from the manually created inspection lot, for which the stock type of the goods does not change.

In production, the inspection lots can also be automatically generated. The system can, for instance, be configured in such a way that the inspection lot is created upon the release of the production order, or upon issue of goods from production. In sales and distribution, an inspection lot would typically be created for a goods issue. If inspection lots are created for serialized materials, the serial numbers can be transferred to the inspection lot.

Inspection Documents

As soon as an inspection lot has been created, the relevant shop floor papers are printed out (in Customizing, you can define if this is to happen automatically). These papers consist of the following:

► Sample-drawing instruction

The sample-drawing instruction specifies whether and to what degree the sample is to be drawn from the total quantity. Furthermore, the printout contains additional information such as the material document number, the material number, and the inspection lot number. It is advisable to customize the report according to your own requirements.

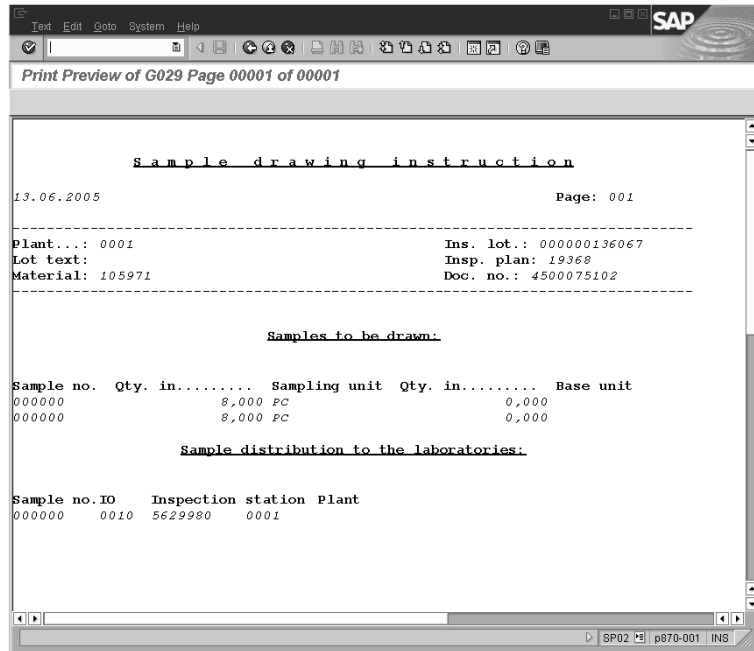


Figure 7.5 Example of a Sample-Drawing Instruction

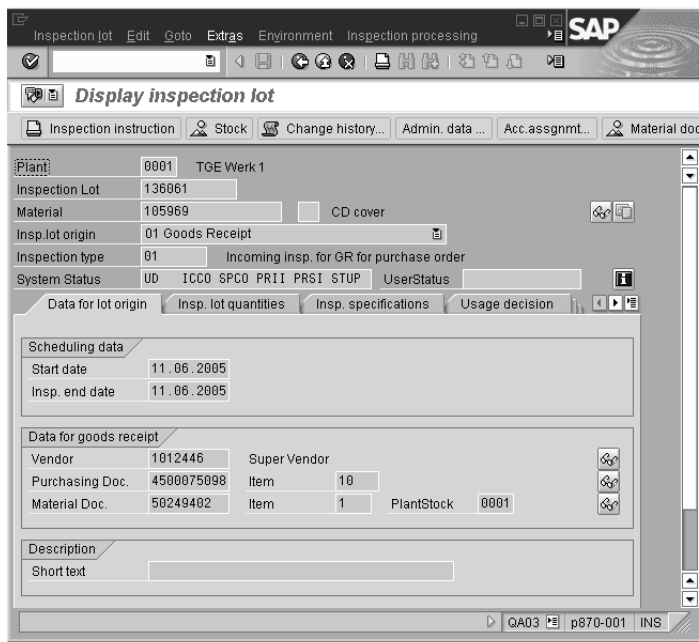


Figure 7.7 Displaying the Inspection Lot (© SAP AG)

By using the sample-drawing instruction you can draw the sample in the goods receipt and send it to the quality assurance department. There, the inspection is executed on the basis of the inspection instruction.

7.3 Results Recording

Results recording is carried out to document your inspection. If you want to execute a results recording according to characteristics, you must be able to assign an inspection plan or a material specification to the inspection lot. In this book, we assume that you inspect according to inspection plans and that there is at least one inspection operation with one or several inspection characteristics.

The Worklist

As is the case with many applications of the R/3 system, there is also a worklist for inspection-lot processing. Before you can begin the results recording, the corresponding inspection lot must be located in the worklist.

From Release 4.6, the Easy Access design introduced a few new transactions that can be easily recognized from the "N" placed at the end of the transaction code. The display of the worklist for results recording with the Transaction QE51N is one of the changes to the QM module. The advantage of this newly designed view is

the combination of the worklist in list form with the screen for results recording in one screen. As an option, you can also use a screen segment for help display during the learning phase. The size of each screen window can be set individually and depends on the hardware used such as monitor and graphics card. Figure 7.8 shows an example of a worklist for results recording with this new type of display.

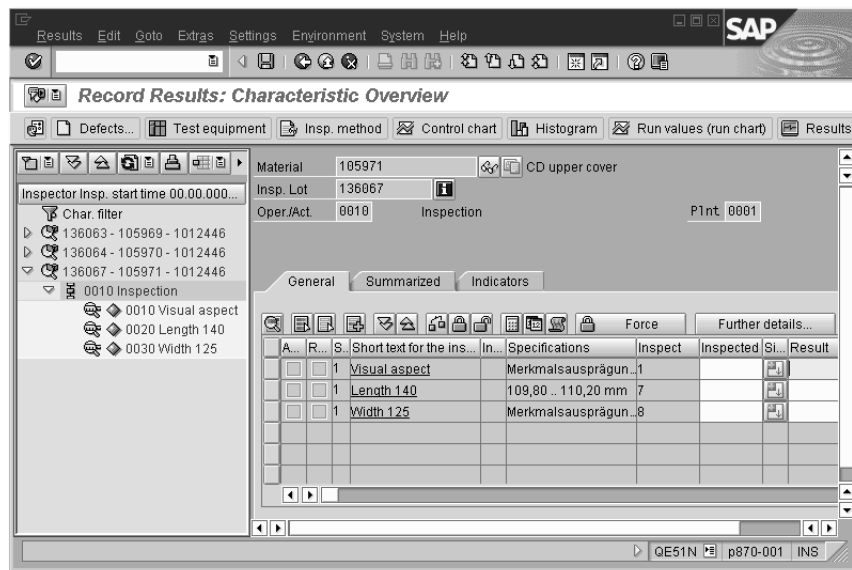


Figure 7.8 Transaction QE51 with Worklist and Results Recording (© SAP AG)

The familiar results recording transactions from Releases 3.1, 4.0, and 4.5 can now be found under the menu item **Variants for Results Recording**. The following selection options are available there:

- ▶ Using List
- ▶ For Physical Samples
- ▶ For All Inspection Lots
- ▶ For Inspection Points
- ▶ For Master Inspection Characteristic

Select Transaction QE51, which is common to all releases, through the menu tree with **Worklist · Variants for Results Recording · Using List**, and only enter the **processing mode Char. filter "1"** (for "All Characteristics"). You will then obtain a list of all inspection lots in the worklist. You can use this structure list in order to enter your individual selection criteria. For instance, you can limit the selection by date, material number, vendor number, or work center.

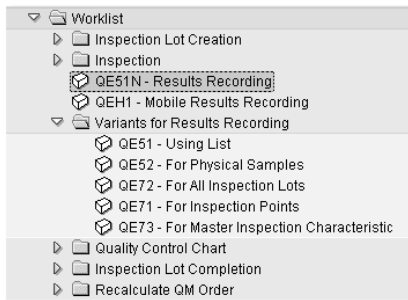


Figure 7.9 Menu Selection for the Worklist (© SAP AG)

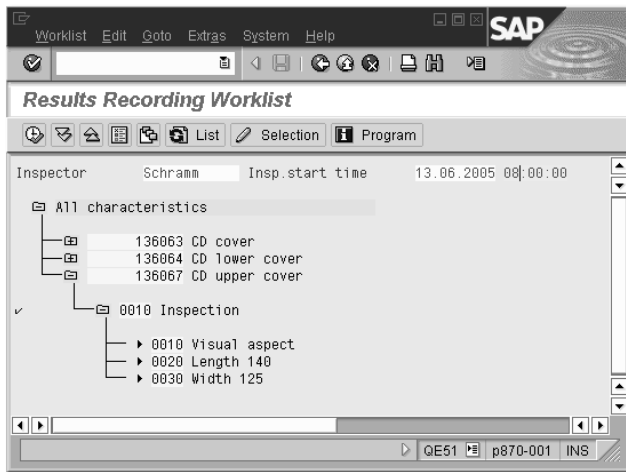


Figure 7.10 Worklist for Results Recording (© SAP AG)

The other sub-menus enable an optimized display of the worklist for specific applications, such as the management of physical samples in the process industry.


Figure 7.10 contains an example of such a worklist. It displays three inspection lots where the hierarchy tree for the inspection lot with number 136067 has been expanded so that under the inspection lot name the operation (GR inspection) and inspection characteristics (0010–0030) are displayed as well.

No Inspection Lot in the Worklist

Sometimes it can happen that although an inspection lot is created (Status CRTD) it does not contain the status RELEASED. This means that it cannot be seen in the worklist but rather only via the following menu: **Inspection Lot • Processing • Display**. If the inspection lot hasn't been released, no plan can be assigned in most cases. This can occur for several reasons:

- ▶ The identifier for the automatic specifications assignment is not set in the material master record.
- ▶ No valid inspection plan/material specification is available.
- ▶ The inspection plan/material specification is not released.
- ▶ The inspection plan is not yet valid at the key date or is no longer valid.
- ▶ The revision of the material and the inspection plan are different.
- ▶ The plan usage and the inspection type in the material master don't match.
- ▶ In the material allocation to routings, the inspection plan is assigned to a vendor other than the one that actually supplied the material.
- ▶ Several inspection plans exist, and thus a clear assignment is not possible.

Looking at this list—and it is not even a complete one—you realize that it can be hard to learn why a task-list assignment is missing. You will find it informative to look at Chapter 6, *Quality and Inspection Planning*, on this matter. When displaying the worklist for results recording, you must note that the processing mode performs a selection. The processing modes available in the standard version only allow the display of inspection lots with characteristics. Inspection lots without characteristics cannot be displayed with this transaction.

If the inspection plans have been correctly created, the assignment must also function properly during the inspection-lot creation. However, if you should notice that the inspection lot cannot find any inspection plan, you can still correct this problem through the following path: **Inspection Lot • Processing • Change**. To do this, use the list above as a check list and check for the possible defects listed above. If you have found the defect and corrected the inspection plan, then go to the menu **Processing • Change** and assign the changed inspection plan, or—if several inspection plans are involved—the correct one via **Insp. specifications**. Once you have pressed the  key, the status changes from CRTD (created) to REL (released).

After **Saving**, the inspection lot is displayed in the worklist, and the inspection documents are printed out.

Tip In order to avoid having to execute this inspection-lot change too often, it is possible to recognize this situation at an earlier stage. As soon as an order has been created, you can check if the system finds a valid inspection plan for the material ordered. In order to perform this check, go to **Quality Planning • Inspection Planning • Inspection Plan • Missing or Unusable Inspection Plans in Procurement**.

In the selection screen, you can enter a range of relevant material numbers. After starting the selection by clicking the **Enter** button, the system displays a list of the procurement orders for which either no inspection plan or an incorrect inspection plan exists (see Figure 7.11). If in the status bar the message "No entries found" is displayed, then there's no current problem, and all inspection lots that are created for the current procurement orders also appear in the worklist.



Figure 7.11 Missing Inspection Plans (© SAP AG)

The good thing about this list is that you can go directly to the material view in order to check the entries there. Unfortunately, there is no corresponding function that enables you to view the corresponding inspection plan as well.

The evaluation **Missing or Unusable Inspection Plans** works in the same way. The only difference is that all selected material numbers are checked there whether or not a procurement order has been created.

It is advisable to carry out this check regularly (for instance weekly) or—better still—to plan a job which automatically runs every Sunday and provides you with the results list through SAPoffice.

7.3.1 Characteristics Results

If your company, like others that have implemented a quality-management systems, does plan inspections, the inspection plans contain at least one inspection operation and one inspection characteristic. As soon as an inspection lot has been created, it is displayed in the worklist. The easiest way to enter into the characteristic results is by double-clicking on the operation (here: **GR inspection**). For this

reason, the hierarchy tree of the inspection lot must previously have been expanded as can be seen for inspection lot number 136067 in Figure 7.10.

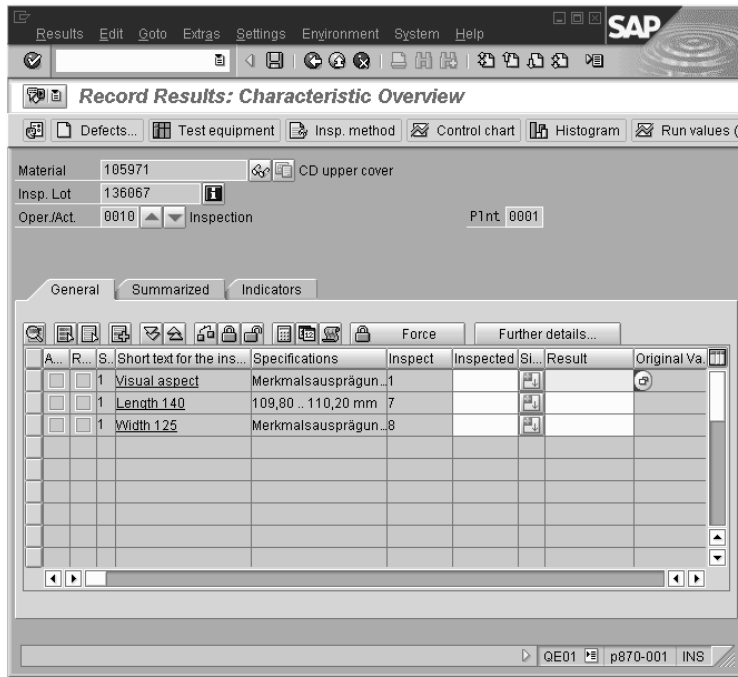


Figure 7.12 Screen for Recording Characteristic Results (© SAP AG)

If you go to the screen **Record Results: Characteristic Overview** (see Figure 7.12), all characteristics are displayed that should be inspected.

In Chapter 6, *Quality and Inspection Planning*, we described that it is possible to plan variable and attributive characteristics for the inspection. This means the confirmation of the inspection results is also different. In our example (see Figure 7.12) you must record results for three attributive characteristics.

The **Characteristic Overview** screen contains the following three tabs:

- ▶ **General**
- ▶ **Summarized**
- ▶ **Indicators**

Instead of the summarized recording, inspection planning can also provide for the recording of classed values (i.e. the number of events within value classes) or of individual values (if necessary, by entering the number of the unit to be inspected). The name of the tab changes accordingly. A separate screen is available

for recording individual values, in which you can enter the characteristic values per individual item or serial number.

If independent multiple samples were provided for by inspection planning, you can record results for several samples per inspection characteristic. It is even possible to enter a higher number than the number of pieces specified in the sample procedure.

Other planning variants for attributive inspection are double and multiple samples. For inspections according to AQL (ISO 2859), the result of a sample can lie between the acceptance number and the rejection number. Consequently, the sample will be increased. A new evaluation takes place after recording the results for the new sample.

The inspection characteristic changes its status during the individual processing steps. Possible statuses are:

- ▶ The characteristic must be/can be processed
- ▶ Skip
- ▶ Processed
- ▶ Evaluated
- ▶ Completed

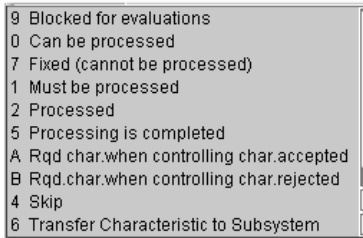


Figure 7.13 Characteristic Status (© SAP AG)

When you call the screen **Record Results** the **General** tab is activated, and the column **Result** is ready for entries. You can begin recording the characteristic results.

Attributive Characteristic Results

Our example provides for the confirmation of attributive (qualitative) characteristic results. If you want to record qualitative results, you can only record the evaluation "Acceptance"/"Rejection" or the more differentiated evaluation by using the catalog for characteristic attributes. Figure 7.14 contains an example of a simplified characteristic catalog.

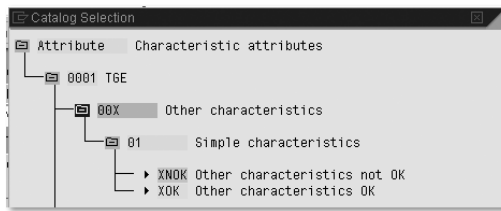


Figure 7.14 Simple Catalog for Characteristic Attributes (© SAP AG)

However, in a worst-case scenario the information "Other Characteristics not OK" is not very informative. Therefore, a somewhat more meaningful catalog should be used. Figure 7.15 shows an example of this.

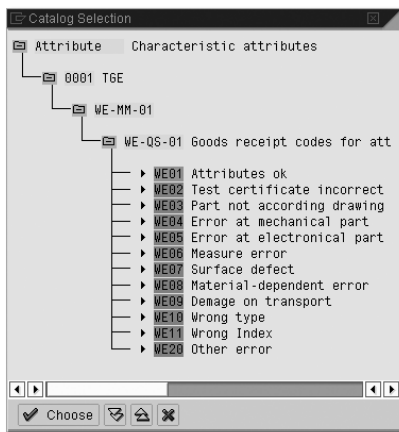


Figure 7.15 Catalog for Characteristic Attributes with Error Type Specification (© SAP AG)

You can save an inspection description for each characteristic as additional information.

When making entries in the **Characteristic Overview** screen, the specification of the quantity to be inspected is also used as the inspected quantity. However, especially for units with non-conforming characteristics, it is worth knowing the number of samples that contain the defect. In order to record this information, you need to select the characteristic by highlighting it and following the menu path **Edit • Characteristic • Choose** or by double-clicking on it. This selection brings you to the screen **Characteristic Single Screen**, and you can enter the exact quantity for **Inspected** and **Non-conforming**.

An example of our CD lid characteristic "width" is shown in Figure 7.16. In this example instead of the required eight pieces, only seven pieces were inspected. This means that upon completion, the message "The inspected sample scope does

not match the planned scope" is triggered. However, this warning can be skipped by using the **Force** function. This message is triggered by the control indicator for the inspection characteristic **Fixed Inspection Scope**.

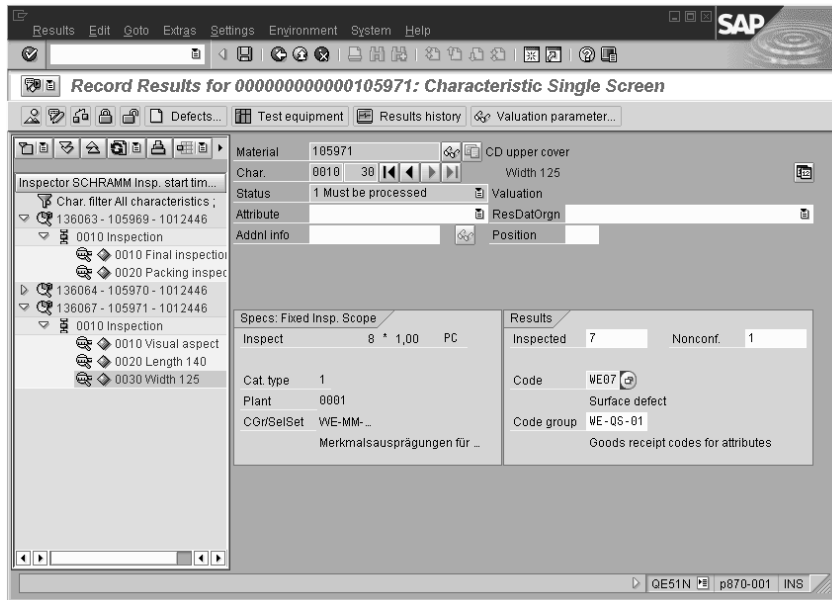


Figure 7.16 Characteristic Single Screen (© SAP AG)

Processing of the characteristics must be completed at the end of the results recording. This task can be carried out for each individual characteristic or for all characteristics together. First select all characteristics, and then select the menu **Edit · Characteristic · Close**.

If not all characteristics have been confirmed, or if the quantity inspected is different from the specification (as in Figure 7.16), you will obtain a notification. You can skip this message and force the completion. If no error code has been specified for a characteristic and you force the completion, the system requires you to decide whether the characteristic is to be saved as accepted or rejected. This entry is important in enabling the system to make specific suggestions for the usage decision, as we will see.

Quantitative Characteristic Results

In contrast to the attributive (qualitative) characteristic results for quantitative (variable) characteristics, also you can confirm specific measured values. In this context it is also possible to include both qualitative and quantitative characteristics in an inspection operation.

In the case of quantitative characteristics, the **Characteristic Overview** is different from that shown in Figure 7.10, as there's an additional tab available: **Unit of Inspection**.

The reason for this is that the control indicator **Individual result** was selected under **Result confirmation** during the creation of the characteristic in the inspection plan. This means you can number the sample devices serially (or use an existing serial number) and enter a measured value for each unit of inspection. In order to enter the measured values, you should use the screen **Single Values for Characteristics**. To do this, you only need to click on the characteristic.

In addition to the individual results per unit of inspection, you can also plan a summarized recording or a classed recording. For variable measured values, the summarized recording only makes sense if you do not need any original values, as the mean value is created on the basis of the entered values. This type of recording could also be helpful if, for instance, you measure the diameter of a shaft at several points but only the mean value is to be documented. A classed recording can be useful if you plan an evaluation with the histogram, as the planned measured-value classes are also used to display the histogram.

Let us take the example of our CD cover, described in previous chapters, in which the characteristic "0010 length" is created as a quantitative characteristic, Figure 7.17 shows entry values for a sample of seven units.

By closing the variable characteristic, a few evaluations take place, which you can also see in Figure 7.17. First, the result is evaluated with regard to acceptance/rejection. As all measured values were located within the required tolerances, the evaluation was completed with **Acceptance** (indicated on your screen by a green checkmark). In addition, the fields were correspondingly set with **Inspected** and **Non-conforming**, and the mean value and standard deviation were calculated. In addition, the **Histogram** function was called to display the standard distribution according to the measured values. In addition, you can also calculate and display the process capability indices cp and cpk.

For Figure 7.17, the new SAP Easy Access display that is available from Release 4.6 onwards was selected. In this display, all information is displayed in one screen. Of course this requires a correspondingly large monitor and a higher resolution. However, the options from older releases are also still available, in which the information is displayed in several overlapping windows on the screen. You can thus select your preferred display form by specifying the type of access in the menu tree.

Another way to display quantitatively recorded individual values is the *run chart* which displays the run of the measured values of a characteristic as a curve.

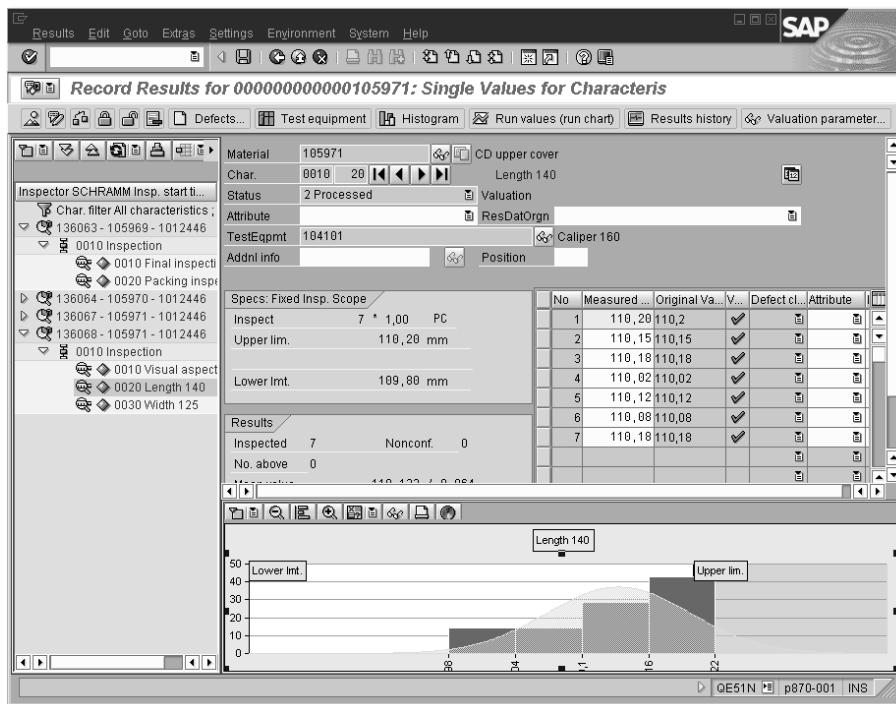


Figure 7.17 Recording Screen for Individual Characteristic Values (© SAP AG)

There, you can identify trends and the situation in relation to tolerance limits, although no action limits are displayed.

In many cases, these evaluation and display options should be sufficient and eliminate the need for an external statistical program. In those cases where the requirements for statistical evaluation are higher, the R/3 statistical interface (QM STI) provides the option of further processing the data with an external statistical software.

Tip If you must record the measured values as quantitative inspection results only occasionally, you can make the entries manually via the keyboard. However, if this occurs frequently, a keyboard wedge is advisable. You can directly connect test equipment to it and transfer measured values directly in the input screen. You will learn more on this in Section 7.10.

As is the case with the attributive characteristics, you also can force completion for quantitative characteristics without having entered any measured values. The system then displays a warning messages and asks if the characteristic should be accepted or rejected.

Required and Optional Characteristics

In inspection planning, you can use the control indicators of the inspection characteristics to determine whether results recording is mandatory (required characteristic) or optional (optional characteristic). In the results-recording screen, this is indicated by the status of the characteristic (O = optional characteristic). The processing doesn't need to be completed; completion is absolutely necessary only for required characteristics.

In an enhanced hierarchy tree of the results-recording worklist, you can recognize on your screen the status of the characteristics also from the color. Required characteristics are displayed in yellow and optional characteristics are displayed in light blue (Transaction QE51).

Unplanned Characteristics

You might want sometimes to record results for a characteristic that wasn't provided for in the inspection plan. To do this, you enter a new characteristic in the results recording. However, there is a little snag to it: You can only enter master characteristics.

Tip You can simply create a master inspection characteristic called "Other characteristic" and enter this as required as an *additional characteristic*.

Provided you have already created this master characteristic, from the **Edit** menu of the screen **Record Results: Characteristic Overview**, call the item **Create Additional Characteristic**. Enter the source code for the master-inspection characteristic. The system then requests the sample procedure for this new characteristic, and you can then use it for results recording.

Results Recording Using Control Charts

In the QM module, you can use the following types of control charts:

- ▶ Mean-value chart considering tolerance values (acceptance chart)
- ▶ Shewhart chart for the mean value
- ▶ Shewhart chart for the standard deviation

The type of control chart used is established during the inspection planning of the characteristics and the sampling procedures used. You can specify if a separate control chart is to be used for each inspection lot or if you want to use a control chart for several inspection lots.

is specified for inspections with a plan, this procedure must be entered in the inspection data for inspections without a plan.

With these settings, for instance, you can create an inspection lot at goods receipt. Unfortunately, this inspection lot is not contained in our results-recording worklist, as only inspection lots with characteristics are displayed there. However, since we have no plan, there are no characteristics for which a result should be recorded.

For such an inspection lot, we must go directly to **Inspection Lots without Usage Decision** without confirming inspection results. Therefore, in the input screen for the usage decision, only the two tabs **Defects** and **Inspection Lot Stock** are available. Of course, you can record defects for the usage decision (inspection lot), as described in Section 7.3.2. However, these can only be errors in the inspection lot and not on the operation or characteristic, as these are only possible during an inspection with a plan.

Evaluations

Once you have completed a characteristic it is evaluated and a decision is made on its acceptance or rejection. The evaluation is indicated on your screen with a green checkmark (acceptance) or a red X (rejection). You can set different types of evaluation:

- ▶ Manual evaluation
- ▶ Evaluation based on codes from the catalog of characteristic attributes
- ▶ Evaluation based on non-conforming units and/or the number of defects
- ▶ Evaluation based on the tolerance range of variable characteristics
- ▶ Evaluation based on the violation of action limits for quality control charts

If an automatic evaluation was provided for, but this could not be executed—if, for example, no characteristics or too few characteristic results were confirmed—an input window appears with the request to carry out a manual evaluation.

7.3.2 Defects

The recording of characteristic results as measured values, or via the attribute code of the characteristic catalog, is also referred to as planned characteristic results. In contrast to this, unplanned characteristic results represent the creation of a defect-data record. This is not to be confused with the negative characteristic results reflected in the characteristic catalog. The entry of defects represents an independent process that opens further options. It is, for instance, ideally suited to meet the standard requirements of ISO 9000 with regard to carrying out corrective and preventive measures.

Defects can be created at different stages of results recording for the inspection lot. Thus, we differentiate between the following defects:

- ▶ Defect for characteristic
- ▶ Defect for operation
- ▶ Defect for inspection lot

Let's now run through the creation of a defect-data record in the case of "Defect for characteristic" and describe the options of this instrument.

In the **Record Results: Characteristic Overview** screen for each characteristic, you can see a paper symbol in the column **Defect for characteristic**. As soon as you click on this symbol, the input screen for the defect recording is called. You can also call the screen via the menu structure. Select the **Edit** menu, and under **Defect** you will find the above-listed defect input options.

Before entering a defect you will first be prompted to select a defect code from Catalog 9, **Defect Types**. This is a different catalog than Catalog 1, **Characteristic Attributes**, which we know already from recording the characteristic results. The advantage of this type of defect recording is obvious: for each characteristic you can enter several **Defects**, the respective **Number of Defects** and a descriptive **Text**. You can see an example in Figure 7.19.

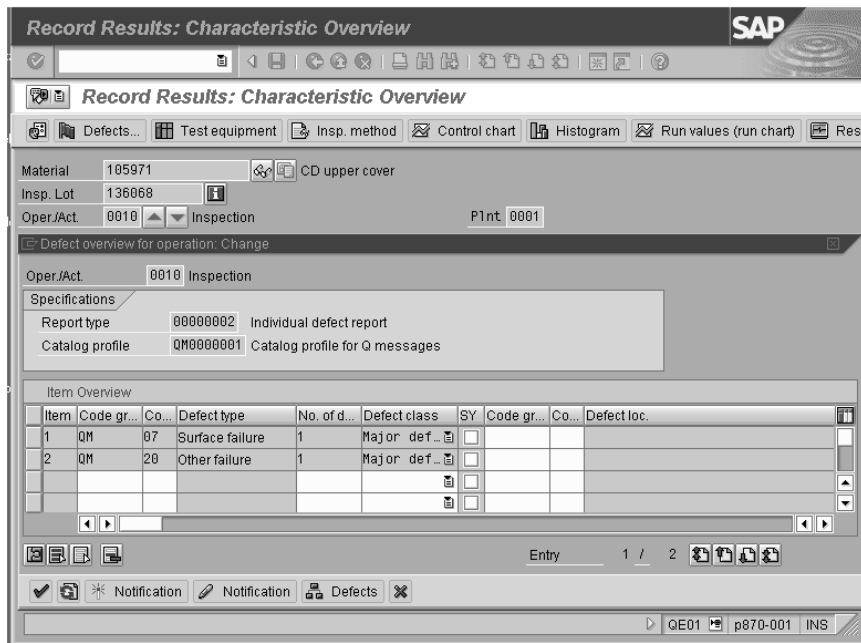


Figure 7.19 Defect Recording for the Characteristic (© SAP AG)

Tip It has been proven in practice that we can design defect catalogs for the characteristic attributes and the defect types in the same way, because each characteristic that is not OK also can be assigned a defect type.

Finally, from every level of the defect creation, you can activate a quality notification manually as well as automatically. This means you can inform an internal or external partner quickly about defects that have emerged. If several defects were recorded, for instance for different characteristics and for the operation, the quality notification contains a list of these defects. The automatic creation of a quality notification should be used with caution, as it is through this setting that a large quantity of created notifications emerges in the system, which must be systematically processed. In real life, the manual creation of the quality notification for a defect has proven to be the most reliable option. You will find additional details on the subject of *Quality Notification* in Chapter 9.

7.4 Inspection-Lot Completion

By **Completing** and **Saving** the characteristics, the results recording is completed. This means that an evaluation of all characteristics with regard to acceptance or rejection is available. In order for the inspection lot to be completed the usage decision, and, for stock-relevant inspection lots, the posting of the inspection lot stock still needs to be done.

The inspection-lot completion is assigned the following actions, which are manually taken or automatically run by the system:

- ▶ Evaluation of the inspection results
- ▶ Calculating the defect portions per lot
- ▶ Determining the quality scores
- ▶ Updating the quality level
- ▶ Making a usage decision
- ▶ Posting the stock
- ▶ Calculating the inspection costs
- ▶ Updating the key figures in the QM information system

As many of the actions mentioned above are directly related to the tasks of quality control, these will be described in detail in Chapter 8, *Quality Control*.

Inspection Results

In order to reach an informed usage decision with regard to an inspection lot, you must know the inspection results. The screen **Record Usage Decision** provides all the information needed to make the decision in the following tabs:

- ▶ **Characteristics**
- ▶ **Defects**
- ▶ **Inspection lot stock** (in so far as the lot is relevant to the stock)
- ▶ **Inspection points** (provided that inspection points have been planned)

By double-clicking on individual characteristics you can display additional details of the characteristic results, and you can read inspection descriptions.

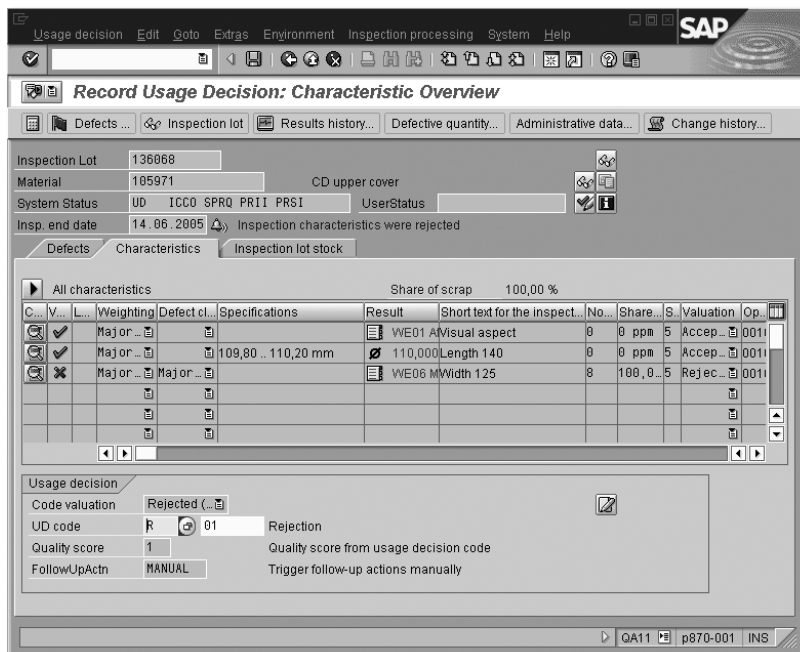


Figure 7.20 Usage Decision Screen with Characteristic Results (© SAP AG)

Inspection Report

The inspection report displays the inspection results and comments on every characteristic on the screen or in the form of a printout. This means it can also be used to provide an overview of the inspection carried out or it can be referred to as a basis for the usage decision. It can also serve as an attachment to a quality notification to the vendor or to internal departments to describe in detail the deviations of individual characteristics according to type and scope in the case of defects.

In order to display the inspection report, select the following path from the menu tree: **Quality Inspection • Info System • Inspection Result • Print**. Then the selection screen **Results print** is shown.

If the inspection lot number is known, you can enter it directly. Otherwise, the selection allows you to make limitations through known parameters such as material number, vendor, date, among others.

Figure 7.21 shows an example of how such an inspection report could appear in the screen display. Of course, you can also print out this inspection report.

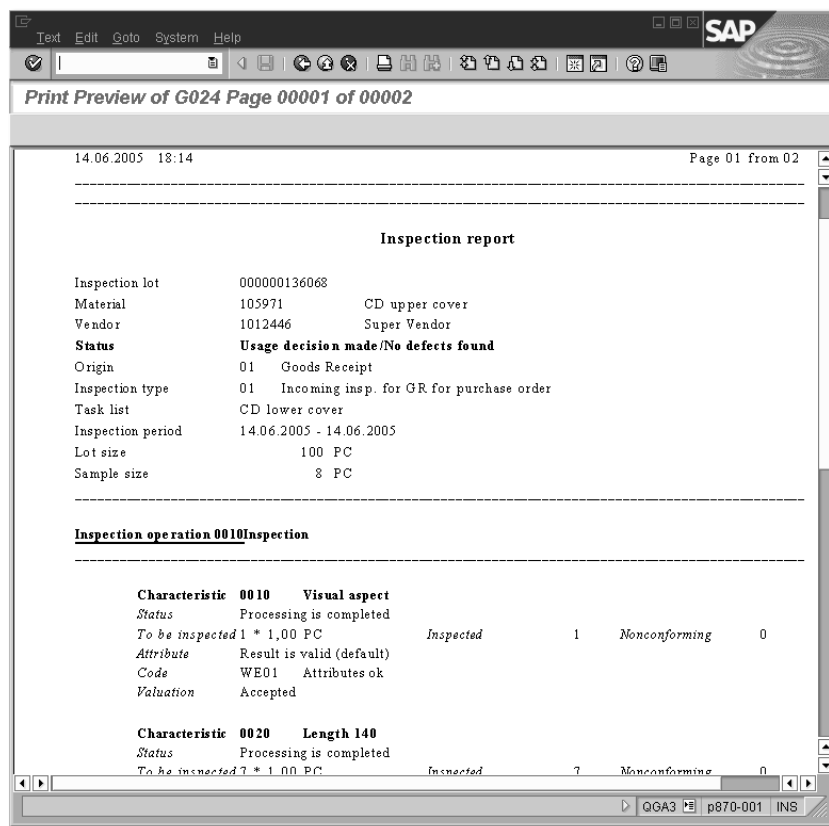


Figure 7.21 Inspection Report (© SAP AG)

7.5 Inspection Costs

The consideration of quality-related costs also belongs to the tasks of quality management. In many companies these costs can form an essential part of the expenses. By recording and evaluating quality-related costs, a company can initiate improvements that increase efficiency and profitability.

Quality-related costs are usually divided into the following categories:

- ▶ Inspection costs
- ▶ Prevention costs
- ▶ Non-conformity costs

The collection and evaluation of costs in companies is carried out in the Controlling module (CO). In that module, the quality-related costs that were recorded in the QM module as inspection and non-conformity costs are merged and can be formatted for quality evaluation. There are different order categories to record costs from the different applications in CO. For example, to record costs from Quality Management, the QM order with order category 06 is provided. The QM orders are then once again divided into the following types:

- ▶ General QM order for inspection costs (one order for several materials/inspection lots)
- ▶ Individual QM order for inspection costs (one order for a specific inspection lot)
- ▶ QM order for non-conformity costs (one order for a quality notification)

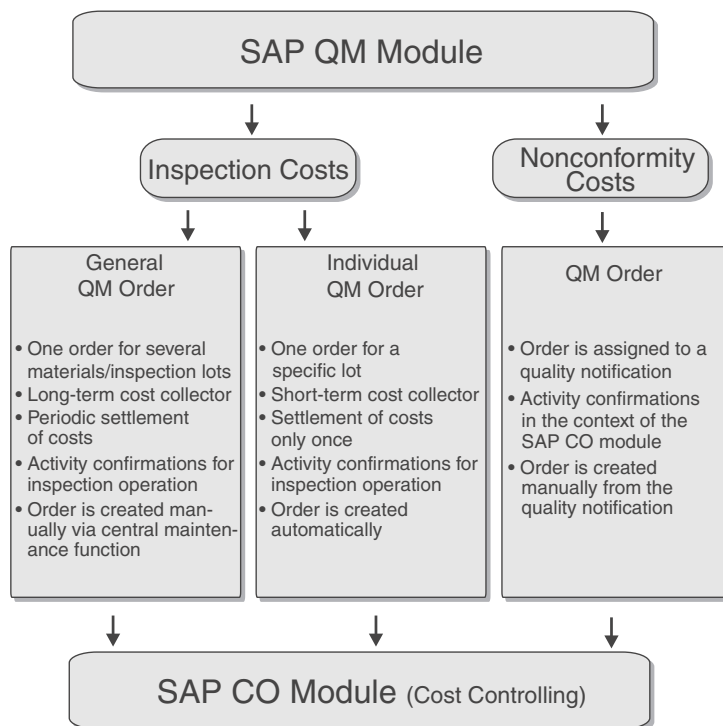


Figure 7.22 Recording Quality-Related Costs

The inspection costs cannot be directly specified in monetary amounts. They are instead calculated on the basis of confirmed performance times achieved for the inspection operation in the Controlling module from the scales set. As in work scheduling, the performance times are compiled from time and labour data, set-up times, and machine times. The confirmation of performance occurs with the results recording or the usage decision. In production, it is carried out together with the confirmations of the production order.

The non-conformity costs are recorded with the processing of the quality notification. For this reason, the QM order must be created manually as a cost collector in the quality notification. In this order, which is assigned to the notification header, you can record the costs such as rework costs, sorting costs, or warranty costs. This way, you can determine all types of non-conformity costs related to the quality notification, and if necessary charge the person responsible and further analyze the costs in Controlling.

The prevention costs which mainly include training measures are recorded through the Human Resource Management component.

7.6 Sample Management

In the process industries (for example chemical, pharmaceutical and food industries) the withdrawal and management of physical samples is very important. The generation of physical samples can be necessary at goods receipt or during production. The requirements of Good Manufacturing Practice (GMP) in the process industries are met with R/3 Sample Management.

The system supports the following types of sample generation:

- ▶ Automatic generation of physical samples during inspection-lot creation
- ▶ Manual generation of physical samples (if needed, with reference to an inspection lot)
- ▶ Manual generation of inspection lots for existing physical samples

Sample Data Record

For each physical sample, a physical-sample record is created which contains the following essential information:

- ▶ Sample number
- ▶ Sample type (from goods receipt, from production, from customer complaints)
- ▶ Physical-sample category (primary sample, pooled sample, reserve sample)
- ▶ Sample origin (material, batch, order)
- ▶ Detail data

Planned Physical Samples

If the physical samples were planned in a sample-drawing procedure, they are automatically generated during inspection-lot creation. The sample-drawing procedure determines how many samples are to be drawn, the scope of the samples, if the sample-drawing is to be confirmed, and what physical-sample category is to be used. This procedure is logically assigned to the inspection plan or routing. When the physical sample is generated, a sample-drawing instruction can also be printed out with the inspection-lot creation, which contains detailed information on how the sample is to be drawn.

The following physical-sample categories are available for selection:

▶ **Primary sample**

The primary sample is drawn directly from a material/batch stock. You can inspect these samples or create pooled samples from them.

▶ **Pooled sample**

This sample is created by mixing other physical samples from the same material/batch.

▶ **Reserve sample**

The reserve sample is drawn from a material/batch stock and stored for other inspections.

If the material is supplied in different physical-sample containers, you can store corresponding instructions depending on the physical-sample container.

Unplanned Physical Samples

In the context of sample management, it can also be necessary to draw physical samples that were not planned. This can be done in two different ways:

- ▶ You can manually generate an entirely new physical sample.
- ▶ You can manually generate a physical sample for an existing physical-sample record.

Manual Inspection Lots

For each existing physical sample, you can also create manual inspection lots. These can, for instance, perform additional inspections for reserve samples or for samples that were not accepted by the customer.

As already described in Section 7.2, no stocks can be managed with manual inspection lots.

Confirmation

In the sample-drawing procedure, you can determine whether automatically created physical samples are to be released automatically or manually (confirmed). Upon confirmation of a physical-sample drawing, all corresponding physical samples are released. Under the security aspects of GMP, a manual confirmation can be required. In addition, there is the option of entering a digital signature, which ensures that certain activities (e.g. the confirmation) can be executed only by authorized employees. Manually created physical samples must always be confirmed manually.

Label Printing

For automatically created physical samples, you can print out labels for the samples. You can create these labels according to your requirements and ideas, and can print details such as name, date, time, batch, sample number, and inspection-lot number, and even add a barcode. Of course, you can also manually trigger label printing for the sample data record.

Results Recording and Usage Decision

The results recording for the physical sample is done in the same way as the inspection lot results recording. The physical samples are located in a specific results recording worklist (related to the work center or the user) and can be processed from there. One or several physical samples can exist per inspection lot. Only when all physical samples for an inspection lot have been processed and evaluated can you make a usage decision for the inspection lot.

Unplanned (manually created) physical samples must first be manually released (confirmed), before you can record results.

7.7 Quality Inspection in Sales and Distribution

Inspection-lot generation and results recording in sales and distribution is only slightly different from the procedures in materials management. Instead of generating the inspection lot for goods receipt, the inspection lots are generated at goods issue, for specific goods movements (for instance for a return), or for a customer complaint. There is also the option here to manually create inspection lots.

The inspection-lot generation can also be connected to the material or customer so that the agreed inspections are only executed for specific customers or materials. Results recording in sales and distribution corresponds to the process already described.

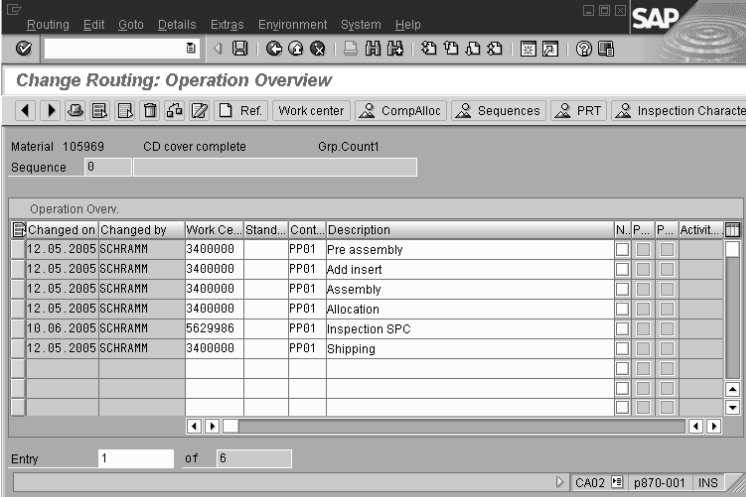
Certificates

Different customers require specific certificates, for example on properties warranted, material quality, works test certificates, or inspection proof. You can configure the system so that these certificates are automatically generated for the respective customers and deliveries, and are automatically printed out or faxed.

7.8 Quality Inspection in Production

Regarding the essential processes, quality inspection in production basically corresponds to that in materials management. There are however a few important differences.

Inspection in production is based on the idea that inspections executed during the production process are your own responsibility (operator inspection). Therefore, quality inspection in production is integrated in production planning and execution. As we already described in Chapter 6, *Quality and Inspection Planning*, the operations of quality inspection in production are contained in the routing. The inspection operations are in principle not different from other production processes in the routing. It is only at the next level, at which the inspection operations are also assigned inspection characteristics, sampling procedures, and characteristic catalogs, that the additional functionality of the quality management module opens up. You can see an example of a routing with an inspection operation in Figure 7.23.



The screenshot shows the SAP 'Change Routing: Operation Overview' window. The material is 105969, 'CD cover complete', with group 'Count1'. The sequence is 0. The table below lists the operations in the routing:

Changed on	Changed by	Work Ce...	Stand...	Cont...	Description	N.	P...	P...	Activit...
12.05.2005	SCHRAMM	3400000		PP01	Pre assembly		<input type="checkbox"/>	<input type="checkbox"/>	
12.05.2005	SCHRAMM	3400000		PP01	Add insert		<input type="checkbox"/>	<input type="checkbox"/>	
12.05.2005	SCHRAMM	3400000		PP01	Assembly		<input type="checkbox"/>	<input type="checkbox"/>	
12.05.2005	SCHRAMM	3400000		PP01	Allocation		<input type="checkbox"/>	<input type="checkbox"/>	
10.06.2005	SCHRAMM	5629986		PP01	Inspection SPC		<input type="checkbox"/>	<input type="checkbox"/>	
12.05.2005	SCHRAMM	3400000		PP01	Shipping		<input type="checkbox"/>	<input type="checkbox"/>	

Figure 7.23 Routing with Inspection Operation (© SAP AG)

The release of a production order generates the inspection lots for the inspection operations. The entire quantity can also be split into partial lots. The inspection documents (sample-drawing instructions and inspection instructions) are printed out together with the shop floor papers. Due to the sequence of inspection steps in the routing you can map both in-process inspections and final inspections.

Inspection lots for production can be created manually, as well as through goods movements or a goods receipt from production.

The integration of inspections in the routings requires a close collaboration between inspection planning and work scheduling, provided this is not done by a central authority or a responsible person. In the production operation "Inspection," the test equipment is displayed as production/resource tool. No separate inspection plans are required.

The inspection results are confirmed in the same way for each inspection lot and inspection characteristic as already described. Here, inspection in production is the same as inspection in the other applications.

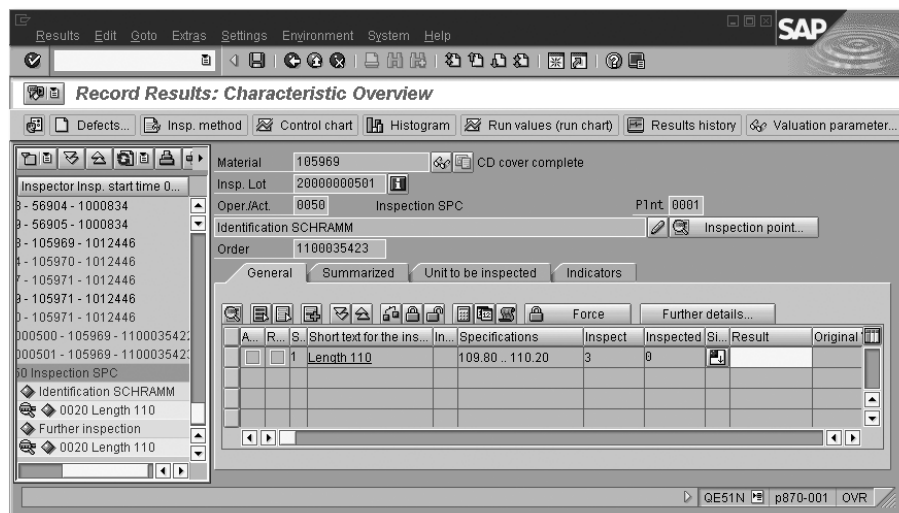


Figure 7.24 Results Recording for a Production Order (© SAP AG)

The inspection completion is also accompanied by a usage decision (see also Chapter 8, *Quality Control*), although the quantity confirmation does not occur in the usage decision but rather in the production order for the corresponding operation. You enter the relevant quantities **to unrestricted**, **to rework** or **to scrap**. You have the options of partial confirmation, final confirmation, and automatic fi-

nal confirmation. Thus, you can first inspect a part of the production lot and confirm this, and at later time inspect and confirm the rest (final confirmation).

Inspection Points

If you want to perform inspections at specific time intervals, at specific points in time, after the production of specific production quantities, or in response to specific events, you need inspection points. Such events can for instance include a change of containers for finished goods or a shift change. A typical reason for the implementation of inspection points would be the hourly inspection of a sample from running production.

For the implementation, at least the following entries are required in the routing:

- ▶ Planning header—parameters for inspection points
- ▶ Operation (inspection)—inspection interval (quantity, time)
- ▶ Characteristic—sample size (fixed size)

The inspection points also enable the creation of partial lots as well as the assignment of partial lots to batches.

Control Charts

Typically, the control chart is used in production in the statistical process control (SPC) inspection. In a corresponding configuration of the QM module, you can use the R/3 system as an instrument for SPC in production. By using direct measured value entry (see Section 7.10), control charts, and inspection points, you can optimally monitor the production process without having to invest again in specific SPC software solution. You can use the existing IT structure of the R/3 system for the measured-value recording in production which will help you keep the hardware costs within reasonable limits.

Section 7.3.1 contains more information on control charts. You will find a detailed section on the subject of SPC in Chapter 8, *Quality Control*.

Batches

If you intend to implement batch management for your materials, you can assign batches to the partial lots and/or summarize several partial lots to a batch. The inspection results of the partial lots can be directly forwarded to the batch and used for the batch classification. The inspection results can also be used directly to create quality certificates.

Tip In order to transfer inspection results to the batch classification, a material specification must also be maintained for the material that is subject to batch management requirements.

Inspection in the QA Department

If your company's independent inspections are planned in a quality assurance department (QA), this can be mapped without any problem. Inspection lots can also be created in production via goods movements. This means a goods movement leads directly to an inspection lot, or you can manually create such a lot, provided you have customized it correspondingly.

As inspection in this case is separated from production planning, you must set an inspection type and a relevant plan usage in the system. In addition, an inspection plan must be created with this plan usage. For instance, Inspection Type 04 which is available in the standard version, is suitable (goods receipt from production).

This scenario is more or less similar to goods receipt for purchase orders. As previously described, the results are recorded for the planned characteristics.

Example The process of an operator inspection is illustrated using an example from the company's own plastics-molding plant. We make the following assumptions here:

- ▶ We mold a plastic part in our own production (production by lot size).
- ▶ The quality inspection is active for the material.
- ▶ Attributive characteristics exist for an inspection operation in the context of a plant operator inspection.
- ▶ The release of the production order automatically creates an inspection lot.

Consequently, this inspection lot must be available in the worklist. Therefore, we select the selection screen for **Results Recording**, as it was described in Section 7.3. In order to restrict the inspection list to the data which originate from production, it is useful to first enter the inspection lot origin in the selection screen (**03, Production**).

If you compare Figure 7.25 with the worklist from materials management (see Figure 7.10), you will see that there is essentially no difference between the two apart from the number range of the inspection lot numbers. Further inspection and results confirmation are also quite similar in both worklists. Therefore, we refer you to the corresponding process in Section 7.3.1.



Figure 7.25 Example of a Worklist of Inspection Lots from Production (© SAP AG)

7.9 Quality Inspection in Procurement

Now that we have covered the processes in materials management, we will describe in more detail two specific scenarios that can occur on a daily basis.

Scenario

Changing the status of a material upon goods receipt from "subject to quality inspection" to "not subject to quality inspection"

Let's look at the following situation: An eager colleague maintained some materials as "subject to quality inspection" in the R/3 system, although they are not to be inspected. This defect is not noticed at first. The purchaser can create its purchase order without a problem and send it out. One day there is a delivery of material, such as a pallet of toilet paper, and immediately upon the goods-receipt posting the goods are in the inspection stock. Depending on the configuration of the system, an inspection lot is generated at the same time. At the latest, when someone wants to take the toilet paper from the warehouse stock, they will notice that it is located in the inspection stock, and was incorrectly provided for a GR inspection.

In order to salvage the situation, a usage decision is made for the current inspection lot and the goods are posted from the inspection stock into "unrestricted stock." This means the goods are available and can be withdrawn. In order to ensure that this unwanted inspection lot does not cause incorrect key figures, the inspection lot is canceled, which can be easily done via **Inspection Lot · Usage Decision · Change with or w/o History and Usage Decision · Functions · Cancel lot.**

In order to correct this defect for subsequent deliveries, it is sufficient to set the inspection type as inactive in the quality management view of the material by unchecking the **Active** field. If the inspection type is no longer active, the material is

no longer subject to quality inspection. As it does not make sense to keep the inspection type in the quality management view of such a material master, it is even better to delete the inspection type entirely.

In some circumstances, this may not be sufficient. If a larger quantity was ordered by purchasing and only a partial quantity is delivered due to a scheduling agreement schedule, this means that the same problem will occur again at the next goods receipt, and it even will happen if the inspection type was deleted in the meantime! The explanation for this is that the respective time validity periods must be taken into account. The purchase order is based on whether the material is subject to quality inspection at the time of the purchase order. If the material, as in our case, is later changed to "not subject to quality inspection," this does not in turn affect the current purchase order, but rather affects purchase orders which are newly created.

The reverse scenario is also not unusual. Let's assume that after the posting of a goods receipt you find out that this material should actually always undergo a GR inspection. In order to ensure that the following scenario of a catch-up GR inspection also makes sense, we will assume that the goods are still available, so that on the one hand a sample can still be drawn and on the other hand the goods can be blocked due to a negative inspection result.

Tip If a material that was planned for quality inspection is changed in such a way that it is no longer subject to quality inspection, you should check if open purchase orders exist for this material. If this is the case, the change only affects new purchase orders. However, if you want this change to take effect immediately, the current purchase order must be changed. To do this, you must uncheck the **Quality inspection** field in the **Change purchase order** menu and save the purchase order. Before you do this, the inspection type in the quality view of the material master must be set to inactive.

Scenario

Changing the status of a material upon goods receipt from "not subject to quality inspection" to "subject to quality inspection"

The solution to this scenario is quite simple: You perform the required actions for inspection planning for this material afterwards, then cancel the goods receipt and carry a new goods-receipt posting. The change from "not subject to quality inspection" to "subject to quality inspection" takes immediate effect here. In other words, the new goods receipt posting now generates an inspection lot, and the goods are posted to the inspection stock. This also applies to all other purchase orders and goods receipts, as long as you don't undo the inspection planning settings.

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