

# R/3 System

## MRP Strategies

### Made Easy



Guidebook to Materials  
Requirements Planning

SAP Labs, Inc.  
R/3 Simplification Group

For R/3<sup>™</sup> Releases 3.0D to 3.1I



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## Terminology

The following sections explain the terminology used throughout this guide.

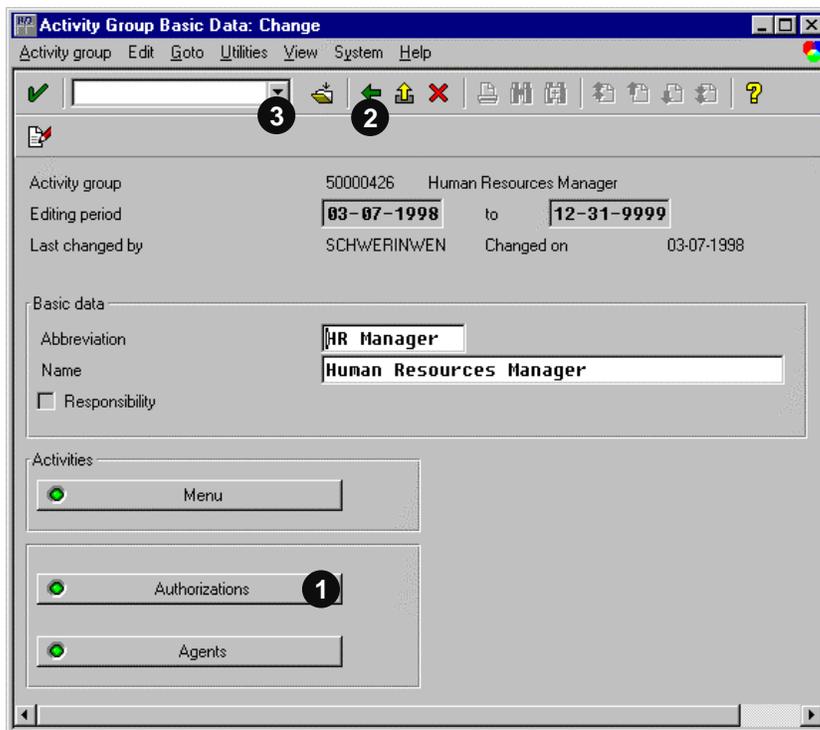
### Click

When you see the word “click,” use the mouse to point and click to perform the action. “Click” is always used for on-screen buttons. For example:

The following phrases ask you to use your left mouse button to click the on-screen button:

1. Click *Authorizations*.
2. Click *Back*.
3. Click *possible entries*.

Number callouts on the screenshot help clarify the activity.

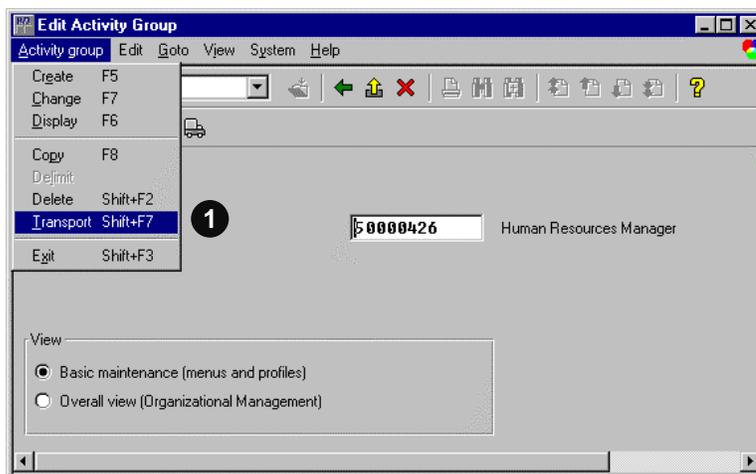


### Choose

The word “choose” always appears with menu paths. Use your mouse to select the menu item from the top of your window. In some cases, a menu path might lead you through several screens.

Menu paths appear as follows:

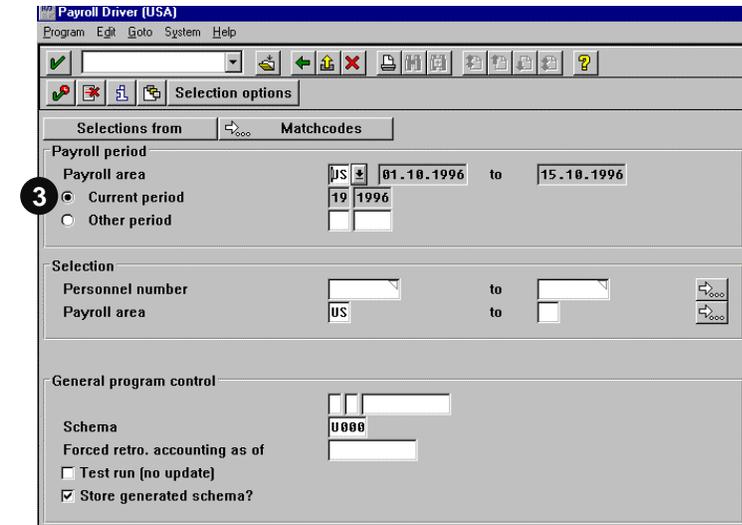
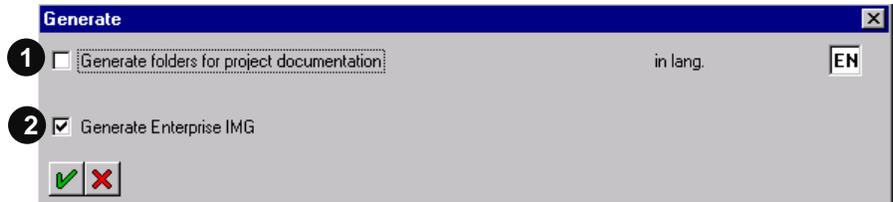
1. Choose *Activity group* → *Transport*.



## Select

The words “select” and “deselect” always appear in instructions for checkboxes and radio buttons. For example:

1. Deselect *Generate folders for project documentation*.
2. Select *Generate Enterprise IMG*.
3. Under *Payroll area*, select *Current period*.



Sometimes “select” is used in conjunction with “click” when a user must click to select a particular line. For example:

4. Click to select the *Header level release* line.



## Typeface Styles

The steps that require “user input” (text to be entered into a field or after a command prompt) are indicated with **bold**, *courier* font such as:

Enter 14287 in *Personnel number*.

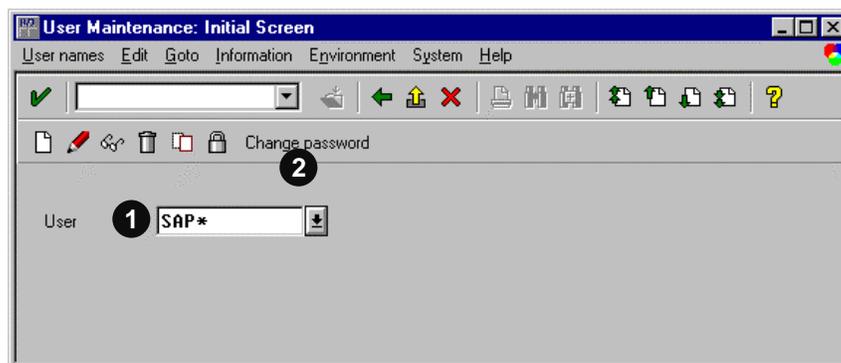
Notice that “Personnel number” appears in *Object style*, which is italicized text that indicates the word is an on-screen object, such as a:

- Button
- Field
- Screen title
- Book or chapter title

- Screen text or messages

For example:

1. In the *User Maintenance* screen, enter **SAP\*** in *User*.
2. Click *Change password*.



With the above examples, in the first step, whenever you see text in **courier bold**—user input style—you know that information needs to be entered. Also in the first step, the words *User Maintenance* and *User* are italicized because they refer to a screen title and an on-screen field.

The second step indicates that an action is required. *Change password* is italicized because it is an on-screen button.

## Special Icons

Throughout this guide you will see special icons indicating important messages. Below are brief explanations of each icon:



Exercise caution when performing this task or step. An explanation of why you should be careful will be included.



This information helps you understand the topic in greater detail. It is not necessary to know this information to perform the task.



These messages provide helpful hints and shortcuts to make your work faster and easier.



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## Overview

The overall goal of production planning—and the use of planning strategies—is to better serve your customers by reducing:

- Storage costs
- Replenishment lead times

To reach that goal you should group your materials according to their individual needs. You should create as few groups as possible (for better transparency on the shop floor) and as many as necessary (for flexibility). The following examples may provide the criteria to group:

- Cheap materials, which could be planned-consumption based.  
It is more important to have these materials permanently available than to run out of them. The effort to plan these materials should be minimal.
- Expensive materials, or those with long replenishment lead times, which need a more sophisticated planning approach.

Consider the following questions when grouping the materials:

- Who is responsible for the production plan?
- Are the materials produced before or after the arrival of sales orders?
- How should the actual stock level affect production?
- Do you need a consumption of planned quantities? When should this consumption take place?  
Consumption of planned production quantities (planned independent requirements) allows for a permanent reevaluation of planned quantities based on actual sales orders.
- On what level in the product structure does your planning take place (finished product vs. subassembly)

Production planning usually takes place only on one level of your product structure. For example, you either perform production planning (“forecast” of demand) on the finished product level or on the subassembly level.

### Disclaimer

All scheduling information in the sample scenarios (stock/requirements lists), including the screens, is subject to your scheduling settings. The actual results depend on your configuration and the setup of your master data. The data is intended to give you typical examples.

### Questions

To select the most appropriate *planning strategies*, answer the questions for each material group (remember to use different strategies for different purposes). To make this guidebook easier to use, we have structured similar strategy groups in such a way as to minimize the time you spend reading the entire document.

### Planning Level

On which of the following levels do you want to plan component procurement:

- Finished product level
- Subassembly or component level
- Characteristics or characteristics value level

#### Finished Product Level

Finished product level planning is used when there is a stable and predictable demand pattern at the **finished product** level (the material sold in sales orders).

#### Subassembly or Component Level

Planning on the component level is used when there is a stable and predictable demand pattern at **component or subassembly** level (the material used in production orders).

For the following reasons, it is often more convenient to plan at the component, rather than on the finished product, level:

- The demand pattern at finished product may be unstable
- Many similar variants of finished products require the same component or subassembly
- Finished products may be consumption based

## Characteristics or Characteristics Value Level

Planning on the characteristics (value) level is used when, for each configurable product, you have a stable and predictable demand patterns at characteristics (value). The use of characteristics requires the use of the variant configurator (see chapter 5, *Characteristics Planning*). Characteristics selection is translated into component selection. Therefore, when planning at characteristics (value) level, you are planning, for example, the characteristic “blue” paint. This characteristic results in the selection of the component “blue paint.” A more complex example is to plan the characteristic “stick shift,” which results in the selection of components related to that characteristic’s value.

## Production Level

Would you like to produce the planned product in stock before a sales order is entered?

- If “Yes,” use a make-to-stock strategy (for example, 10, 11, 40).
- If “No,” use either a make-to-order or a strategy without final assembly (for example, 30, 52, 63, 20, 25, 26, 54, 55, 56, 65, 89)

## Procuring Components

Would you like to procure the components before the entry of sales orders?

- To procure or produce the entire product (the part that you sell) in stock before sales orders can be placed, you should use a make-to-stock planning strategy (40, 10, 11). The components are automatically procured before the sales order entry.
- To procure or produce only subassemblies—essentially planning on a finished product level—you will most likely use strategies **without final assembly** (for example, 50, 52, 55, 60, 63 or 65).
- To procure or produce subassemblies based on plans, which are **independent** of finished products, you will most likely use strategies for the planning of components (70 or 59).

## Responsibility for Production

Who is responsible for the production quantities?

If your production department is responsible for production quantities and the resulting stock levels (and they do not want to rely on sales forecast for the finished products), you can use strategies for planning components and *de-couple* the two departments.

## Influence of Stock

Should the stock level influence the production quantities?

Strategy 11 allows for production that relies only on the planned quantities from Demand Management (without *netting* stock quantities). This strategy is particularly useful if you want to have a determined production plan (for example, if you have to deal with a seasonal demand pattern but want to have constant production).

# Consumption Strategies and Logic

## Purpose

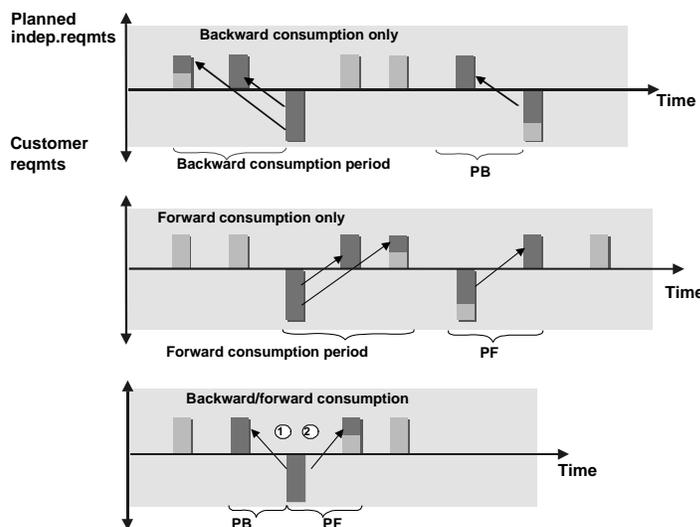
In the consumption process, the system compares planned independent requirement quantities and dates with actual customer requirements. The consumption process is defined for every planning strategy in Customizing for Demand Management by combining a requirements type from Demand Management and a requirements type from sales order management. This step means that the requirements type entered when maintaining planned independent requirements is compared to the customer requirements type specified in Customizing.

## Prerequisites

You must maintain the consumption mode in the *Material Master Record (MRP)* screen or in Customizing for Demand Management. The consumption mode determines whether consumption is to be carried out as backward or forward consumption, or whether both consumption types are allowed. In backward consumption, the system looks for the planned independent requirement quantity that exists directly before the sales order.

In forward consumption, the system looks for the planned independent requirement quantity that exists directly after the sales order. You also need to maintain the consumption period in the *MRP* screen or in Customizing for Demand Management. The consumption period (forward or backward) is specified in workdays and is valid from the current date. Sales orders, material reservations, and dependent requirements then consume the planned independent requirement quantities that lie within the consumption period and after (for forward consumption) or before (for backward consumption) the requirements date.

## Process Flow



The customer requirement consumes the planned independent requirement quantity that either directly precedes or follows it. If the planned independent requirement quantity directly preceding the customer

requirements does not cover the customer's requirement, then the system looks for the next closest planned independent requirements in the future or past.

During this process, the system refers to the consumption periods maintained in the material master or in Customizing for Demand Management (see above). The consumption periods determine the intervals (for backward or forward consumption) within which customer requirements consume planned independent requirements. Customer requirements that lie outside the consumption period are not consumed.

If no consumption periods have been maintained, you can only consume requirements that are planned on the same day. The allocation of customer requirements to planned independent requirements is carried out dynamic. This step means that if sales orders or planning is rescheduled, the allocation is deleted and redefined.

## Determining the Requirements Type

A requirements type contains the control parameters to plan and consume planned independent requirements and customer requirements. Different requirements types or combinations of requirements types from planned independent requirements and customer requirements are defined for each planning strategy.



You do not have to define any new strategies. SAP's standard delivery provides you with all strategies described in this document. There are only a few cases where you should define your own planning strategies.

## Activities

If you want the system to determine the requirements type when automatically creating the planned independent requirements, enter strategy groups for the corresponding materials in the material master record. If the strategy group allows a number of planning strategies, the system proposes the requirements type from the main strategy. You can overwrite this strategy in the sales order using one of the alternative requirements types in the *Overview* → *Procurement* screen.

### Assigning a Planning Strategy via the MRP Group

You can also assign the planning strategy with the MRP group.

1. Assign the **strategy group** to the **MRP group** (in *Customizing for Demand Management*, choose *Planned Independent Requirements* → *Planning Strategy* → *Assign strategy group to MRP group*). The MRP group is assigned to the material in the material master record.
2. If you have entered a strategy group or an MRP group containing the appropriate strategies in the material master record, you do not have to enter a requirements type in Demand Management.

The system determines the valid requirements type with the strategy group from the material master record and automatically proposes this type when creating independent requirements (or customer requirements). If the strategy group contains more than one planning strategy, the system proposes the requirements type of the main strategy. If necessary, you can overwrite this proposal using one of the requirements types from the alternative strategies.

## Maintaining and Defining Strategies and Strategy Groups

The planning strategies represent the business procedures to plan and produce a material. In the system, the planning strategies are recorded in Customizing by a combination of requirements types from Demands and Sales Order Management. This combination determines either the consumption of planned independent requirements by customer requirements or how the availability check is to be carried out.

The planning strategies are maintained in Customizing for Demand Management. Here, the requirements types are combined for the planning strategy. Technically speaking, the requirements types are texts that represent the planning strategy in the application (Demand Management, Sales and Distribution). The requirements type is controlled by another key—the requirements class. The requirements class contains all the control parameters required for Demand Management and Sales and Distribution. To maintain the planning strategy, you only have to combine the necessary requirements types. The corresponding requirements class is automatically assigned with all the accompanying control parameters.

By assigning a planning strategy to a particular material, the system determines the correct requirements type (and all the control parameters of the requirements class) when creating planned independent requirements or sales orders. To set up this mechanism, certain objects and assignments must be set up in the system. The standard system is set up so that you can perform all standard processes described in this guidebook.

The primary object for setup is the planning strategy (in Customizing for Demand Management). This strategy is defined by a requirements type from Demand Management, Sales Order Management or a logical combination of both requirements types. These requirements types determine, for example, how the consumption of planned independent requirements by customer requirements is carried out and whether the availability check according to the ATP logic also occurs.

The following assignments have to exist to assign the requirements classes to planned independent requirements and sales orders:

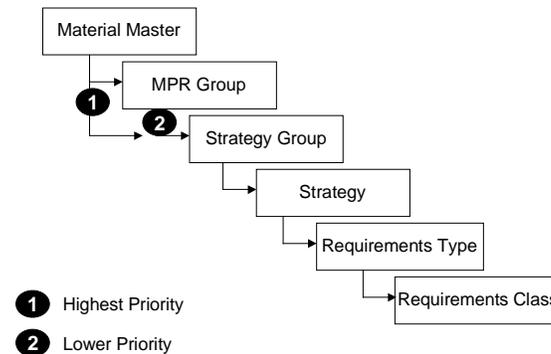
- Planning strategy to a strategy group (in Customizing for Demand Management) so that a material can be planned with various planning strategies.

You can maintain one main strategy and up to six alternative strategies.

- Strategy group to the material (in the material master record), so that the system can automatically determine the correct requirements type.

A planning strategy can also be assigned with the MRP group. Assign the strategy group in Customizing for Demand Management to the MRP group. In this case, the MRP group is assigned to the material in the material master record.

## Determination of the Requirements Type



If you have entered a strategy group or an MRP group containing the appropriate strategies in the material master record, you do not have to enter a requirements type in Demand Management. The system determines the valid requirements type with the strategy group from the material master record and proposes this type automatically when creating independent or customer requirements. If the strategy group contains more than one planning strategy, the system proposes the requirements type of the main strategy. If necessary, you can overwrite this proposal using one of the requirements types from the alternative strategies.

The following strategy groups combine two planning strategies:

- Strategy 31  
Allows you to select the *Make-to-Order Production (20)* or *Production by Lot-size (30)* strategies by selecting the KE or KL requirements types [strategy 20 (KE) is the default]
- Strategy 32  
Allows you to select the *Production by Lot-size (30)* or *Make-to-Order Production (20)* strategies by selecting the KL or KE requirements types [strategy 30 (KL) is the default]
- Strategy 33  
Allows you to select the *Production by Lot-size (30)* or *Planning with Final Assembly (40)* strategies by selecting the KL or KSV requirements types [strategy 30 (KL) is the default]

### Table of Planning Strategy Assignments

Strategy	Requirements Type for Independent Requirements		Requirements Type for Customer Requirements	
10 (Chapter 2)	LSF	Make-to-stock production	KSL	Sale from stock without independent requirement reduction

Strategy	Requirements Type for Independent Requirements		Requirements Type for Customer Requirements	
11 (Chapter 2)	BSF	Gross planned independent requirements	KSL	Sale from stock without independent requirement reduction
20 (Chapter 4)			KE	Individual sales order without consumption
25 (Chapter 5)			KEK	Make-to-order with configurable material
26 (Chapter 5)			KEL	Make-to-order for material variants
30 (Chapter 2)	LSF	Make-to-stock production	KL	Sales order manufactured by lot size
40 (Chapter 2)	VSF	Planning with final assembly	KSV	Sales order with consumption
50 (Chapter 4)	VSE	Planning without final assembly	KEV	Make-to-order with consumption
52 (Chapter 2)	VSE	Planning without final assembly	KSVS	Make-to-stock with consumption without final assembly
54 (Chapter 5)	VSE	Planning without final assembly	KEKT	Make-to-order with consumption of variant
55 (Chapter 5)	VSE	Planning without final assembly	KELV	Make-to-order variant with consumption
56 (Chapter 5)	VSE	Planning without final assembly	KEKS	Make-to-order with consumption of characteristics planning
59 (Chapter 3)	VSEB	Planning; phantom assemblies		
60 (Chapter 4)	VSEV	Planning the planning material	KEVV	Individual customer with planning material consumption
63 (Chapter 2)	VSEV	Planning the planning material	KSVV	Make-to-stock with consumption of planning material

Strategy	Requirements Type for Independent Requirements		Requirements Type for Customer Requirements	
65 (Chapter 5)	VSEV	Planning the planning material	ELVV	Make-to-order variant with planning material
70 (Chapter 3)	VSFB	Planning for assemblies		
81 (Chapter 6)			KMSE	Assembly planned order
82 (Chapter 6)			KMFA	Assembly with production order
89 (Chapter 5)	VSE	Planning for assemblies	KMSE	Assembly planned order

The following planning strategies are used in the Project System (refer to the Project System documentation for more details):

- Strategy 21  
Similar to 20 with project settlement.
- Strategy 51  
Similar to 50 with project settlement.
- Strategy 61  
Similar to 60 with project settlement.
- Strategy 83  
Assembly processing for PS.
- Strategy 85  
Assembly processing for PS.

The following planning strategy is used in Service Management (refer to the Service Management documentation for more details):

Strategy 84      Assembly processing for SM

The following planning strategy is used in PP-PI [(Production Planning for Process Industry) refer to the PP-PI documentation for more details]:

Strategy 86      Assembly processing for PP-PI

## Cross-Plant Planning

### Purpose

Demand Management can also be used to plan across plants. For each material, there is a **planning plant** that procures and stores the materials independently of orders. There are also one or more **ordering plants** where the materials are used for sales orders, production orders, or for other requirements.

### Prerequisites

It is recommended that you first read *Planning with Final Assembly (40)* in chapter 2 to better understand the following example.

Set up the material master as follows:

Planning Plant	Ordering Plant
Any strategy group	Special procurement type = <b>40</b>
<i>Mixed MRP</i> indicator = <b>1</b>	

### Process Flow

The following table illustrates a typical process flow:

Planning Plant	Ordering Plant
Planned independent requirements are created in Demand Management and trigger procurement.	
Procurement takes place before the sales order arrives and materials are placed in stock.	
	Any order (sales order, production order, reservation) is created.
	A stock transport order is created (for example, by converting a transfer request that was created by the MRP run).
Delivery for the stock transport order.	
	Goods receipt for the stock transport order.
	Material is available for order.

## Chapter 2: Strategies for Make-to-Stock Production

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## Purpose

The planning strategies explained in this section are designed for planning procurement (production or purchasing) of components by planning the final products. If you can plan at component level more easily, see chapter 3.

## Prerequisites

Choose a make-to-stock strategy, if:

- The materials are not segregated.  
In other words, they are not assigned to specific sales orders.
- Costs need to be tracked at material level, and not at sales order level.

If you produce stock independently of orders, always use make-to-stock production, because you want to immediately provide your customers with goods from that stock. You may even want to produce goods without having sales orders, if you expect that there might be customer demand in future. This means that make-to-stock strategies can support a close customer-vendor relationship, because the objective is to quickly provide your customers with goods from your stock. Returns that have passed quality inspection and other unexpected goods receipts can be used for other sales orders.

Avoid unreasonably high stock levels by:

- Creating a production plan in advance (in Demand Management) to plan your stock.  
If you make use of this option, you may also want to decide whether sales orders exceeding your plan are to affect production or not.
- Receiving sales orders as early as possible (using scheduling agreements, for example).

## Process Flow

Automate the planning stage by using forecast, flexible planning, or SOP results, and passing the results from these applications directly to Demand Management. For more information, see *Transfer to Demand Management* in the R/3 Library under *Sales and Operations Planning (PP-SOP)*.

In a make-to-stock environment, smoothing production is an important feature. This smoothing means that the irregular requirements flow resulting from different customer requirements quantities can be smoothed and simply produced to stock.

Make-to-stock strategies are usually combined with any lot-size key or rounding values. For instance, you may want to produce the entire amount for the whole month once a month, or you may want to produce full pallets only. In the following sample scenarios, the lot-size key is always *EX* for easier understanding. No specific product structures are required for make-to-stock strategies. In other words, the material may or may not have a bill of materials (BOM). The material can be produced in-house or it can be externally procured.

The strategies *Planning Without Final Assembly and Without Make-to-Order (52)* and *Planning with a Planning Material and Without Make-to-Order (63)* are exceptions to these rules. They require a lot-for-lot lot-size key and require a specific product structure (BOM). From a costing perspective, these are make-to-stock strategies, because costs are tracked at material level. They enable the procurement of components on the

basis of planning and final assembly based on sales orders. Make-to-stock strategies generally consist of up to five stages.

The following table illustrates which stages are involved in which strategies:

Stage	40	30	10	11	52	63
1. Demand Management (Creation of Planned Independent Requirements)	Yes	No	Yes	Yes	Yes	Yes
2. Procurement before Sales	Yes	No	Yes	Yes <sup>2</sup>	Yes	Yes
3. Sales Order	Yes <sup>1</sup>	Yes	Yes	Yes	Yes <sup>1</sup>	Yes <sup>1</sup>
4. Procurement after Sales	No	Yes	No	No	Yes	Yes
5. Goods Issue for Delivery and Reduction of Planned Independent Requirements	Yes	Yes	Yes	Yes <sup>3</sup>	Yes	Yes

<sup>1</sup> = + Allocation

<sup>2</sup> = + Reduction of planned independent requirements

## Planning with Final Assembly (40)

### Purpose

This strategy is probably the most widely used make-to-stock strategy. If you can forecast production quantities for the final product, it makes sense to use this planning strategy.

Planned independent requirements are consumed by incoming sales orders so that the master plan is always adjusted to suit the current requirements situation. Therefore, the important feature of this planning strategy is that you can react quickly to a customer's requirements. The smoothing of the master plan is less important here.

### Prerequisites

You need to maintain the following master data for the finished product in the material master:

- Strategy group 40 on the *MRP* screen
- Consumption parameters (*Consumption mode*, *Bwd consumption*, *Fwd consumption*) to allow consumption of independent requirements

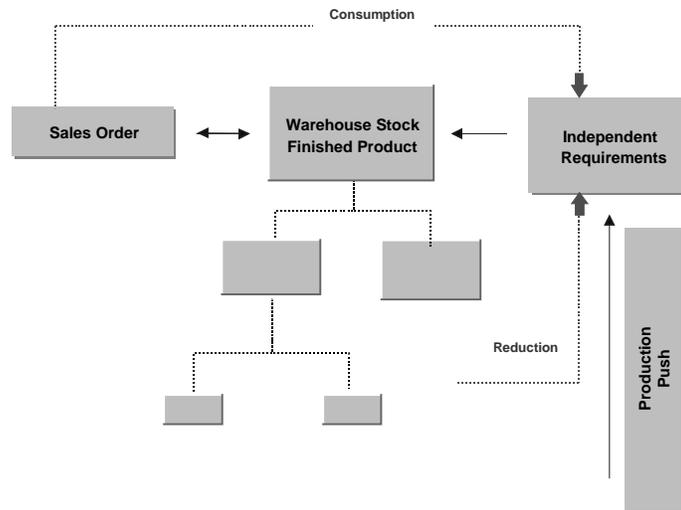
If no consumption parameters are maintained in the material master, default values are taken from the *MRP* group.

- A consumption mode and consumption period to control consumption.

For more information, see *Consumption Strategies and Logic*.

- Item category group (for example, *NORM*) on the *Sales Organization Data* screen.

## Process Flow



For a detailed example of the entire process, see *Sample Scenario: Strategy 40*.

## Key Properties of Strategy 40

- Planned independent requirements are entered at finished product level and trigger the procurement and production of the necessary assemblies and components before receipt of the sales orders.  
 It is possible to use information from the sales forecast, or from the Sales Information System, or other planning tools to plan production quantities.
- As soon as the sales order is received, it consumes the planned independent requirements.  
 This step means that you can compare the planned independent requirements situation with the actual customer requirements situation.
- An accurate availability check is performed according to ATP (available to promise) logic during sales order processing.  
 Here, the system checks whether sufficient planned independent requirements have been planned to cover the sales order.
- Requirements from the sales orders are passed onto production and can lead to changes being made to procurement if the requirements from the sales orders exceed the planned independent requirement quantities.  
 If there is insufficient coverage of components—that is, the sales order quantities exceed the planned independent requirement quantities—the sales orders cannot be confirmed. The system therefore automatically adjusts the master plan. For more information see *Coping with Insufficient Coverage of Components*. Planned independent requirement quantities that are left unconsumed increase the

warehouse stock of the finished product. However, the system does not create additional production orders if sufficient stock exists.

## Other Areas

### Availability Check

Unlike other planning strategies, planning strategy *Planning with Final Assembly (40)* does not require the material master MRP *availability check* to contain a specific value. This field does not impact the strategy 40 planning process. You can also use the SD checking rule with (or without) replenishment lead times and seen in the sales order under *Edit* → *Item availability* → *Goto* → *Scope of check*, according to your business needs.

### Statistics in Demand Management

In the total requirements list in Demand Management, R/3 will display only order quantities that have consumed independent requirements. Quantities in excess of this amount will not be displayed. For example, examine the following situation:

- Stock Available 100 PC
- Planned Independent requirements 50 PC
- Two sales order, 50 PC each order

Order's dates are close enough that they consume the planned independent requirements of 50 PC.

Confirm the creation of the sales orders and the consumption of the planned independent requirements in the *Stock/requirements* list. The total requirements list (*Logistics* → *Production* → *Master Planning* → *Demand Management* → *Evaluations* → *Display total requirements*) only shows the sales order(s), that have created a physical reduction of independent requirements. Orders are allocated to independent requirements on a first-come-first-serve basis. When independent requirements are fully consumed by current orders, they cannot be further reduced by new orders. So, those new orders will not display on the *total requirements* list. The system performs this process dynamically (based on a calculation). Hence, the allocation will not display on the database. As a result, the Demand Management statistics may not display all sales figures over a planning period.

In the above example, only the 50pc of the first sales order will display in the Demand Management's total requirements list, even though more were sold. Other functions, such as LIS or SIS, display those extra orders.

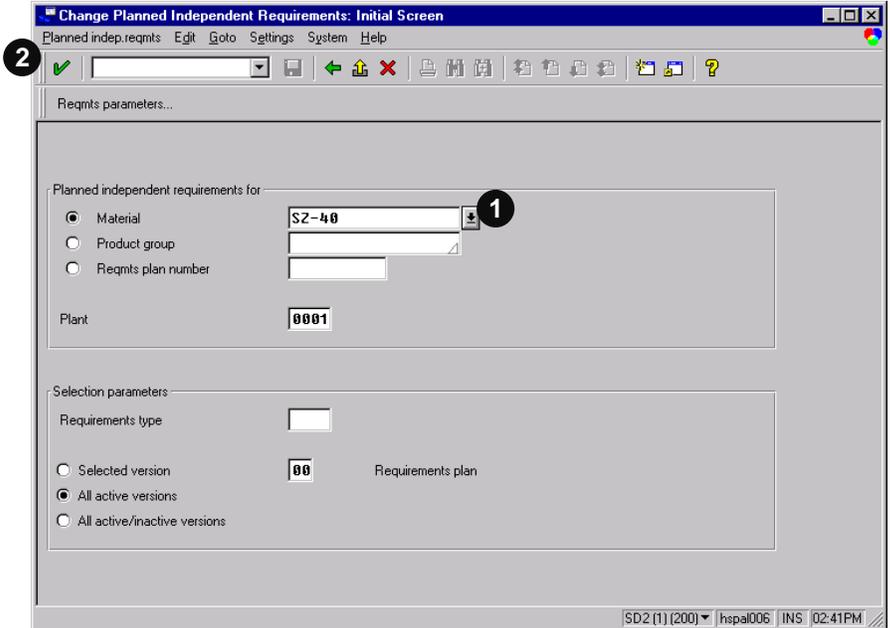
## Sample Scenario: Strategy 40

This scenario is based on a production plan where 100 pieces are planned for <reqdat1>, <reqdat2>, and <reqdat3>.

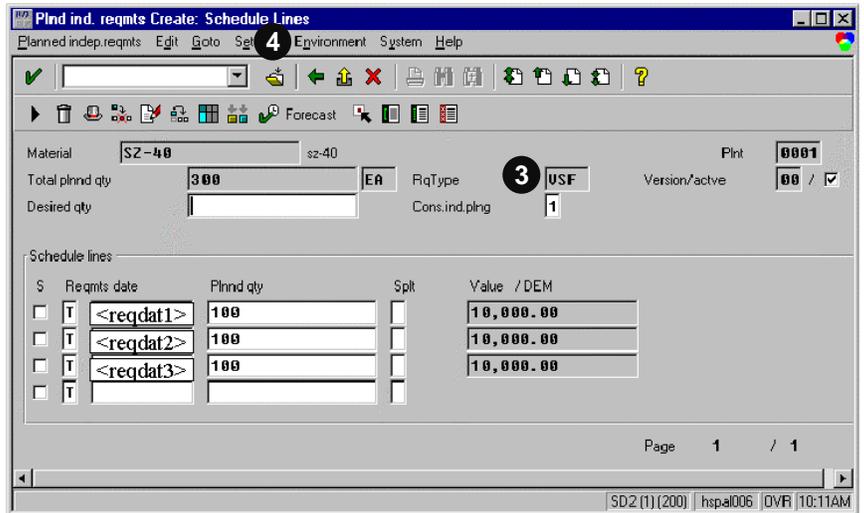
### Stage 1: Demand Management

Planned independent requirements are created for the production plan.

1. Enter the material number to be planned, for example sz-40.
2. Click *Enter*.

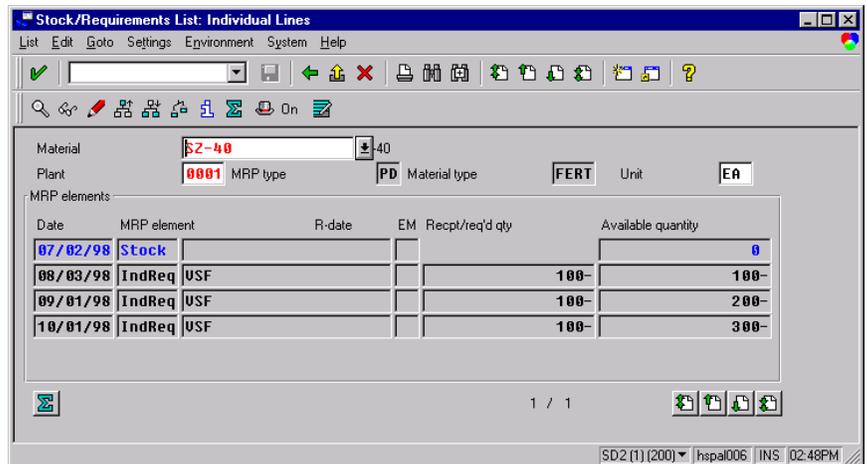


3. The system finds requirements type *VSF* because the strategy group has been set to *40* (see the *Table of Planning Strategy Assignments* in chapter 1).
4. Click *Save* to pass these requirements onto production.



5. To check the results of the previous transactions, choose *Logistics* → *Production* → *MRP* → *Evaluations* → *Stock/reqmts list*.

The stock/requirements list for the above example appears as shown to the right. In the rest of this documentation, the stock/requirements list will appear in table form.



### Stage 2: Procurement Before Sales

A procurement requisition is created in the MRP run. To initiate the MRP run, choose *Logistics* → *Production* → *MRP* → *MRP* → *Total planning*..

The resulting stock/requirements list appears as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<reqdat1>	PlOrd.	1234/Stck	100 +	100+
<reqdat1>	IndReq	VSF	100 -	0
<reqdat2>	PlOrd.	1235/Stck	100 +	100+
<reqdat2>	IndReq	VSF	100 -	0
<reqdat3>	PlOrd.	1236/Stck	100 +	100
<reqdat3>	IndReq	VSF	100 -	0

This procurement requisition is the starting point for production or external procurement. In the R/3 System, various possibilities exist for handling the procurement process. One option would be to convert the planned order into a production order by releasing the production order and a goods receipt of the yield quantity. The second option would be to use returns or other goods movements for make-to-stock production.

After the receipt of the order and a second MRP run, the stock/requirements list appears as follows.

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			100
<reqdat1>	IndReq	VSF	100 -	0
<reqdat2>	PlOrd.	1235/Stck	100 +	100
<reqdat2>	IndReq	VSF	100 -	0
<reqdat3>	PlOrd.	1236/Stck	100 +	100
<reqdat3>	IndReq	VSF	100 -	0

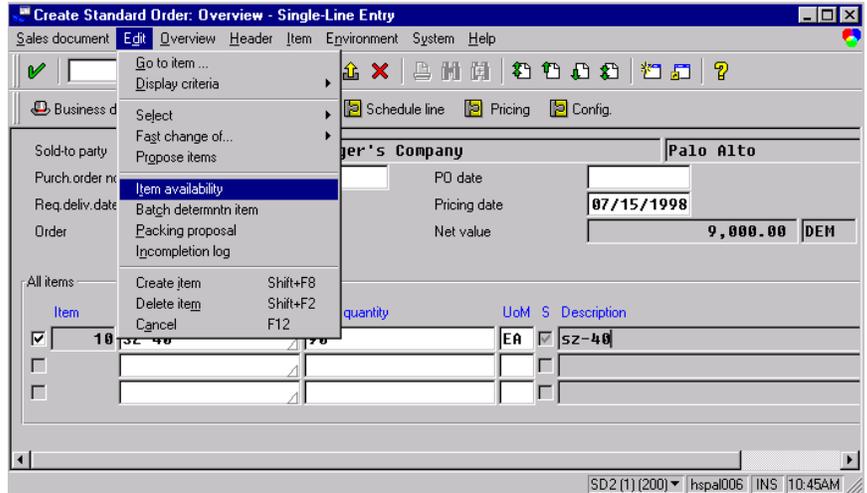
### Stage 3: Sales Order

To create a sales order, choose *Logistics* → *Sales and distribution* → *Sales* → *Order* → *Create*.



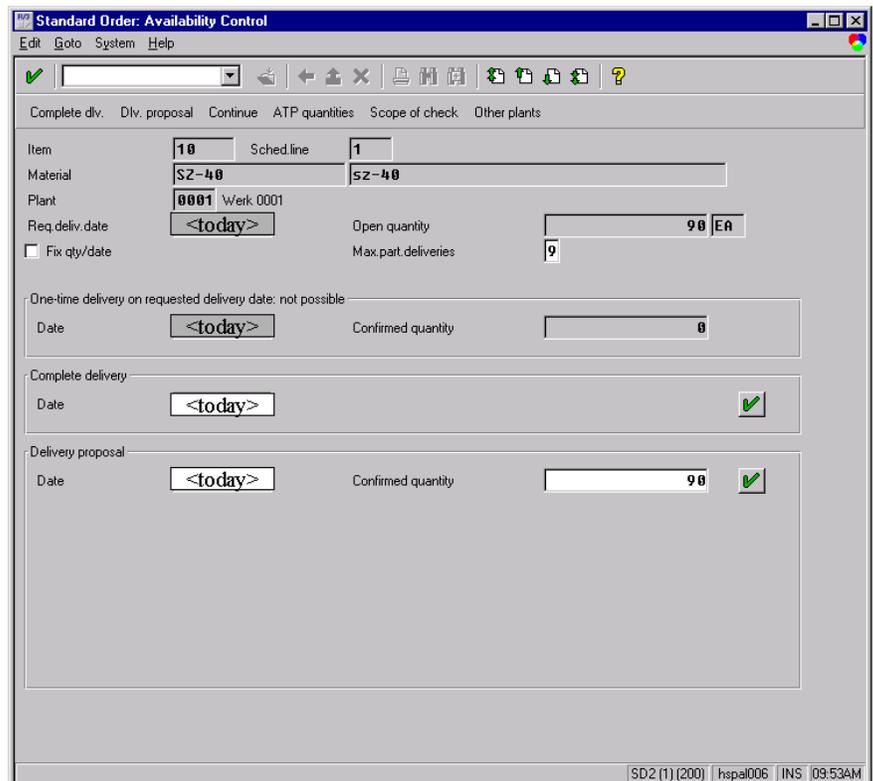
The following steps (1-4) are optional to check the component availability.

1. On the *Create Standard Order: Overview - Single-Line Entry* screen, choose *Edit* → *Item* availability.



2. The quantities on this screen confirm the available quantity. In this example, any quantity—up to the stock quantity—can be confirmed based on the ATP checking rule (100 pieces in this example).

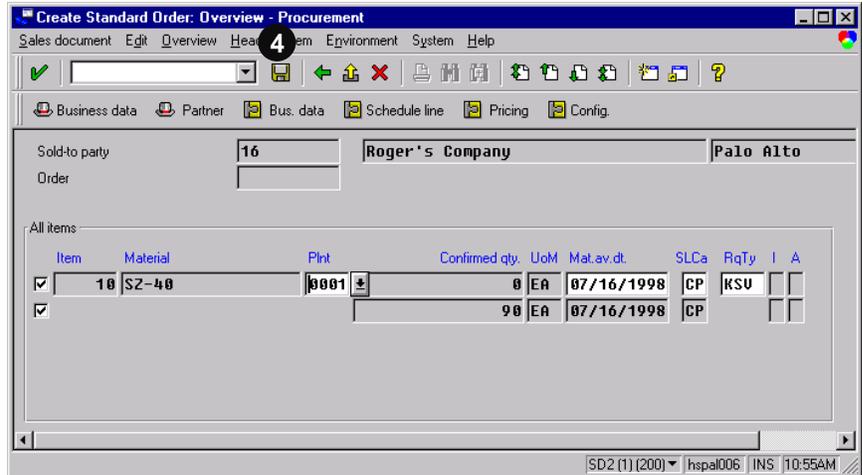
Checking availability proves that stock is available.



- From the *Create Standard Order: Overview – Single-Line Entry* screen, choose *Overview* → *Procurement* if you wish to check the requirements types.

The *Create Standard Order: Overview – Procurement* screen appears.

Because the strategy group has been set to 40, the system will find the requirements type *KSV*. The system finds the schedule line category *CP* and the item category *TAN* because the item category group was set to *NORM*.



- Click Save.

After the sales order has been entered, the stock/requirements list appears as follows:

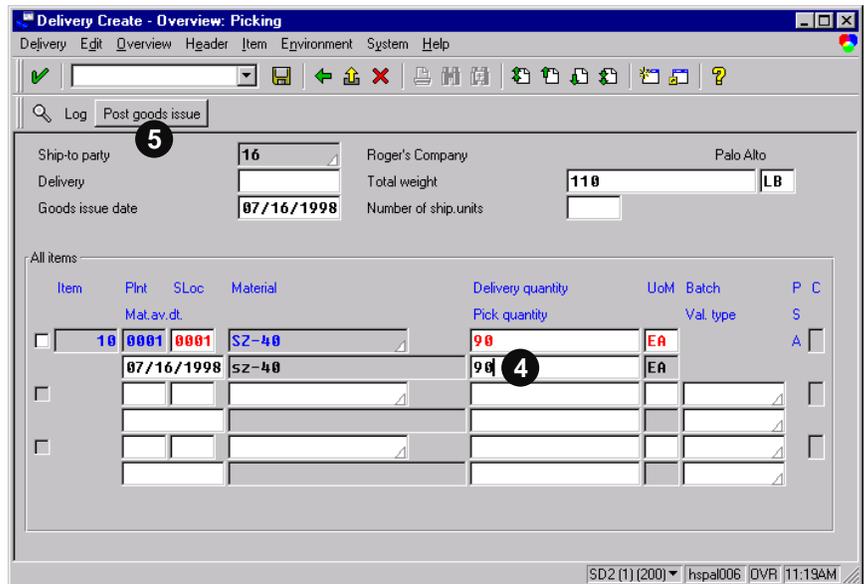
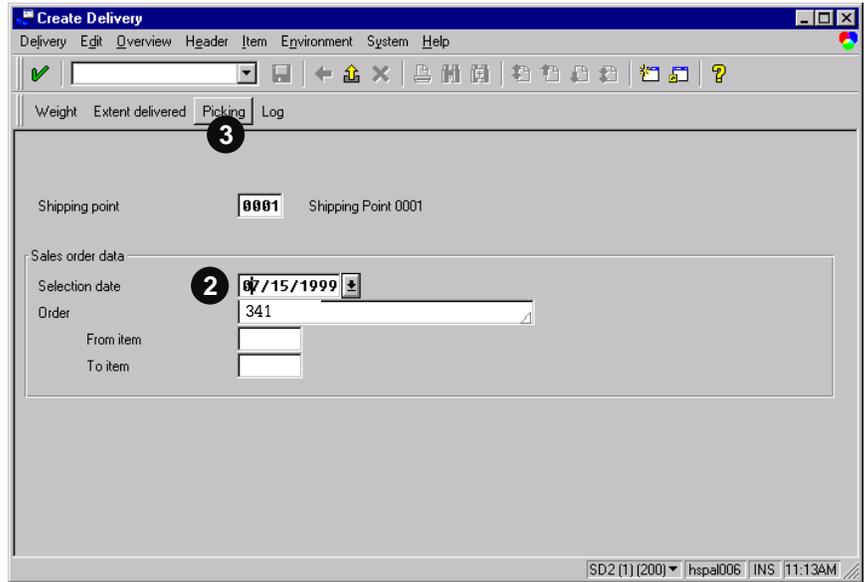
Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			100
<today>	Order	341/010/01	90 -	10
<reqdat1>	IndReq	VSF	10 -	0
<reqdat2>	PlOrd.	1245/Stck	100 +	100
<reqdat2>	IndReq	VSF	100 -	0
<reqdat3>	PlOrd.	1236/Stck	100 +	100
<reqdat3>	IndReq	VSF	100 -	0

#### Stage 4: Procurement After Sales

This stage does not, as a rule, apply in this strategy. If demand exceeds planning, there may be a need for production to take place after sales.

### Stage 5: Goods Issue for Delivery and Reduction of Planned Independent Requirements

1. To create a delivery and post a goods issue choose, for example, *Logistics* → *Sales and distribution* → *Shipping* → *Delivery* → *Create*.
2. In *Selection date*, enter a date greater than the *Planned delivery date* (as calculated in the sales order).
3. Choose *Picking*.
4. Enter a *Pick quantity*.
5. Click *Post goods issue*.



The stock/requirements list appears as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			10
< reqdat1>	IndReq	VSF	10 -	0
<reqdat2>	PlOrd.	1245/Stck	100 +	100+
<reqdat2>	IndReq	VSF	100 -	0
<reqdat3>	PlOrd.	1236/Stck	100 +	100
<reqdat3>	IndReq	LSF	100 -	0

The reduction of the independent requirements is not visible now, because the planned independent requirement was allocated during sales order processing. Technically speaking, however, the planned independent requirement is reduced by the delivery (see *Statistics in Demand Management* earlier this chapter).

## Coping with Insufficient Coverage of Components

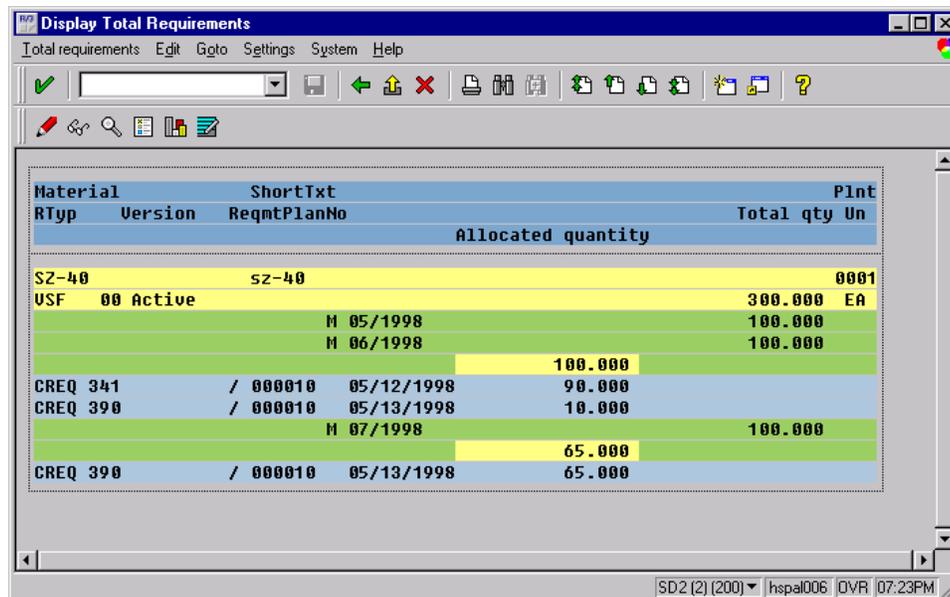
Sales order quantities may exceed planned independent requirements quantities. The scenario that follows appeared first in the section *Sample Scenario: Strategy 40*, but also applies to all planning strategies that use planned independent requirements.

### Process Flow

A sales order with a quantity of 75 pieces is entered. Ten pieces remain in stock, but they are unallocated. Only a quantity up to the stock quantity can be confirmed. The entire quantity, however, is passed onto MRP. After entry of the sales order and an MRP run, the stock/requirements list appears as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			100
<today>	Order	341/010/01	90 -	10
<today>	Order	390/010/01	75 -	65 -
<t + rlt>	PlOrd.	1234/Stck	65	0
<reqdat2>	PlOrd.	1235/Stck	35	35
<reqdat2>	IndReq	VSF	35 -	0
<reqdat3>	PlOrd.	1236/Stck	100	100
<reqdat3>	IndReq	VSF	100 -	0

The stock/requirements list and the total requirements list (*Demand Management* → *Evaluations* → *Display total requirements*) show the allocation. The combined order quantity of 165 pieces has been allocated to two planned independent requirements; it has totally consumed the requirement, which was on <reqdat2> and has partly consumed the next requirement of <reqdat3>. Although the requirement is no longer visible in the stock/requirements list, it is visible in the total requirements list.



### Suggestions for Coping with Insufficient Coverage

To set up the consumption parameters in the material master on the *MRP* screen, check if the *Consumption mode*, *Bwd consumption*, *Fwd consumption* fields contain entries. If these fields are empty, default values are taken from the MRP group parameters in Customizing. If these fields are filled in the material master, however, they override the MRP group parameters.

We advise you to review all unconfirmed sales orders. To do this, use the backorder functionality in *Sales and Distribution* under *Sales* → *Environment* → *Backorders* → *Rescheduling* → *Execute*. If you run the report in test mode (enter **x** in the *Simulate* field), it will provide you with a log that lists all unconfirmed sales orders. Use this list as the basis for discussions between the sales and production departments to decide how to proceed.

One option would be to talk to the customer and cancel or postpone the order (or some schedule lines of it). Another option, if possible, would be to increase production. In both cases, you need to repeat the availability check for the orders. Backorder processing is the most efficient way of confirming multiple sales orders.

## Production by Lot Size (30)

### Purpose

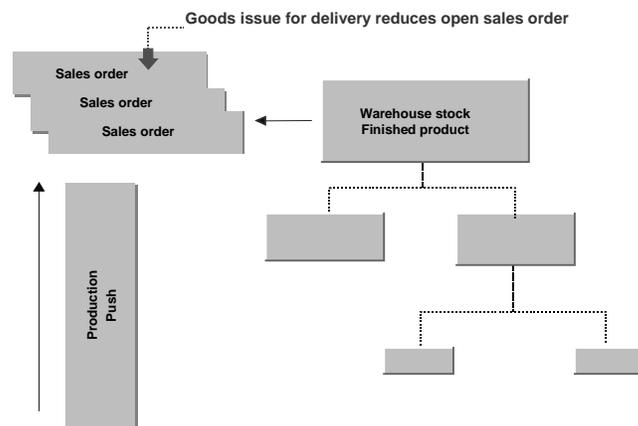
Procurement is based only on sales orders, and no planning for the finished product is involved here. Depending on the dates, several sales orders can be grouped together for production in one single lot.

### Prerequisites

Maintain the following master data for the finished product:

- Strategy group *30* on the *MRP* screen
- *Availability check* field (on the *MRP* screen and the *Sales: General/Plant* screen) so that you perform an availability check with replenishment lead times (*01* in the standard system)
- Item category group (for example, *NORM*) on the *Sales Organization* screen

### Process Flow



For a detailed example of the entire process, see *Sample Scenario: Strategy 30*.

Procurement is based only on sales orders. No planning for the finished product is involved here, which means that you usually have to know the sales order situation in advance. Therefore, with regard to the

production time and replenishment lead times of the components, this strategy is sometimes combined with scheduling agreements.

You can also procure the necessary components with the following:

- Individual planning of the components, for example, using strategy 70 [for more information, see *Planning at Assembly Level (70)*]
- Kanban components
- Consumption-based components

## Key Properties of Strategy 30

- It is not possible to make use of information from other SAP planning tools, such as forecasting, Sales Information System, or SOP (except when combined with schedule line agreements).
- Accurate availability check performed according to ATP logic during sales order processing
- Lot size optimization or rounding mechanisms

Depending on the dates, several sales orders can be grouped and be collectively produced in a single lot. The lot size in this procedure depends on various aspects of production, such as pallet size or production optimization.

- Leftover stock from previous procurements  
Using leftover stock for other sales orders is particularly useful for companies that mainly produce goods for major customers, but who also require the option of selling smaller requirements from stock.
- Planned independent requirements not consumed by sales and stock orders  
However the delivery “consumes” the schedule lines or sales order items, because it updates the delivered. If an issue is made for a particular sales order, the system reduces the sales order quantity. Stock orders are reduced when the goods are sold from stock.

## Other Areas

### Availability Check

You need to maintain the ATP indicator (*Availability check* field in the material master) so that you can check with replenishment lead times. In the standard system, checking rule 01/A checks with replenishment lead times. To define how the availability of components in production orders is checked in the Implementation Guide (IMG), in *Sales and Distribution*, choose *Basic Functions* → *Availability Check and Transfer of Requirements* → *Availability Check* → *Availability Check with ATP logic or against planning* → *Carry out control for availability check*.

AV (= Checking group for availability check)	Description	ChR (= Checking rule for availability check)	RLT
01	Daily requirements	A	“Blank” (= check with replenishment lead time)
02	Individual requirements	A	X (= check without replenishment lead time)



The checking rule in the sales order is always *A* in make-to-stock strategies. In the standard system, checking group *01* is set up so that daily requirements are passed onto production. This means that there is only one line visible in the stock/requirements list (as shown in the following sample scenario) that contains the cumulated quantity for one day, rather than the individual sales orders. Hence, the sales order number does not display on the *Order* line in the stock requirements list.

### Sample Scenario: Strategy 30

In this example, a quantity of 10 pieces is entered with a required delivery date of today. An order like this can be confirmed after the replenishment lead time.

#### Stage 1: Demand Management

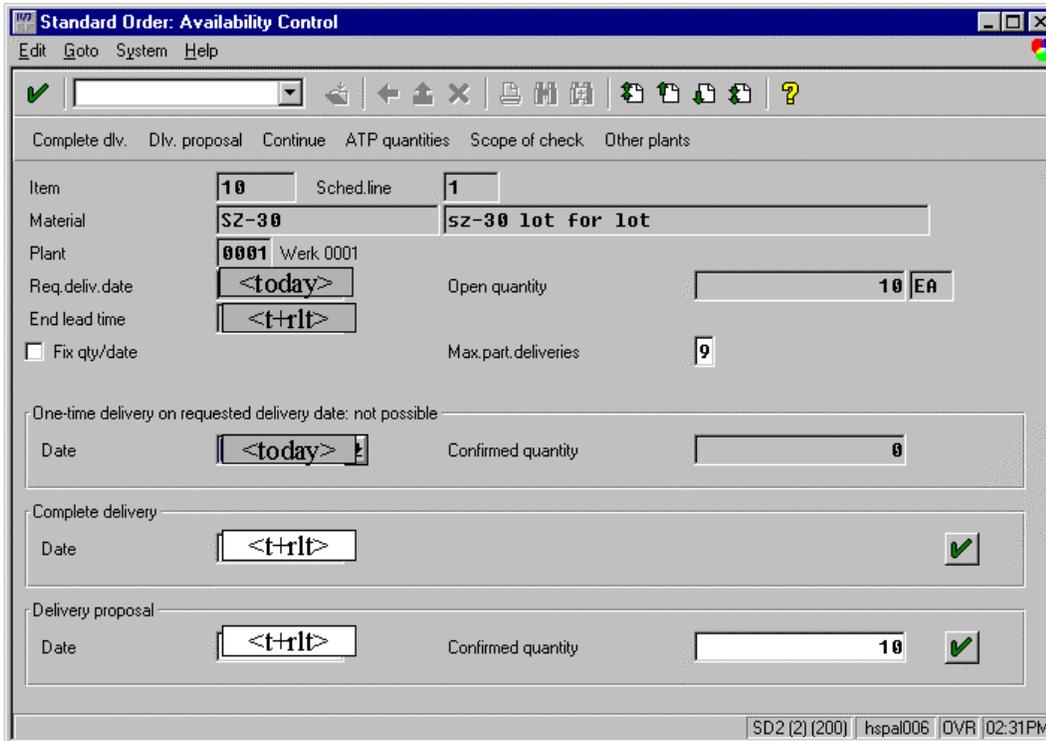
This stage does not apply to this strategy.

#### Stage 2: Procurement Before Sales

This stage is also not applicable in this strategy because production does not take place without a sales order. If advance sales orders exist in the system, production is carried out before the required delivery date.

#### Stage 3: Sales Order

A sales order is created (*Logistics* → *Sales and distribution* → *Sales* → *Order* → *Create*).



In this picture you should note the following:

It is possible to confirm a quantity according to an ATP checking rule (*Edit* → *Check availability* on the *Sales Order* screen). In this strategy, because you do not always have warehouse stock, it is important to maintain the *Availability check* field in the material master so that the replenishment lead time is used in the check.

The system finds the schedule line category *CP* and the item category *TAN* because the item category group was set to *NORM*. The system will find the requirements type *KL* (under the *Overview* → *Procurement* in the sales order menu) because the strategy group has been set to *30*.

Once the sales order has been entered, the stock/requirements list appears as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	Order		10 -	10 -

#### Stage 4: Procurement After Sales

A procurement requisition is created in the MRP run (*Logistics* → *Production* → *MRP* → *Total planning*). The stock/requirements list for the above example would then appear as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	Order		10 -	10 -
<t + rlt>	PIOrd.	000214/Stck	10	0

t + rlt = today + replenishment lead time

This procurement requisition is the starting point for production or external procurement. In the R/3 system, various possibilities exist to handle the procurement process. One option would be to convert the planned order into a production order, releasing the production order and a goods receipt of the yield quantity. Another option is to use returns or other goods movements for make-to-stock production.

After receiving the order and a second MRP run, the stock/requirements list is as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			10
<today>	Order		10 -	0

### Stage 5: Goods Issue for Delivery and Reduction of Planned Independent Requirements

After delivery (*Logistics* → *Sales and distribution* → *Shipping* → *Delivery* → *Create*) and goods issue, the stock/requirements list is reset to initial (empty).

## Net Requirements Planning (10)

### Purpose

This planning strategy is particularly useful in mass production environments. It is often combined with repetitive manufacturing. Choose this strategy if you want production to be determined by a production plan (Demand Management), and if you do not want sales orders to directly influence production. One of the most important features of this planning strategy is that it enables you to smooth the demand program.

### Examples from Industry

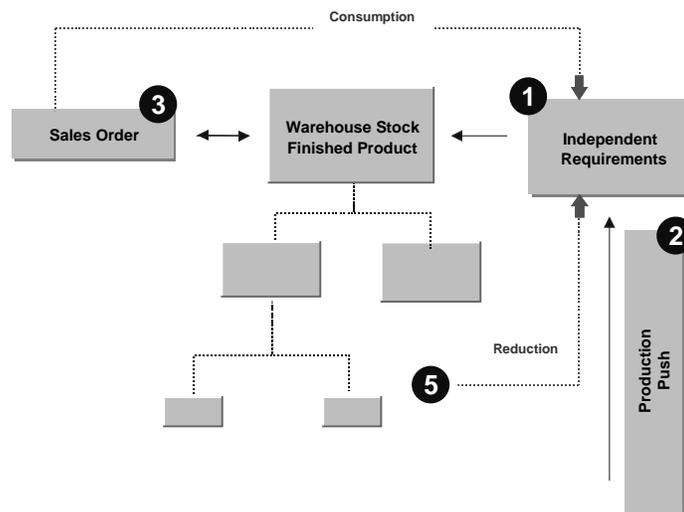
Strategy 10 is used in the customer packaged goods industry because it is possible to plan the demand for ice cream, for example, while a single order should not affect production. Strategy 10 is also used for products with seasonal demand where production needs to be smoothed.

## Prerequisites

Maintain the following master data for the finished product:

- Strategy group *10* on the *MRP* screen.
- Item category group (for example, *NORM*) on the *Sales Organization* screen.
- *Availability check* field in Customizing so that you perform an availability check without replenishment lead times (in the standard system, you need to enter *02* here). For more information, see the *Other Areas* section below.

## Process Flow



For a detailed example of the entire process, see *Sample Scenario: Strategy 10*.

Procurement quantities can be planned relatively effectively with planned independent requirements. It is possible to use information from the sales forecast, or from the Sales Information System, or from other planning tools to plan production quantities. This means that production and procurement of the required components is triggered before receiving sales orders.

## Key Properties of Strategy 10

- Procurement is only determined by planned independent requirements.  
 This property lends itself to a smoothing of production, which means that you can create a smooth production plan that is unaffected by irregular sales orders.
- An accurate availability check is performed using ATP logic during sales order processing.
- Sales orders can be displayed for information purposes only.  
 They do not affect production quantities. Goods are sold from stock in this strategy.
- The planned independent requirements are reduced at goods issue for the delivery.  
 You can compare the planned independent requirements situation with the actual customer requirements.

- Planned independent requirements left unreduced increase the warehouse stock of the finished product and cause procurement to be decreased or, due to netting, to not take place at all in the next period.

If you want the system to reduce future planned independent requirements when it makes withdrawals for unplanned sales orders, maintain the appropriate consumption period. See *Consumption Strategies and Logic* in chapter 1 for more information.

## Other Areas

### Availability Check

You need to work with an availability check that checks without RLT (such as *02* in the standard system). Refer to the *Other Areas* section in *Production by Lot Size (30)* for more information.



For this strategy, it usually makes sense to create a new checking rule that combines “check without RLT” with the passing of daily requirements.

### Displaying Sales Orders

To turn off the orders display, set the *No MRP* indicator to 2 in Customizing (choose *Sales and Distribution* → *Basic Functions* → *Availability Check and Transfer of Requirements* → *Transfer of Requirements* → *Define Requirements Classes*).



Leaving the *No MRP* field blank in strategy 10 leads to serious consequences!

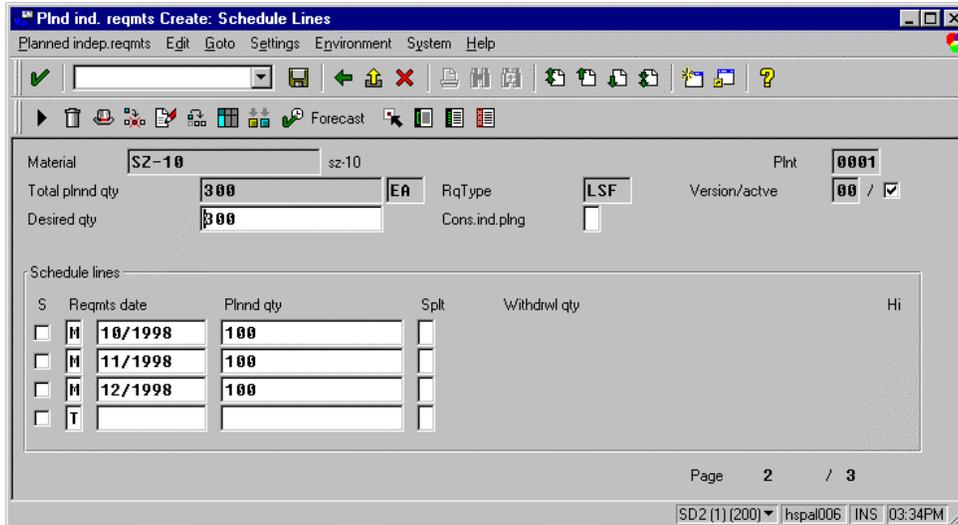
This IMG activity is linked to *LSF* in Customizing under *Sales and Distribution* → *Basic Functions* → *Availability Check and Transfer of Requirements* → *Transfer of Requirements* → *Define requirements types*.

## Sample Scenario: Strategy 10

This example is based on a production plan in which 100 pieces are planned for *<reqdat1>*, *<reqdat2>*, and *<reqdat3>*.

### Stage 1: Demand Management

In this scenario, planned independent requirements are created for the production plan.



The system will find requirements type *LSF* because the strategy group has been set to *10* (see *Table of Planning Strategy Assignments*). The requirements are passed onto MRP. The stock/requirements list (*Logistics* → *Production* → *MRP* → *Evaluations* → *Stock/reqmts list*) for the above example would appear as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<reqdat1>	IndReq	LSF	100 -	100 -
<reqdat2>	IndReq	LSF	100 -	200 -
<reqdat3>	IndReq	LSF	100 -	300 -

### Stage 2: Procurement Before Sales

Procurement requisitions are created in the MRP run (*Logistics* → *Production* → *MRP* → *Total planning*). The stock/requirements list for the above example would then appear as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<reqdat1>	PlOrd.	1234/Stck	100	100
<reqdat1>	IndReq	LSF	100 -	0
<reqdat2>	PlOrd.	1235/Stck	100	100
<reqdat2>	IndReq	LSF	100 -	0
<reqdat3>	PlOrd.	1236/Stck	100	100
<reqdat3>	IndReq	LSF	100 -	0

These procurement requisitions are the starting point for production or external procurement. In the R/3 System, various possibilities exist for handling the procurement process. One option would be to convert the planned order into a production order and release the production order and a goods receipt of the yield quantity. The other option would be to use returns or other goods movements for make-to-stock production.

After goods receipt for the order, the stock/requirements list appears as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			100
<reqdat1>	IndReq	LSF	100 -	0
<reqdat2>	PlOrd.	1235/Stck	100 +	100
<reqdat2>	IndReq	LSF	100 -	0
<reqdat3>	PlOrd.	1236/Stck	100 +	100
<reqdat3>	IndReq	LSF	100 -	0

### Stage 3: Sales Order

A sales order is created (*Logistics → Sales and distribution → Sales → Order → Create*).

Note the following:

- You can confirm any quantity up to the stock quantity (100 pieces in this example) by choosing *Edit → Check availability*.

- The system will find the requirements type *KSL* (choose *Overview* → *Procurement* in the sales order menu) because the strategy group has been set to *10*, and it is not possible to select another requirements type. The table of planning strategy assignments shows this mechanism.
- The system finds the schedule line category *CP* and the item category *TAN* because the item category group was set to *NORM*.

After the sales order has been entered, the stock/requirements list appears as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			100
<today>	Order	327/010/01	90 -	
<reqdat1>	IndReq	LSF	100 -	0
<reqdat2>	PlOrd.	1235/Stck	100 +	100
<reqdat2>	IndReq	LSF	100 -	0
<reqdat3>	PlOrd.	1236/Stck	100 +	100
<reqdat3>	IndReq	LSF	100 -	0

In Net Requirements Planning, according to strategy 10, the order does not create a requirement; the sales order is displayed, but does not generate planned orders. In the table above, you can see that the order does not reduce the *Available Quantity* in the right-hand column, which remains at 100 pieces. When you perform the availability check (in the sales order or in the stock/requirements list under *List* → *Calculate ATP quantity*), however, only 10 pieces are available.

The planned quantity is still 100 pieces. The source of the requirement is the independent requirement alone. The planned independent requirement was neither changed, nor was an allocation carried out.

#### Stage 4: Procurement After Sales

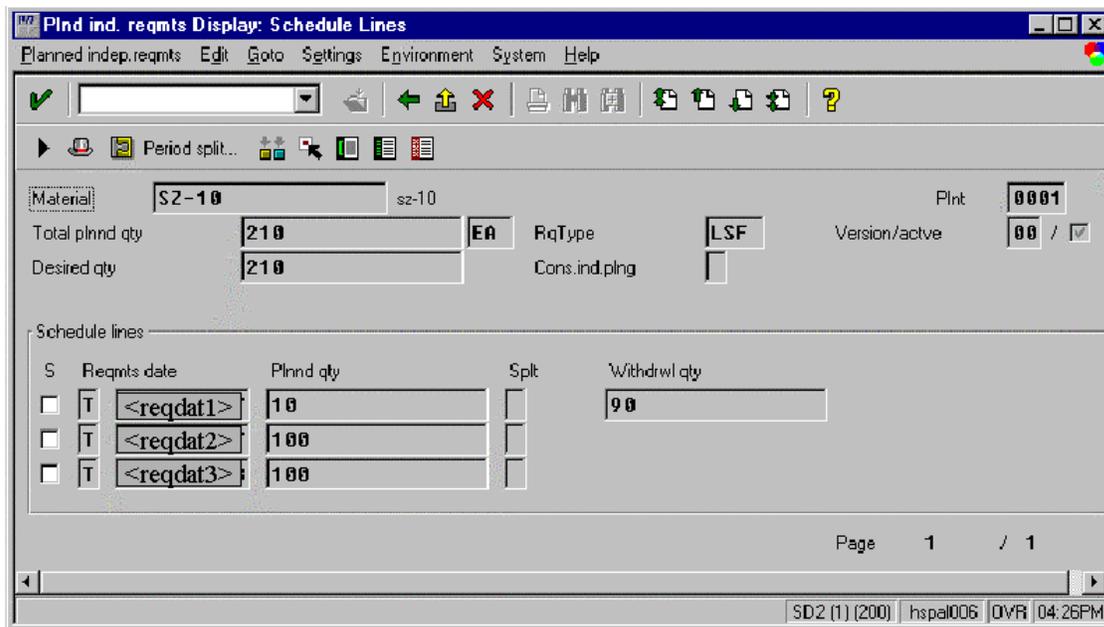
This stage does not apply to this strategy.

#### Stage 5: Goods Issue for Delivery and Reduction of Planned Independent Requirements

After goods issue for the delivery (*Logistics* → *Sales and distribution* → *Shipping* → *Delivery* → *Create*), the stock/requirements list appears as follows:

Date	MRP Element		Received/Required Quantity	Available Quantity
<today>	Stock			10
<reqdat1>	IndReq	LSF	10 -	0
<reqdat2>	PIOrd.	1235/Stck	100 +	100
<reqdat2>	IndReq	LSF	100 -	0
<reqdat3>	PIOrd.	1236/Stck	100 +	100
<reqdat3>	IndReq	LSF	100 -	0

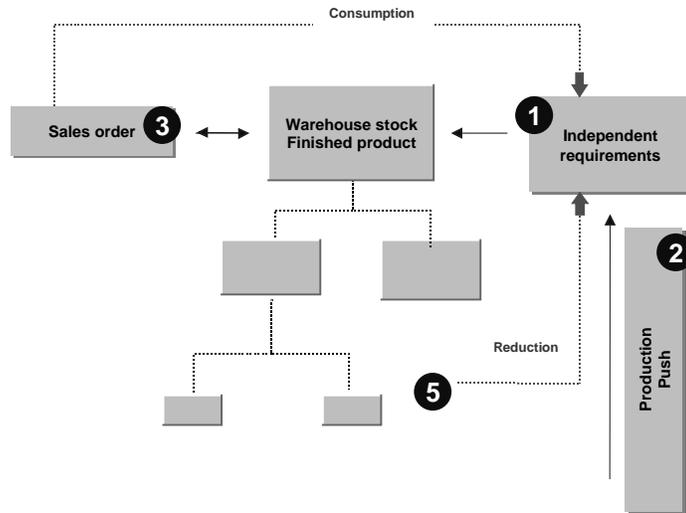
The planned independent requirement is reduced during processing of the goods issue. Old quantities can still be retrieved by choosing either *Goto* → *Schedule line history* in Demand Management, or by using the total requirements list (choose *Evaluations* → *Display total requirements* from the Demand Management menu). The quantities issued are displayed in the *Withdrwl qty* field, as seen in the following picture.



The system always reduces the oldest planned independent requirements unless the consumption fields (*Consumption mode, Fwd consumption per., Bwd consumption per.*) are maintained in the material master or in the MRP group.

### Comparing Strategies 10 and 40

*Net Requirements Planning (10)* and *Planning with Final Assembly (40)* are similar in certain areas. The following graphic applies to both strategies:



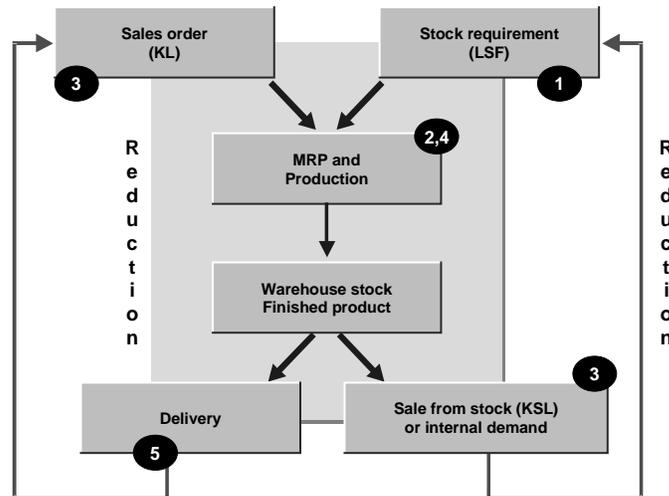
However, the following differences exist between the two strategies:

Strategy	10	40
Customer requirements passed onto production	No	Yes
This means . . .	. . . sales orders do not influence production	. . . sales orders that exceed planned independent requirements can influence production
	. . . the main objective is to ensure smooth production	. . . the most important factor here is the ability to react flexibly to customer demand
Planned independent requirements allocated during sales order processing	No	Yes
Planned independent requirements reduced at goods issue for delivery	Yes	Yes, physical reduction takes place

## Combining Strategies 10 and 30

### Prerequisites

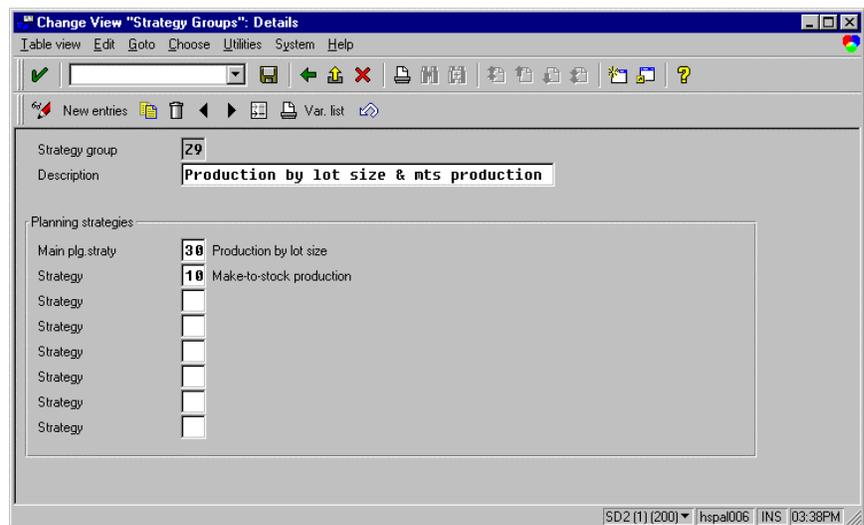
Creating a new strategy group that combines the *Net Requirements Planning (10)* and *Production by Lot Size (30)* is useful only if you can make use of lot size optimization and simultaneously satisfy large and small demand levels.



### Setup Procedure

To set up this strategy:

1. Combine strategy 10 with strategy 30 in the IMG for Demand Management under Production → Master Planning → Demand Management → Planned Independent Requirements → Planning Strategy → Define strategy group.
2. Make the planning strategy you use most often in your sales orders your Main planning strategy.
3. Maintain a material master with this new strategy group.



### Result

You can now sell this material by changing the requirements type by choosing *Overview* → *Procurement* menu in the sales order menu.

- If you maintain requirements type *KL* in the sales order, the process flow will be the same as for Production by Lot Size (30).

- If you maintain requirements type *KSL* in the sales order, the process flow will be the same as for Net Requirements Planning (10).

## Gross Requirements Planning (11)

### Purpose

The make-to-stock strategy *Gross Requirements Planning* is particularly useful in mass production environments and is often combined with repetitive manufacturing. This strategy is particularly useful if you need to produce, regardless of whether you have stock. This strategy is useful for steel or cement because they cannot shut down production. A blast furnace or a cement factory must continue to produce, even if this means producing stock.

This strategy is also frequently used if there is a *material requirements planning* system in a legacy system that needs to be linked to R/3, which serves as a production execution system. The legacy system calculates a specific production plan, which has to be executed, regardless of the stock situation in R/3.

### Examples from Industry

This strategy is often used in heavy-duty industries such as steel manufacturing (blast furnace) and the cement industry. It is also used to interface non-SAP MRP systems.

### Prerequisites

Maintain the following master data for the finished product:

- Strategy group *11* on the *MRP* screen
- Set the *Mixed MRP* indicator to *2* on the *MRP* screen
- Item category group (for example, *NORM*) on the *Sales Organization* screen
- The *Availability check* field so that you perform an availability check without the replenishment lead time (checking group *02* in the standard system).

For more details, see the *Other Areas* section in *Production by Lot Size (30)*.

### Process Flow

This planning strategy is to some extent similar to *Net Requirements Planning (10)*. However, the following differences exist:

- There is no netting of stock with demand; only the planned quantities are produced.
- Production is only determined by planned independent requirements, which lends itself to production smoothing.
- Reduction of planned independent requirements during goods receipt for an order (planned order in repetitive manufacturing, production order, process order, or purchase order)

Strategy	10	11
Stock is taken into account	Yes	No
Reduction of planned independent requirements takes place during . . .	. . . goods issue for the delivery	. . . goods receipt for a production order (discrete production), for a planned order (repetitive manufacturing), or for a purchase order (trading goods).

Gross Requirements Planning also has the following features in common with Net Requirements Planning (10):

- Production quantities can be planned relatively effectively by means of planned independent requirements.

You can use information from the Sales Information System, flexible planning, or other planning tools to plan production quantities. Therefore, production and procurement of the required components is triggered before the sales order stage.

- Individual sales orders, which can be somewhat irregular, do not affect production.
- An accurate availability check is performed according to ATP logic during sales order processing.
- Using lot size or rounding keys, you can perform a *lot size optimization* during planning so that you always plan convenient lot sizes in Demand Management or during the MRP run.

## Other Areas

### Availability Check

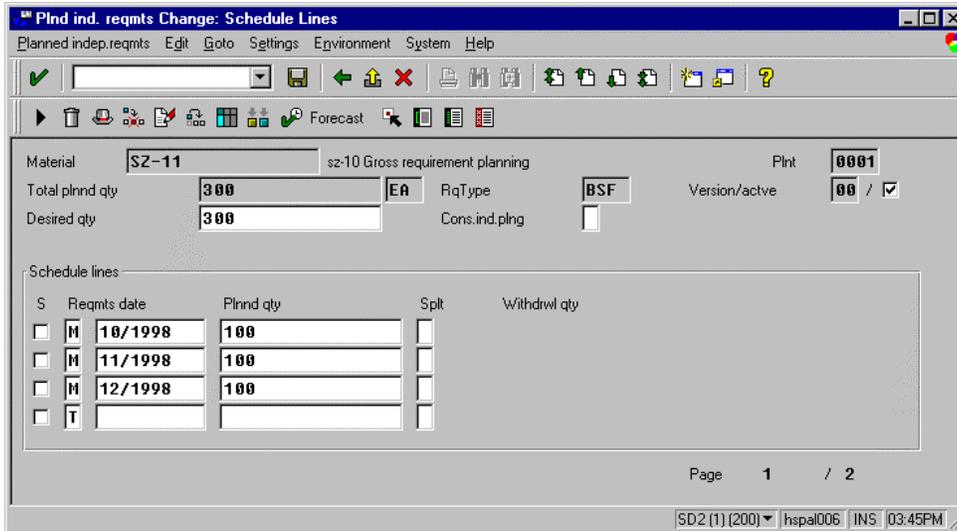
You need to work with an availability check that functions without checking the replenishment lead time. For more details, see the *Other Areas* section in *Production by Lot Size (30)* and *Net Requirements Planning (10)*.

### Sample Scenario: Strategy 11

This example is based on a production plan in which 100 pieces are each planned for <reqdat1>, <reqdat2>, and <reqdat3>

#### Stage 1: Demand Management

In this scenario, planned independent requirements are created as follows for the production plan.



The system will find requirements type *BSF* because the strategy group has been set to *11*. The requirements are passed onto MRP.

The stock/requirements list (*Logistics* → *Production* → *MRP* → *Evaluations* → *Stock/reqmts list*) for this example would appear as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	→Gross reqmts. Plan			
<reqdat1>	IndReq	BSF	100 -	100 -
<reqdat2>	IndReq	BSF	100 -	200 -
<reqdat3>	IndReq	BSF	100 -	300 -

Entry of the independent requirements is very similar to that in strategy 10 (net requirements planning), the only difference being that the requirements have requirements type *BSF*, because the strategy group has been set to *11*. See the table of planning strategy assignments.



There is now a special segment in the stock/requirements list, used only for planning purposes.

## Stage 2: Procurement Before Sales

Procurement requisitions are created in the MRP run (*Logistics* → *Production* → *MRP* → *Total planning*). The stock/requirements list for the above example would then appear as follows:

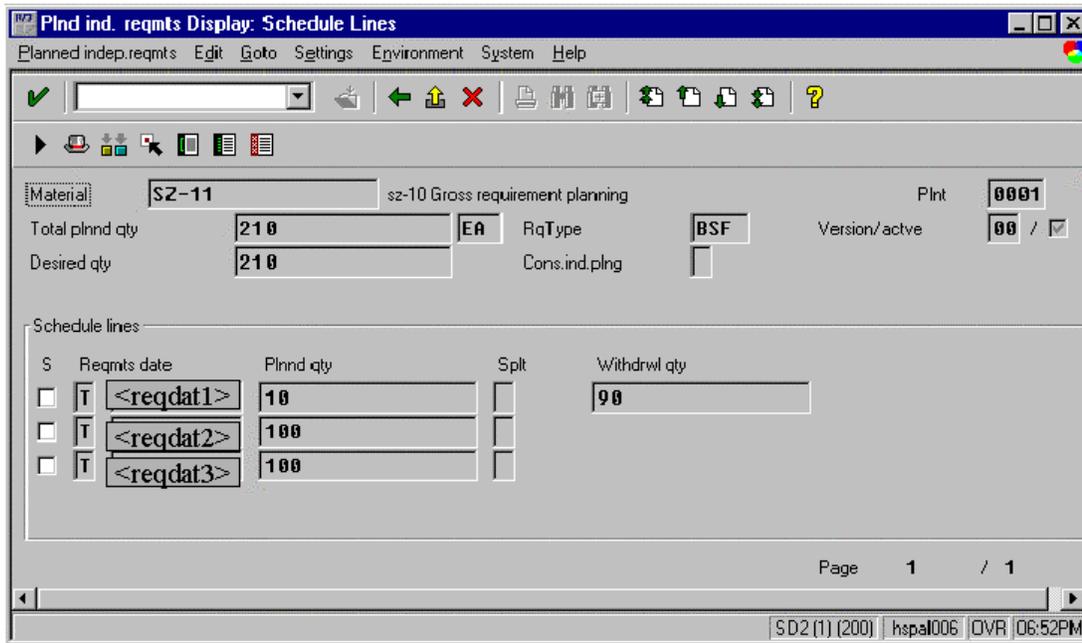
Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	→ Gross reqmts plan			
<reqdat1>	PlOrd.	0001234/Stck	100	100
<reqdat1>	IndReq	BSF	100 -	0
<reqdat2>	PlOrd.	0001235/Stck	100	100
<reqdat2>	IndReq	BSF	100 -	0
<reqdat3>	PlOrd.	0001236/Stck	100	100
<reqdat3>	IndReq	BSF	100 -	0

These procurement requisitions are the starting point for production or external procurement. In the R/3 System, various possibilities exist to handle the procurement process. One option would be to convert the planned order into a production order and release the production order and a goods receipt of the yield quantity. Another option would be to use returns or other goods movements for make-to-stock production.

After goods receipt of 90 pieces of the order (you can work with all kinds of orders, such as production orders, a run of schedule headers in repetitive manufacturing, and purchase orders), the stock/requirements list appears as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			90
<today>	→Gross reqmts plan			
<reqdat1>	PrdOrd.	1000060/PP01/PD	10	10
<reqdat1>	IndReq	BSF	10 -	0
<reqdat2>	PlOrd.	0001235/Stck	100	100
<reqdat2>	IndReq	BSF	100 -	0
<reqdat3>	PlOrd.	0001236/Stck	100	100
<reqdat3>	IndReq	BSF	100 -	0

And the Demand Management screen appears as follows:



The demand quantity, as seen in the planned independent requirements, is reduced when the goods receipt is posted for the production order. The original demand quantity in Demand Management (*Logistics → Production → Master Planning → Demand Management → Planned Ind. Reqmnts → Display*) can be seen by choosing *Goto → schedule line history*, or by choosing *Environment → Display total reqmnts*. (In this view, the total demand is the sum of the goods movement quantity plus the total quantity).

The system always reduces the oldest planned independent requirements unless the consumption fields (*Consumption mode, Fwd consumption per., Bwd consumption per.*) are maintained in the material master or in the MRP group.

### Stage 3: Sales Order

To create a sales order, choose *Logistics → Sales and distribution → Sales → Order → Create*. You may confirm any quantity up to the stock quantity (90 pieces in this example) by choosing *Goto → Item → Schedule lines → Quantities/dates*. The system will find the requirements type *KSL* (choose *Overview → Procurement* in the sales order menu) because the strategy group has been set to *11*. The system finds the schedule line category *CP* and the item category *TAN* because the item category group was set to *NORM*.

After the sales order has been entered, the stock/requirements list appears as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			90
<today>	Order	0000337/0010/001	90 -	
<today>	→Gross reqmts plan			
<reqdat1>	PrdOrd.	1000060/pp01/PD	10	10
<reqdat1>	IndReq	BSF	10 -	0
<reqdat2>	PIOrd.	0001235/Stck	100	100
<reqdat2>	IndReq	BSF	100 -	0
<reqdat3>	PIOrd.	0001236/Stck	100	100
<reqdat3>	IndReq	BSF	100 -	0

In strategy 11, the order does not create a requirement; it is only displayed. You can hide the display of the orders as described in the *Other Areas* section of *Net Requirements Planning (10)*. In the above table, you can see that the order does not reduce the *Available Quantity* in the right-hand column, which remains at 90 pieces. When you perform the availability check (in the sales order or in the stock/requirements list under *List → Calculate ATP quantity*), however, no stock is available.

#### Stage 4: Procurement After Sales

This stage does not apply to this strategy.

#### Stage 5: Goods Issue for Delivery

After delivery (*Logistics → Sales and distribution → Shipping → Delivery → Create*) and goods issue, the stock/requirements list shows only the remaining planned independent requirements and their associated planned orders

## Planning Without Final Assembly and Without MTO (52)

### Purpose

This strategy, along with *Planning with a Planning Material and Without Make-to-Order (MTO) (63)*, allows you to procure components based on planned independent requirements. Production of the finished product, however, is based on actual sales orders, similar to make-to-order strategies. This planning strategy ensures that you can react quickly to customer requirements, even if the finished product has a long overall lead time. You can avoid the main value-added process until you have a customer. This strategy is very similar to strategy 50, which uses make-to-order production. For more information on the differences between these two strategies, see *Planning Without Final Assembly (50)* in chapter 4.

## Prerequisites

You need to maintain the following master data for the finished product:

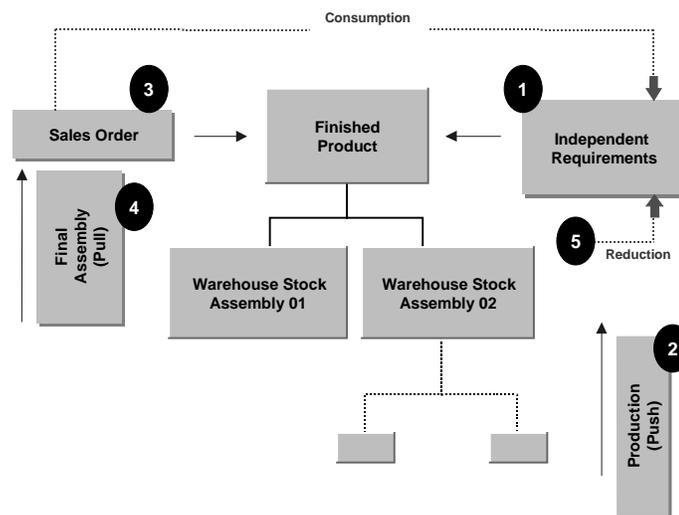
- Strategy group *52* on the *MRP* screen
- Lot-size key *EX* must be set in the *MRP* screen because lot size optimization would be incompatible with the allocation logic, which could result in over-planning and incorrect result in the ATP check. You also need to ensure that no rounding profile or rounding values are taken into account.
- Consumption parameters (*Consumption mode*, *Bwd consumption*, *Fwd consumption*) so that the independent requirements can be found.
- Item category group (for example, *NORM*) on the *Sales Organization* screen



A BOM is required for the finished product, and there are no major implications for the BOM components. However, for the components it is important to set the:

- MRP type to *P\** (or *M\**) on the *MRP* screen to plan the components in MRP.
- *Individual/coll.* indicator to *2* on the *MRP* screen as a starting point for your master data setup. See chapter 3 for more information

## Process Flow



For a detailed example of the entire process, see *Sample Scenario: Strategy 52*.

Production quantities can be planned relatively effectively with planned independent requirements for the finished product. It is possible to use information from the sales forecast, the Sales Information System, or other planning tools to plan production quantities. Only the procurement of the component is triggered before the sales order stage. Final assembly takes place after a sales order has been entered.

## Key Properties of Strategy 52

- The planned independent requirements are consumed during the sales order stage. Therefore, you can compare the planned independent requirements situation with the actual customer requirements.

- An availability check is performed on the basis of the planned independent requirements.
- Demand from sales orders is passed onto production and triggers production after the sales order stage, even if insufficient components are planned. The sales orders, however, cannot be confirmed if there is insufficient coverage of components. For more information, see *Coping with Insufficient Coverage of Components*.
- Planned independent requirement quantities for the finished products that are left unconsumed increase the warehouse stock and cause procurement to decrease or not take place at all in the next period. This procedure is known as “netting.”
- Seen from a costing perspective, this strategy is a make-to-stock strategy, in contrast to strategy 50, which is make-to-order. This means that stock of the finished material is not linked to each customer order. As such, this strategy does not take stock that exceeds the planned independent requirements (due to customer returns, over production, etc.) into account, when creating a sales order. Stock for finished goods should be handled through an exception process.

## Other Areas

### Availability Check

In this strategy, there is only an availability check against planned independent requirements. A material is considered available if a planned independent requirement can be consumed. Therefore, unplanned stock (returns or unplanned production quantities such as over-deliveries) is not taken into account. The *Availability check* indicator (*MRP* and *Sales: General/Plant Data* screens) is not relevant in this case because an availability check according to ATP logic does not take place.

### Stocking Level for Components

See *Stockkeeping at Different BOM Levels* in chapter 3.

### Selling Unplanned Stock

Unplanned stock (returns or unplanned production quantities such as over-deliveries) is not taken into account in the availability check, and is therefore not automatically considered for sales. You can ensure that this stock is sold by changing the requirements type (from *KSVS* to *KL* or *KSV*, for example) in the sales order menu under *Procurement type*.

You also need to have added an alternative strategy (either 30 or 40 in this case) to strategy group 52 in the IMG for production (choose *Master Planning* → *Demand Management* → *Planned Independent Requirements* → *Planning Strategy* → *Define strategy group*). It is also necessary to inform sales personnel of this unplanned stock.

## Sample Scenario: Strategy 52

This example is based on a production plan in which 100 pieces are planned for <reqdat1>, <reqdat2>, and <reqdat3>. The BOM structure for this example has a parent material *SZ-52* and a component *ROH52A*. The BOM has an item quantity of 1.

### Stage 1: Demand Management

Planned independent requirements are created for the production plan. The system will find requirements type *VSE* because the strategy group has been set to *52*.

The requirements are passed onto MRP. The stock/requirements list (*Logistics* → *Production* → *MRP* → *Evaluations* → *Stock/reqmts list*) for the finished product would appear as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	→ Planning without assembly			
<reqdat1>	IndReq	VSE	100 -	100 -
<reqdat2>	IndReq	VSE	100 -	200 -
<reqdat3>	IndReq	VSE	100 -	300 -

### Stage 2: Procurement Before Sales

Procurement requisitions are created in the MRP run (*Logistics* → *Production* → *MRP* → *Total planning*). The stock/requirements list for the finished product would then appear as follows:

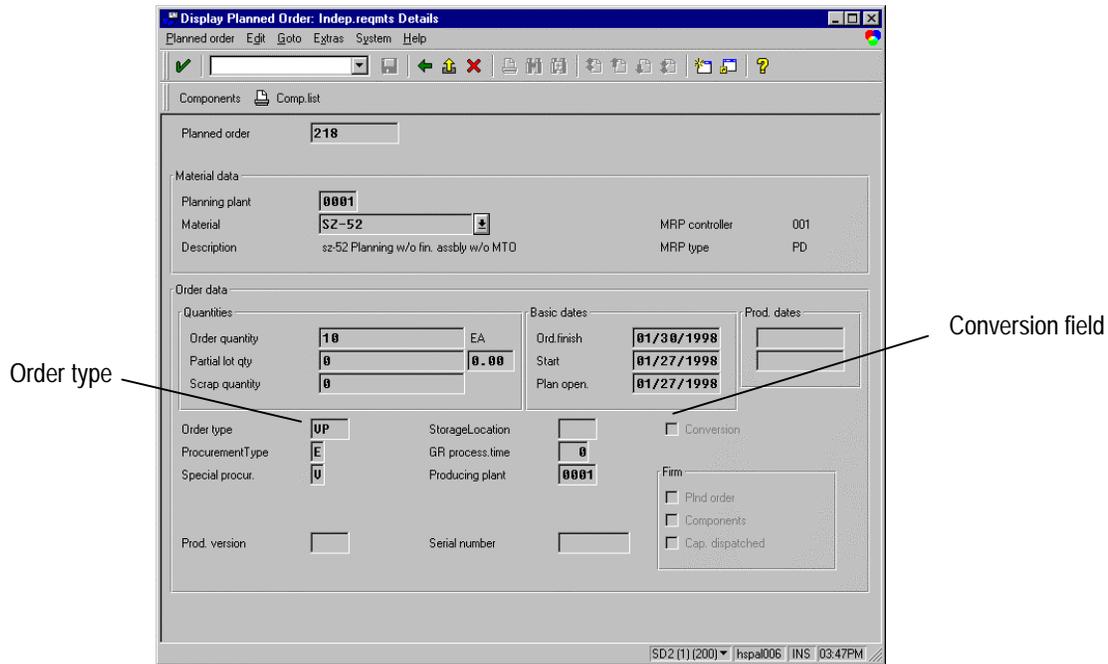
Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	→ Planning without assembly			
<reqdat1>	PlOrd.	1234/IndR	100	100
<reqdat1>	IndReq	VSE	100 -	0
<reqdat2>	PlOrd.	1235/IndR	100	100
<reqdat2>	IndReq	VSE	100 -	0
<reqdat3>	PlOrd.	1236/IndR	100	100
<reqdat3>	IndReq	VSE	100 -	0

These procurement requisitions are the starting point for production or external procurement. In the R/3 System, various possibilities exist for handling the procurement process. The following factors, however, are important for this strategy:

- Stock at finished product level is not taken into account for calculating the production plan.

- The planned orders are not yet “real” because production of the finished product must be executed after receipt of the sales orders.

Technically speaking, the planned orders are independent requirements with order type *VP*. It is impossible to convert these (VP) planned orders into production orders, or to use them in a repetitive manufacturing environment. The *Conversion* field in the display of the planned order is not set, which indicates that it is not possible to produce this planned order.



The MRP run also creates procurement requisitions for the components. In this example, the stock/requirements list for the component ROH52A appears as follows (this example assumes that the *Individual/coll.* Indicator was set to 2):

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<reqdat1>	PlOrd.	1237/Stck	100	100
<reqdat1>	DepReq	SZ-52	100 -	0
<reqdat2>	PlOrd.	1238/Stck	100	100
<reqdat2>	DepReq	SZ-52	100 -	0
<reqdat3>	PlOrd.	1239/Stck	100	100
<reqdat3>	DepReq	SZ-52	100 -	0

Due to Demand Management, the main objective of this strategy—procurement of components—has now been triggered without sales orders. Procurement of the components can occur in a variety of ways. In this case, we assume that a goods receipt (for a purchase order, for example) takes place.

The stock/requirements list for all components of the material then appears as follows:

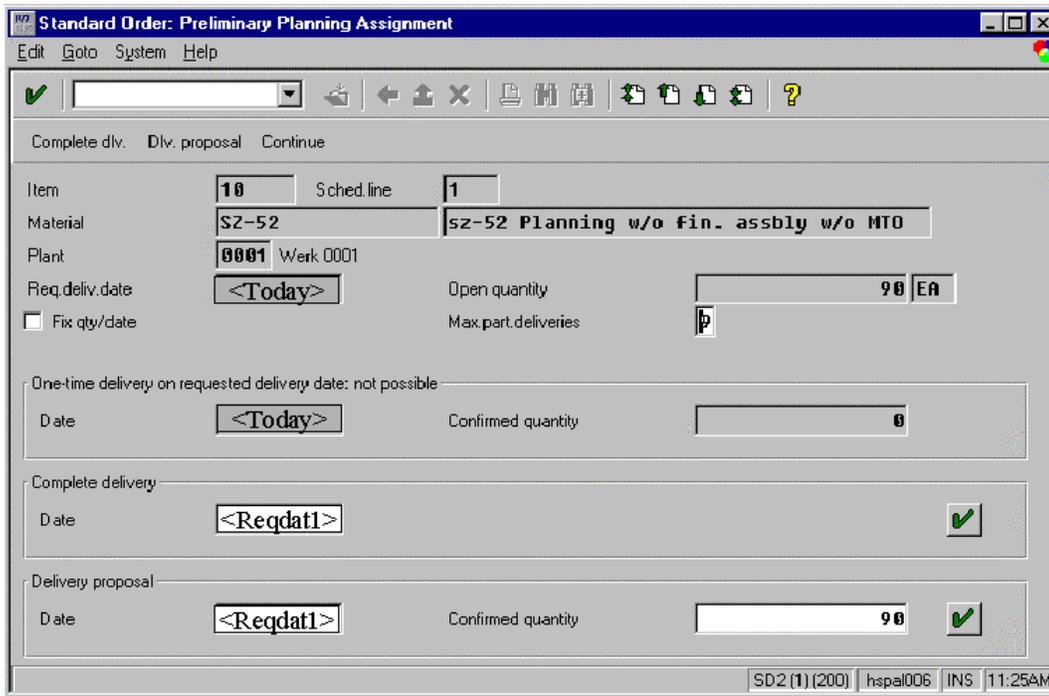
Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			300
<reqdat1>	DepReq	SZ-52	100 -	200
<reqdat2>	DepReq	SZ-52	100 -	100
<reqdat3>	DepReq	SZ-52	100 -	0

### Stage 3: Sales Order and Allocation

A sales order for the parent material is created.

The system will find the requirements type *KSVS* because the strategy group has been set to *52* (see *Table of Planning Strategy Assignments*). It is possible to confirm a quantity that has been previously planned (100 pieces for each schedule line in this example). Note the header text that says *Preliminary Planning Assignment* indicates that this is not a check according to ATP logic but rather an availability check based on planned independent requirements. The system finds the schedule line category *CP* and the item category *TAN* because the item category group was set to *NORM*.

Suppose that for this example an order with a quantity of 90 pieces is entered with a required delivery date of today. This order can be confirmed after the first planned independent requirement date *<reqdat1>* if the consumption parameters have been defined accordingly and this date can be found. For more information, see *Consumption Strategies and Logic* in chapter 1.



After entry of the sales order, the stock/requirements list for the parent material appears as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	Order	000333/0010/ 001	90-	90-
<today>	→ Planning without assembly			
<reqdat1>	PlOrd.	1234/IndR	100	100
<reqdat1>	IndReq	VSE	10 -	90
<reqdat2>	PlOrd.	1235/IndR	100	190
<reqdat2>	IndReq	VSE	100 -	90
<reqdat3>	PlOrd.	1236/IndR	100	190
<reqdat3>	IndReq	VSE	100 -	90

### Stage 4: Procurement After Sales

After a second planning run, the stock/requirements list of the parent material appears as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	Order	000333/0010/ 001	90-	90-
<t+rlt>	PlOrd.	1237/Stck	90	0
<today>	→ Planning without assembly			
<reqdat1>	PlOrd.	1234/IndR	10	10
<reqdat1>	IndReq	VSE	10 -	0
<reqdat2>	PlOrd.	1235/IndR	100	100
<reqdat2>	IndReq	VSE	100 -	0
<reqdat3>	PlOrd.	1236/IndR	100	100
<reqdat3>	IndReq	VSE	100 -	0

The planned order (*Stck*) for the parent material can now be converted to either a production order, a process order, or allow backflushing in the repetitive manufacturing process. This conversion triggers the *production after sales order* stage. Production of this material can be performed quickly because the necessary components are already available. After creating and releasing the production order (for the parent product) the stock/requirements situation remains the same. This process means that the planned order is replaced by a production order.

Working with production orders is only one option for production. This process is also possible in repetitive manufacturing. At component level (ROH52x), the dependent requirements (*DepReq* in the planned order) are replaced by an order reservation (*OrdRes* in a production order). Perform a goods receipt for the “parent” material, after production. Note the increase in available stock in the stock requirements list of the parent material.

### Stage 5: Goods Issue for Delivery and Reduction of Planned Independent Requirements

After goods issue for the delivery (*Logistics* → *Sales and distribution* → *Shipping* → *Delivery* → *Create*) for the parent material, the stock/requirements list of the parent material is reset to empty. In other words, it only shows the remaining planned independent requirements and the corresponding planned orders. The planned independent requirements are, of course, reduced.

## Planning with a Planning Material and Without MTO (63)

### Purpose

This strategy:

- Procures non-variable components based on the planned independent requirements of a planning material.

Production of the finished product, however, is based on actual sales orders. This procedure guarantees that you can quickly react to customer requirements, even if the finished product has a long overall lead time, and avoid the main value-added process until you have a customer.

- Has the same basic features as *Planning Without Final Assembly and Without MTO (52)*. In addition, more than one material can consume the planned independent requirements of one *planning material*.
- Lends itself to the planning of *variants* of one product.

(The term variant, here, indicates *similar* products, not variant configuration.) For example, imagine similar parts sharing a BOM group (which is not necessary in this strategy) so that you can easily exchange a component in all similar BOMs. You usually have up to several dozen variants whereas variance would be much higher in variant configuration.

### Examples from Industry

This strategy lends itself to the planning of different sizes or packages for one product. For instance, you may want to sell a product in packages:

- Containing 1 liter, 2 liters, and 1 gallon
- Labeled in English, German, and Japanese

All variants are set up as different material numbers. Also, a planning material that consists of only non-variant components, which means excluding the packaging materials that form the variants is usually set up. All variants are linked to the planning material with the correct conversion factors. The packaging materials (boxes or cartons for the different sizes or different labels) can be planned based on consumption, because they are not too expensive.

### Prerequisites

You need to maintain the following master data for the products:

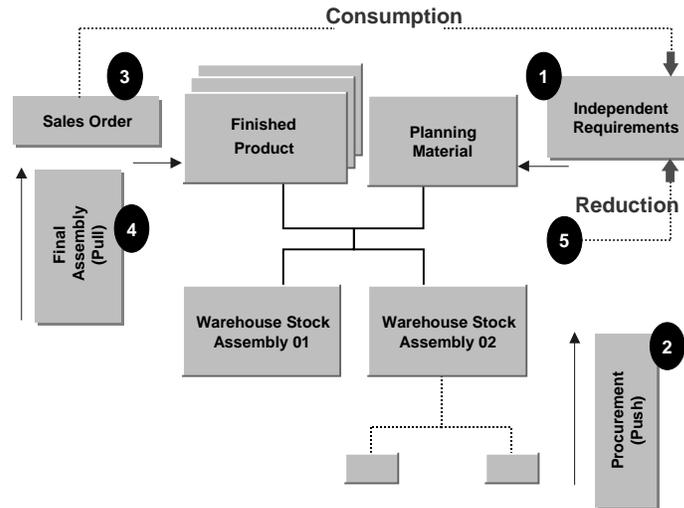
Master Data Field	“Variant” products	Planning material
Strategy group ( <i>MRP</i> screen)	63	63
Item category group ( <i>Sales organization</i> screen)	Such as <i>NORM</i>	Sales organization screens are not required
Lot size key ( <i>MRP</i> screen)	EX	EX
Consumption parameters ( <i>Consumption mode, Bwd consumption per., Fwd Consumption per.</i> ) ( <i>MRP</i> screen)	<b>Not</b> to be maintained, the values of the planning material are used.	Need to be maintained so that the planned independent requirements can be found.
<i>Planning material, Planning plant</i> and <i>Plng conv. Factor</i> ( <i>MRP</i> screen)	Need to be maintained.	
Bill of material	Required  Contains all parts	Required  Contains the non-variable parts



Although there are no major implications for the BOM components, you should set the:

- MRP type of the components (on the *MRP* Screen) to *P\** or *M\** to plan the component in MRP
- *Individual/coll.* indicator (on the *MRP* Screen) to 2

## Process Flow



For a detailed example of the entire process, see *Sample Scenario: Strategy 63*.

## Key Properties of Strategy 63

The planning material could be sold in the same way as any *variant* product. However, it is generally used as an “artificial” material that only contains the non-variant parts. The BOMs of the variant products contain additional components that diversify the product. These variant components cannot be planned exactly using this strategy.

Instead you need to handle the variant components in the following manner:

- The variant components are consumption-based.
- The variant components are planned independently using a planning strategy for components.
- An over-planning or an under-planning of the variant components is accepted.

If your products have a high level of variance, you may want to use characteristics planning to automate the planning of components. See *Characteristics Planning* (for strategies 56 and 89) in chapter 5 for more information. This strategy can also be used as a cross-plant version of strategy 52 (see *Cross-Plant Planning* in chapter 1 for more information).

## Other Areas

The *Other Areas* section of *Planning Without Final Assembly and Without MTO (52)* also applies to this strategy.

## Capacity Planning Using Strategy 63

This strategy is often used to manage a simple but effective method of capacity planning. The planned independent requirements for the planning material represent a given capacity situation. All variant materials require a similar capacity and there is an allocation of given capacity with requested capacity at the order entry stage. Using the total requirements list, you can easily check the capacity situation.

## Overplanning and Underplanning of Components

Imagine that the planning material contains the components A, B, and D. The variant material contains the components A, B, and C. The planning material is planned with 100 pieces each month. There are, therefore, dependent requirements for 100 components each month. Because the planning material is a representation of all variants, too much is planned for component D and too little is planned for component C. If you want to over-plan component D on purpose, to have a higher stock level for it, for instance, this situation is not a problem.

In most cases, however, you would avoid this situation by using other means, such as excluding components C or D in the BOM of the planning material. The variant parts could be planned using *Planning at Assembly Level (70)*, or by simply using consumption-based variant parts.

## Sample Scenario: Strategy 63

This example is based on a production plan in which 100 pieces are planned for <reqdat1>, <reqdat2>, and <reqdat3>.

### Stage 1: Demand Management

Planned independent requirements are created for the production plan. The material number of the *planning* material is entered and the requirements that are expected to be the total for all variants are created. The system will find requirements type *VSEV* because the strategy group has been set to *63*.

The requirements are passed onto MRP. The stock/requirements list for the planning material (*Logistics → Production → MRP → Evaluations → Stock/reqmts list*) for the above example appears as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	→ Planning without assembly			
<reqdat1>	IndReq	VSEV	100 -	100 -
<reqdat2>	IndReq	VSEV	100 -	200 -
<reqdat3>	IndReq	VSEV	100 -	300 -

### Stage 2: Procurement Before Sales

Procurement requisitions are created in the MRP run (*Logistics → Production → MRP → Total planning*). The stock/requirements list of the planning material appears as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	→ Planning without assembly			
<reqdat1>	PlOrd.	1234/IndR	100	100
<reqdat1>	IndReq	VSEV	100 -	0
<reqdat2>	PlOrd.	1235/IndR	100	100
<reqdat2>	IndReq	VSEV	100 -	0
<reqdat3>	PlOrd.	1236/IndR	100	100
<reqdat3>	IndReq	VSEV	100 -	0

These procurement requisitions are the starting point for production or external procurement. Various possibilities exist for handling the actual production process. The following factors, however, are important for this strategy:

- Stock of the planning material is not taken into account to calculate the production plan.
- The planned orders are not yet *real*, because the variant product cannot be produced until after receipt of the sales order.

Technically speaking, the planned orders have order type *VP*. It is impossible to convert these *VP* planned orders into production orders, or to use them in a repetitive manufacturing environment. The *Conversion* field in the display of the planned order is not set. Therefore, it is not possible to produce this planned order.

The MRP run also creates procurement requisitions for the components of the planning material. The stock/requirements list for the component, for example, is as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<reqdat1>	PlOrd.	1237/Stck	100	100
<reqdat1>	DepReq	PLANNINGMATL	100 -	0
<reqdat2>	PlOrd.	1238/Stck	100	100
<reqdat2>	DepReq	PLANNINGMATL	100 -	0
<reqdat3>	PlOrd.	1239/Stck	100	100
<reqdat3>	DepReq	PLANNINGMATL	100 -	0

The main objective of this strategy has now been reached; procurement for the components has been triggered, based on the sales forecast from Demand Management, without sales orders. Procurement of the components can occur in a variety of ways. In this case, we assume that a goods receipt (for a purchase order, for example) takes place. The stock/requirements list for all components of the planning material then appears as follows:

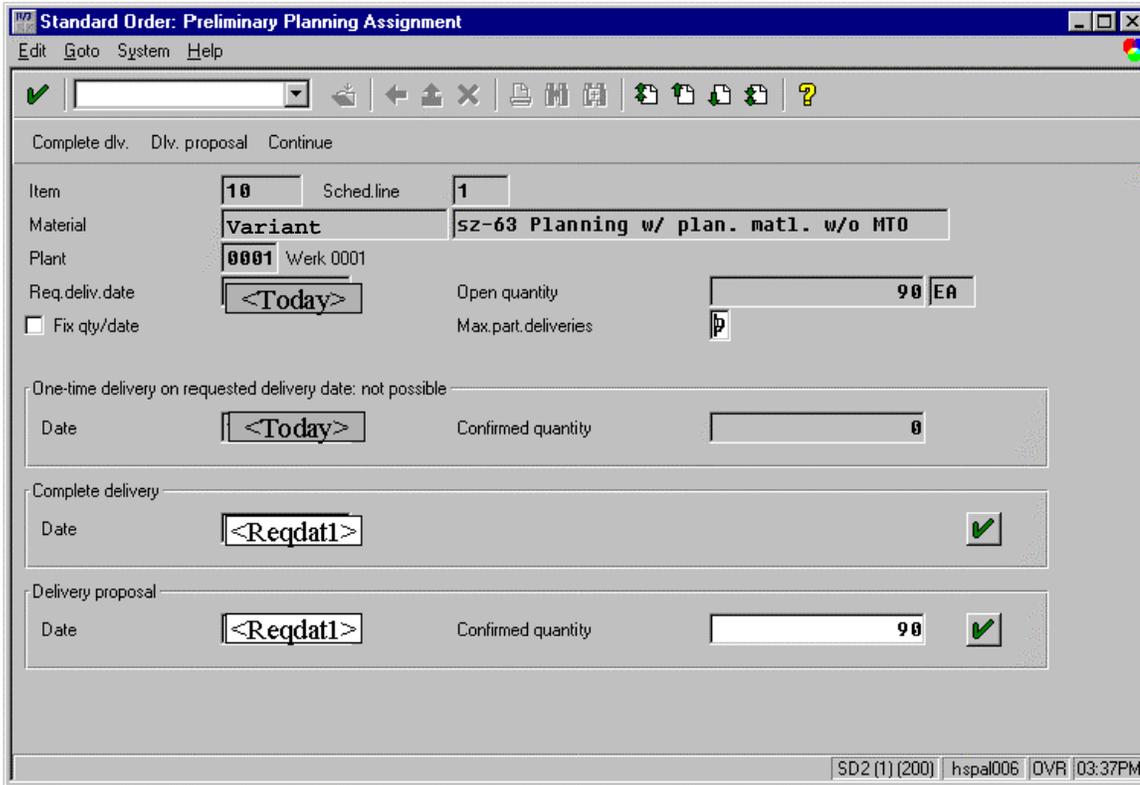
Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			300
<reqdat1>	DepReq	PLANNINGMATL	100 -	200
<reqdat2>	DepReq	PLANNINGMATL	100 -	100
<reqdat3>	DepReq	PLANNINGMATL	100 -	0

### Stage 3: Sales Order and Allocation

After a sales order for a variant material is entered.

- The system will find the requirements type *KSVV* because the strategy group is set to *63*.  
 See the *Table of Planning Strategy Assignments* in chapter 1.
- You can confirm a quantity that has been previously planned (100 pieces in this example). Note the header text that says *Preliminary Planning Assignment*, indicating that this is not a check according to ATP logic but rather an availability check based on planned independent requirements.
- The system finds the schedule line category *CP* and the item category *TAN* because the item category group was set to *NORM*.

Suppose that for this example an order with a quantity of 90 pieces is entered with a required delivery date of today. This order can be confirmed after the first planned independent requirement date <reqdat1>, if the consumption parameters have been maintained correctly (*Consumption mode, Bwd consumption per., Fwd consumption per.*) in the planning material and this date and the planned independent requirements can be found. For more information, see *Consumption Strategies and Logic* in chapter 1.



After the sales order has been entered, the stock/requirements list of the variant material appears as follows:

Date	MRP Element		Received/Required Quantity	Available Quantity
<today>	Stock			0
<orderdat1>	Order	00035/0010/001	90 -	0

The stock/requirements list for the planning material changes as follows because an allocation has taken place:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	→ Planning without assembly			
<reqdat1>	PlOrd.	1234/IndR	100	100
<reqdat1>	IndReq	VSEV	10 -	90
<reqdat2>	PlOrd.	1235/IndR	100	190
<reqdat2>	IndReq	VSEV	100 -	90
<reqdat3>	PlOrd.	1236/IndR	100	190
<reqdat3>	IndReq	VSEV	100 -	90

At component level, the requirement from the planning material has been switched to a requirement from the variant material. The sum of the requirements stays the same.

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			300
<orderdat1>	DepReq	VARIANT	90 -	210
<reqdat1>	DepReq	PLANNINGMATL	10 -	200
<reqdat2>	DepReq	PLANNINGMATL	100 -	100
<reqdat3>	DepReq	PLANNINGMATL	100 -	0

#### Stage 4: Procurement After Sales

After a second planning run, the stock/requirements list of the variant is as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<orderdat1>	PlOrd.	000335/Stck	90	90
<orderdat1>	Order	00035/0010/001	90 -	0

The planned order (*Stck*) for the parent material can now be converted to either a production order, a process order, or allow backflushing in the repetitive manufacturing process. This triggers the *production after sales order* stage. Production of this material can now be executed quickly because all the necessary components are already available.

After creation and release of the production order (for the variant product) the stock/requirements situation remains the same. Essentially, the planned order is replaced by a production order. Working with production orders is only one option for production. This process is also possible in the area of repetitive manufacturing. At component level, the dependent requirements (*DepReq* in the planned order) are replaced by an order reservation (*OrdRes* in a production order).

### **Stage 5: Goods Issue for Delivery and Reduction of Planned Independent Requirements**

After goods issue for the delivery (*Logistics* → *Sales and distribution* → *Shipping* → *Delivery* → *Create*) for the variant material, the stock/requirements list of the planning material is reset back to empty. The planned independent requirements are, of course, reduced.

## Chapter 3: Strategies for Planning Components

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## Overview

The planning strategies explained in this section are designed to plan the procurement (production or purchasing) of components by planning the components. These strategies are particularly useful if:

- There is a variety of finished products (possibly with an irregular demand pattern where planning is not possible).
- The finished products are consumption-based.
- The planning of components also lends itself to separate organizational departments. Component planning in one department is not influenced by the planning of the finished product in another department.

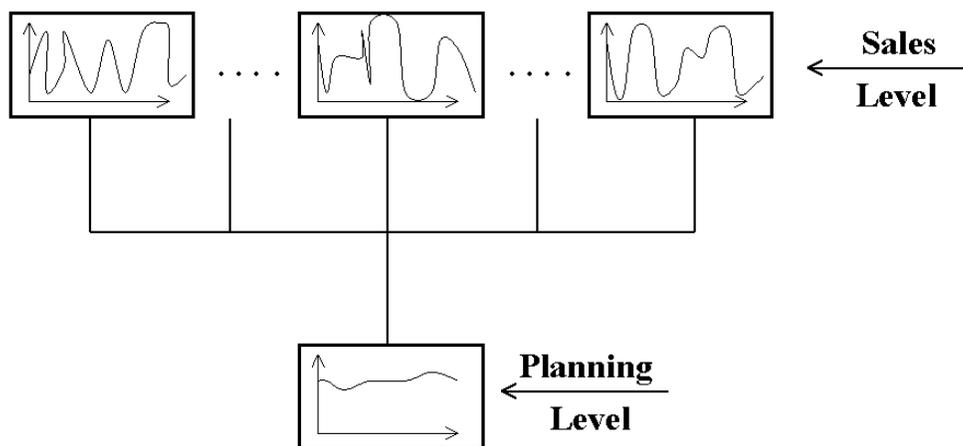
The purpose of planning at component level is to procure components to stock (without sales orders) and quickly react to customer demand.

## Prerequisites

Choose a strategy for planning components if:

- The components are not segregated (that is, they are not uniquely linked at specific orders).
- Costs should be tracked at component (material) level and not at order level.

## Process Flow



Strategies for planning components can be used for both make-to-stock and make-to-order scenarios. To use a strategy for a make-to-stock planning of components in a make-to-order environment, you should consider setting the *Individual/coll.* indicator (on the *MRP* screen) to 2 as a starting point for your master data setup.

The planning of components has the following in common with make-to-stock strategies:

- You can automate the planning stage by using information from the forecast, and pass on the results from these applications directly to Demand Management.

- Make-to-stock costing applies.
- Smoothing of production against customer requirements may be an important aspect.
- Strategies for planning components are usually combined with a lot-size key different from EX or with rounding values. In the following *Sample Scenario* sections, however, lot-size key EX is used for the sake of simplicity.

In *Planning at Assembly Level (70)*, no specific product structure of the component is required. In other words, it does not matter whether the component has a BOM. The material can be produced in-house or procured externally (for example, raw materials). *Planning at Phantom Assembly Level (59)* requires a special product structure.

For information on special issues concerning procuring components using strategies 50, 52, 60, 63, and all make-to-order strategies, see *Stockkeeping at Different BOM Levels* later this chapter. For information on how the replenishment lead time is interpreted, see *Replenishment Lead Time* at the end of this chapter.

## Planning at Assembly Level (70)

### Purpose

If a more reliable forecast can be produced for certain assemblies than for the multitude of product variants, this planning strategy is particularly useful for manufacturers of products with variants.

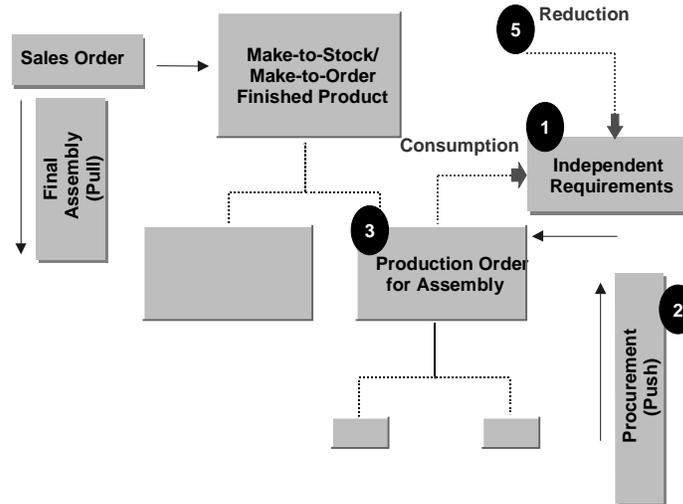
### Prerequisites

To maintain the master data of the assembly:

1. Open strategy group *70* on the *MRP* screen.
2. On the *MRP* screen, enter **1** for assembly planning (the *Mixed MRP* indicator).
3. Set consumption parameters (*Consumption mode*, *Bwd consumption*, *Fwd consumption*, on the *MRP* screen) to allow for consumption of planned independent requirements.

If you use this strategy in a make-to-stock environment, you also need to enter **2** for the *Individual/coll.* indicator on the *MRP* screen.

## Process Flow



For a detailed example of the entire process, see the next section, *Sample Scenario: Strategy 70*.

This strategy is very similar to *Planning with Final Assembly (40)* in chapter 2, the difference being, however, that planned independent requirements are allocated to consumption of production orders (or schedule lines in repetitive manufacturing) and not to consumption of sales orders. The material to be planned is a component in a larger structure, often referred to as an *assembly* or *subassembly*. Although all graphics in this documentation show this component one level below the finished product, it can be on any BOM level.

## Key Properties of Strategy 70

The following information should be considered:

- Stock for the assembly usually exists.
- Planned independent requirements are entered at assembly level.

Procurement (planned by means of the planned independent requirements) is therefore triggered before the production order stage (or schedule line in repetitive manufacturing).

- The planned orders for the assembly/components are convertible.
- You can smooth procurement according to order demand.

In this strategy, however, the ability to react flexibly to requirements is more important.

- An accurate availability check is performed according to ATP logic during order processing.
- Requirements from production orders (or planned orders) are passed onto production and can lead to changes being made to procurement after the sales order stage, if the order quantities exceed the planned independent requirement quantities.

However, order quantities cannot be confirmed if there is insufficient coverage of components. Therefore, the system automatically adjusts the master plan. For more information, see *Coping with Insufficient Coverage of Components* in chapter 2.

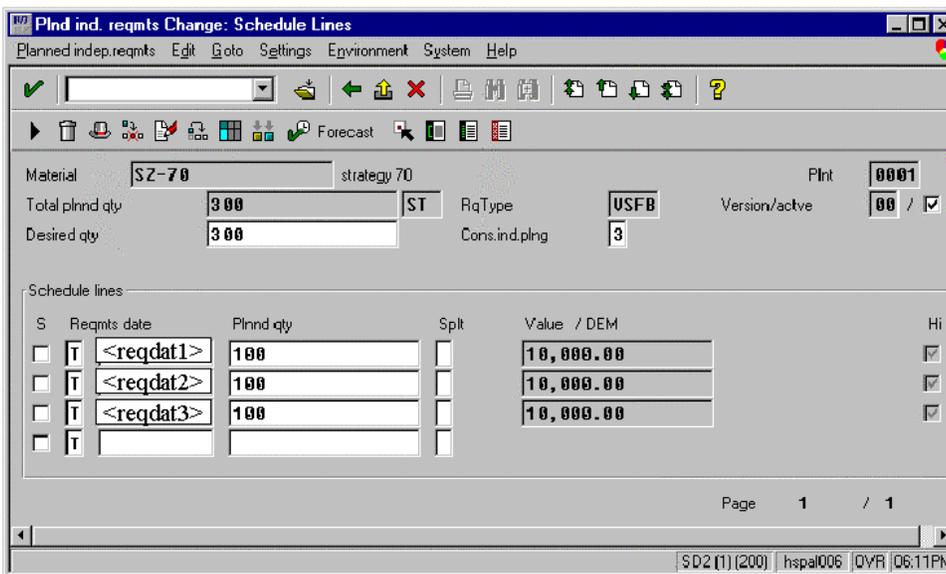
- The planned independent requirements are consumed during the production stage.  
 This step means that you can compare the planned independent requirements situation with the actual order requirements.
- The unconsumed planned independent requirement quantities increase the warehouse stock of the component, and cause procurement to decrease or not take place at all in the next period (this procedure is called netting).

### Sample Scenario: Strategy 70

This example is based on a production plan in which 100 pieces are planned for <reqdat1>, <reqdat2>, and <reqdat3>.

#### Stage 1: Demand Management

In this scenario, planned independent requirements are created as follows for the production plan.



The system will find requirements type *VSFB* because the strategy group has been set to 70. See the table of planning strategy assignments in chapter 1. The requirements are passed onto MRP. The stock/requirements list (*Logistics* → *Production* → *MRP* → *Evaluations* → *Stock/reqmts list*) for the above example appear as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<reqdat1>	IndReq	VSFB	100 -	100 -
<reqdat2>	IndReq	VSFB	100 -	200 -
<reqdat3>	IndReq	VSFB	100 -	300 -

### Stage 2: Procurement Before Use in Production

A procurement requisition is created in the MRP run (*Logistics* → *Production* → *MRP* → *Total planning*). The stock/requirements list for this example would then appear as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<reqdat1>	PlOrd.	123/Stck	100	100
<reqdat1>	IndReq	VSFB	100 -	0
<reqdat2>	PlOrd.	124/Stck	100	100
<reqdat2>	IndReq	VSFB	100 -	0
<reqdat3>	PlOrd.	125/Stck	100	100
<reqdat3>	IndReq	VSFB	100 -	0

This procurement requisition is the starting point for production or external procurement. You have a variety of options to handle the procurement process in the R/3 System. One possibility would be to convert the planned order into a production order, releasing the production order and a goods receipt of the yield quantity. Another possibility is to use returns or other goods movements for make-to-stock production.

After goods receipt for the order, the stock/requirements list is as follows:

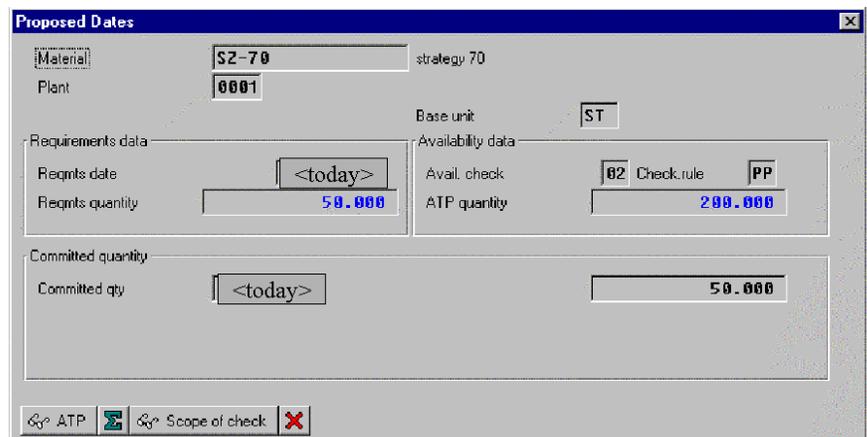
Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			200
<reqdat1>	IndReq	VSFB	100 -	100
<reqdat2>	IndReq	VSFB	100 -	0
<reqdat3>	PIOrd.	125/Stck	100	100
<reqdat3>	IndReq	VSFB	100 -	0

### Stage 3: Production Order and Allocation

A production order that uses the planned component is created (*Logistics → Production → Production control → Order → Create*). Note that two different things happen, an availability check and allocation.

An availability check is performed by choosing *Component → Availability → Check availability*.

For example, let us assume that production is 50 pieces of the material and the material has an in-house production time of zero. A popup window appears containing the information displayed to the right.



The availability check is always performed according to ATP logic. This logic is determined by the checking rule (maintained for PP in the IMG in *Production → Production Orders → Operations → Availability check → Define checking rule*), and the checking group (maintained in the material master and defined in IMG under *Production → Production Orders → Operations → Availability check → Define checking group*).



By comparison, in sales and distribution, the checking rule cannot be defined by configuration. If the sales and distribution logic is make-to-stock, then the checking rule will have the value A. If the logic is make-to-order, then the checking rule will have the value AE.

The checking rule and checking group comprise the scope of the check (maintained in the IMG under *Production → Production Orders → Operations → Availability check → Define scope of check*).

The scope of the check defines:

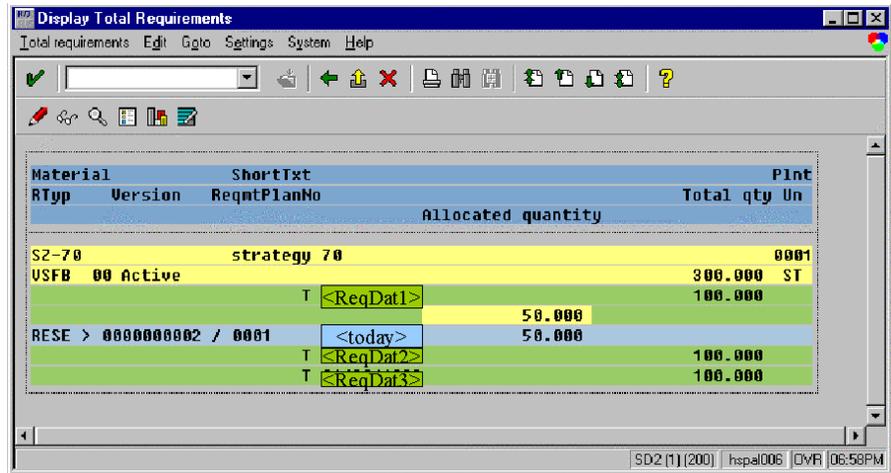
- Which MRP elements, such as purchase orders and reservations, the system includes in the availability check.

- Whether the check includes only the replenishment lead time or the end of the planning horizon.

In addition, the checking control (maintained in the IMG under *Production* → *Production Orders* → *Operations* → *Availability check* → *Define checking control*). During order creation (or release), when check availability can be performed, checking control defines a plant and production order type combination.

In terms of allocation, the planned quantity—which is not visible in the production order—is allocated to the component quantity. You can, however, control the allocation in the stock/requirements list or in the total requirements list.

The screenshot to the right shows the total requirements list.



After creating the production order, the stock/requirements list is as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			200
<today>	OrdRes	SZ-10	50 -	150
<reqdat1>	IndReq	VSFB	50 -	100
<reqdat2>	IndReq	VSFB	100 -	0
<reqdat3>	PlOrd.	125/Stck	100	100
<reqdat3>	IndReq	VSFB	100 -	0

Any parent material that consists of this component is automatically allocated to this plan. In practice, there are several header materials (like SZ-10 in this example) that allocate this material.

#### Stage 4: Procurement After Production

This stage does not apply to this strategy.

### Stage 5: Goods Issue for Production Order

After goods issue for the production order (*Logistics* → *Materials management* → *Inventory management* → *Goods movement* → *Goods issue*), the stock/requirements list appears as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			150
< reqdat1>	IndReq	VSFB	50 -	100
<reqdat2>	IndReq	VSFB	100 -	0
<reqdat3>	PIOrd.	125/Stck	100	100
<reqdat3>	IndReq	VSFB	100 -	0

## Planning at Phantom Assembly Level (59)

### Purpose

This strategy can be used for a set of components that:

- Are always assembled together in various finished products
- Are planned together
- Do not make up an assembly (they constitute a *phantom* assembly)

### Prerequisites

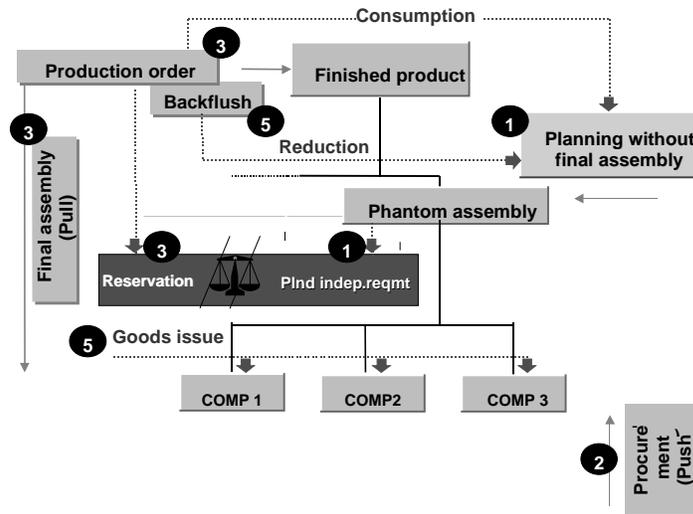
You need to maintain the master data of the phantom assembly in the following way:

- Enter 59 for strategy group on the *MRP* screen.
- For assembly planning and the *Mixed MRP* indicator, enter 1 on the *MRP* screen.
- Consumption parameters (*Consumption mode*, *Bwd consumption*, *Fwd consumption*, on the *MRP* screen) to allow for consumption of planned independent requirements.
- Enter 50 in the *Special procurement* field on the *MRP* screen (phantom assembly)
- Enter 2 for the *Individual/coll.* indicator on the *MRP* screen.

To maintain the master data of the components in the phantom assembly, enter 1 in the *Backflush* field (2 may also be possible) on the *MRP* screen. Backflushing is essential because the components are planned with only one planned independent requirement and not with individual planned independent requirements. Subsequently the strategy can only work correctly if all reservations are simultaneously reduced. This procedure is only possible when the goods issue for the components is posted at a later stage, as in backflushing. In addition, all components of the phantom structure have to be linked to the

same operation. BOMs must be maintained for the finished product(s) and for the phantom assembly.

## Process Flow



For a detailed example of the entire process, see the next section *Sample Scenario: Strategy 59*.

## Key Properties of Strategy 59

This strategy is similar to *Planning at Assembly Level (70)*, as you can see below:

- Component requirements can be planned relatively effectively.  
Procurement (planned by means of planned independent requirements) is triggered before the production order stage.
  - You can smooth procurement based on order demand.  
In this strategy, however, the ability to react flexibly to customer requirements is more important.
  - An accurate availability check is performed according to ATP logic during production order processing.  
An availability check at component level is possible in the production order.
  - If the order quantities exceed the planned independent requirement quantities, requirements from production orders (or schedule lines) are passed onto production and can lead to changes being made to procurement after the sales order stage.
  - The planned independent requirements are consumed during the production stage.  
You can compare the planned independent requirements situation with the actual order requirements.
- Due to its “phantom” nature, in contrast to strategy 70, stock does not exist for the assembly in strategy 59.

## Sample Scenario: Strategy 59

This example is based on a production plan in which 100 pieces are planned for <reqdat1>, <reqdat2>, and <reqdat3>.

### Stage 1: Demand Management

Planned independent requirements are created for the production plan. The system will find requirements type *VSEB* because the strategy group has been set to *59* (see the *Table of planning strategy assignments* in chapter 1).

The requirement is passed onto MRP. The stock/requirements list (*Logistics* → *Production* → *MRP* → *Evaluations* → *Stock/reqmts list*) for the phantom appears as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	→ Planning without assembly			
<reqdat1>	IndReq	VSEB	100 -	100 -
<reqdat2>	IndReq	VSEB	100 -	200 -
<reqdat3>	IndReq	VSEB	100 -	300 -

### Stage 2: Procurement Before Use in Production

Procurement requisitions are created in the MRP run (*Logistics* → *Production* → *MRP* → *Total planning*). The stock/requirements list for the phantom would then appear as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	→ Planning without assembly			
<reqdat1>	PlOrd.	1234/IndR	100	100
<reqdat1>	IndReq	VSEB	100 -	0
<reqdat2>	PlOrd.	1235/IndR	100	100
<reqdat2>	IndReq	VSEB	100 -	0
<reqdat3>	PlOrd.	1236/IndR	100	100
<reqdat3>	IndReq	VSEB	100 -	0

This procurement requisition is the starting point for production or external procurement. You have a variety of options to handle the procurement process. The following factors, however, are most important in this strategy:

- At phantom assembly level, stock is not taken into account.
- The planned orders are not yet “real” because production of the finished product must be executed after receipt of the sales orders.

Essentially, the planned orders are independent requirements with order type *VP*. It is impossible to convert these (VP) planned orders into production orders, or to use them in a repetitive manufacturing environment. The *Conversion* field in the display of the planned order is not set, which indicates that it is not possible to produce this planned order.

- The MRP run also creates procurement requisitions for the components of the phantom assembly (In this example, SZ-59 is the phantom assembly).

The stock/requirements list for a component of the phantom assembly is as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<reqdat1>	PlOrd.	1237/Stck	100	100
<reqdat1>	DepReq	SZ-59	100 -	0
<reqdat2>	PlOrd.	1238/Stck	100	100
<reqdat2>	DepReq	SZ-59	100 -	0
<reqdat3>	PlOrd.	1239/Stck	100	100
<reqdat3>	DepReq	SZ-59	100 -	0

Due to Demand Management, the main objective of this strategy—procurement for the components of the phantom assembly—has now been reached. In this scenario, we now assume that a goods receipt (for a purchase order, for example) takes place. The stock/requirements list for all components of the phantom assembly then appears as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			300
<reqdat1>	DepReq	SZ-59	100 -	200
<reqdat2>	DepReq	SZ-59	100 -	100
<reqdat3>	DepReq	SZ-59	100	0

### Stage 3: Production Order and Allocation

A sales order is created for a finished product whose BOM contains the phantom assembly (50 each in the following example). The requirements type of the finished product does not matter here. More importantly, a planned order for the finished product is created which includes (at least) the phantom assembly and the components of the phantom assembly. The requirement from the production order consumes the planned independent requirements immediately.

After a second MRP run, the stock/requirements list for the phantom assembly is as follows:

Date	MRP Element		Received/Required Quantity	Available Quantity
<today>	Stock			0
<today>	→ Planning w/o assembly			
<reqdat1>	PIOrd.	1234/IndR	50	50
<reqdat1>	IndReq	VSEB	50 -	0
<reqdat2>	PIOrd.	1235/IndR	100	100
<reqdat2>	IndReq	VSEB	100 -	0
<reqdat3>	PIOrd.	1236/IndR	100	100
<reqdat3>	IndReq	VSEB	100 -	0

The independent requirements for the phantom assembly have been consumed, resulting in a reduction of the planned independent requirements. A reservation was therefore created one level lower, shifting the source of the requirement from the independent requirement (Dep Reg) to the dependent requirement (Ord Res) of the sales order.

The stock/requirements list of the component of the phantom assembly is as follows:

Date	MRP Element		Received/Required Quantity	Available Quantity
<today>	Stock			300
<today>	OrdRes	SZ-59	50 -	250
<reqdat1>	DepReq	SZ-59	50 -	200
<reqdat2>	DepReq	SZ-59	100 -	100
<reqdat3>	DepReq	SZ-59	100 -	0

Today's dependent requirement was created by the planned order for the finished product [containing the phantom assembly and the component(s) of the phantom assembly]. The other dependent requirements were created by the independent requirements.

When a production order is created for the finished product (*Logistics → Production → Production control → Order → Create*), an availability check can be performed for all components of the order (*Component → Availability → Check availability*). For more information, see *Stage 3 in Sample Scenario: Strategy 70*. The source of a requirement for a component of the phantom assembly shifts from the planned order to a production order.

#### Stage 4: Procurement After Production

This stage does not apply for this strategy.

#### Stage 5: Goods Issue for Production Order

After goods issue for the production order (*Logistics → Production → Prod. control → Confirmation →*), the stock/requirements list for the phantom assembly looks the same as in stage 3. The stock/requirements list for the component(s) of the phantom assembly is as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			250
<reqdat1>	DepReq	SZ-59	50	200
<reqdat2>	DepReq	SZ-59	100 -	100
<reqdat3>	DepReq	SZ-59	100 -	0

It is vital that you use backflushing to when withdrawing the components. See the *Prerequisites* section in *Planning at Phantom Assembly Level (59)* for more information.

## Strategies for Multi-Use Materials

### Definition

A multi-use material is a material, which can be used at the same time in the following areas:

- Production
- Sales orders
- Other areas (such as requirements from cost centers)

## Use

Strategies for multi-use materials are most typically used for components sold as *spare parts*.

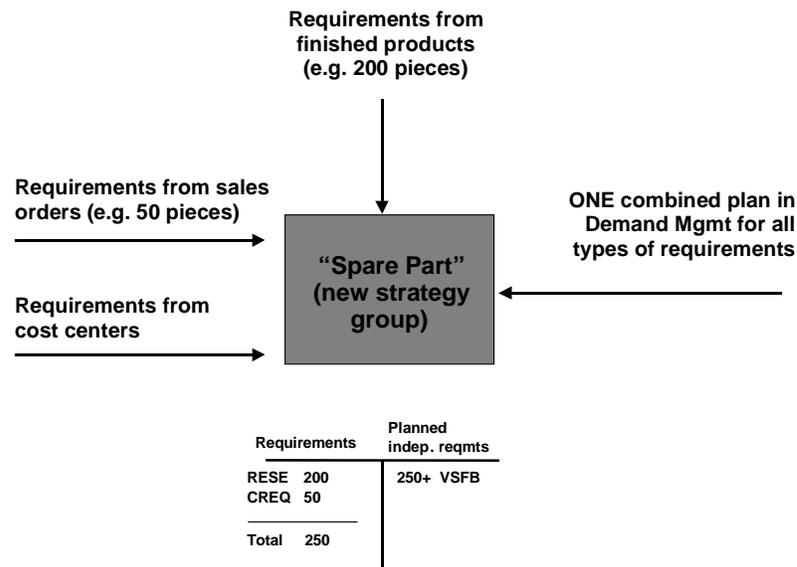
The objectives for including a multi-use material in your planning can be either one of the following:

- Use one combined plan for all uses of the material. See the next section, *Combining Sales Order and Production Requirements*, for more information.
- Create one plan for use in production and a separate plan for use in sales orders. See *Planning Requirements Separately* later this chapter.

## Combining Sales Order and Production Requirements

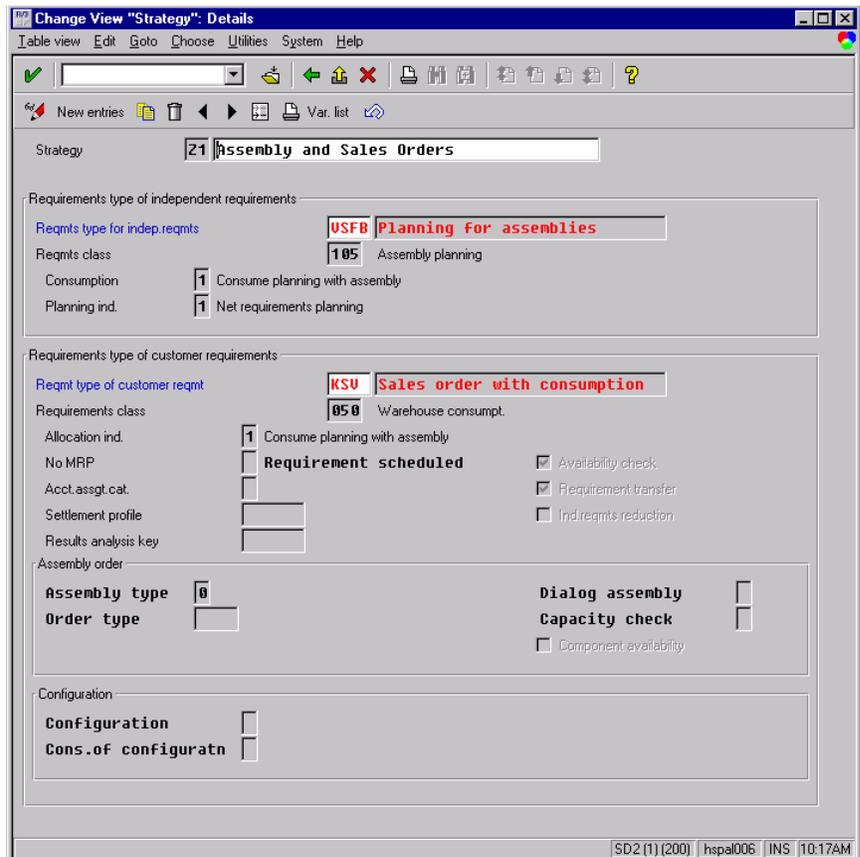
This procedure involves one combined plan for use in production and sales orders (for spare parts, for example). In the same manner as strategy 70 (*Planning at Assembly Level*), this procedure is particularly efficient if the component is used in several finished products, or if:

- Different planning strategies are used at the parent level.
- The parent material(s) is/are planned-consumption based.

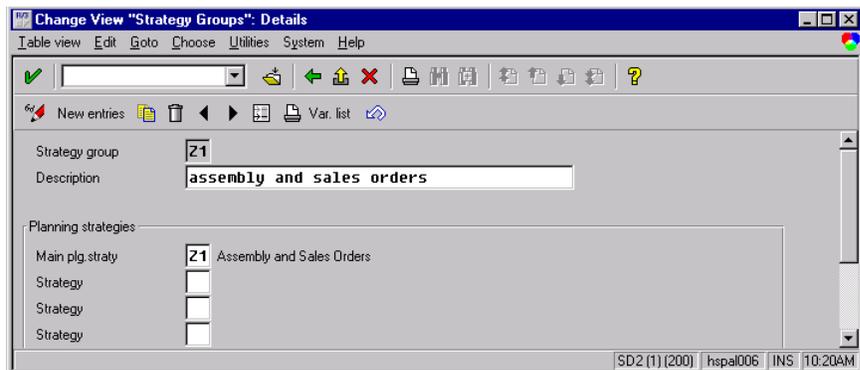


## Procedure

Create a new strategy in the IMG for production (choose *Master Planning* → *Demand Management* → *Planned Independent Requirements* → *Planning Strategy* → *Define strategy*), which combines the requirements type for independent requirements (*VSF*), and the requirements type for customer requirements (*KSV*). This new strategy combines the planning side (*KSV*) of strategy 40 and the sales order side (*VSFB*) of strategy 70.



Next, create a corresponding strategy group in the IMG for production (choose *Master Planning* → *Demand Management* → *Planned Independent Requirements* → *Planning Strategy* → *Define strategy group*).



Maintain the following in the material master for the *spare part*:

1. Enter your new strategy group on the *MRP* screen
2. Enter 1 for *Mixed MRP*.
3. Set the consumption fields (*Consumption mode*, *Fwd consumption per.*, *Bwd consumption per.*) to enable consumption of the planned independent requirements.
4. Enter 2 for *Individual/coll.* if you are working in a make-to-order environment for the parent materials.

## Result

### Using the Material as a Component

The process flow for use as a component is identical to the description in *Planning at Assembly Level (70)*. In addition, however, you can allocate customer requirements to the same planned independent requirements. Make sure that the *Consumption indicator (Planned independent requirements → Create/change → Requirements parameters)*, is set to 3 (the default value for requirements type *VSFB* in the standard system). This configuration enables consumption of sales orders and other requirements.

### Using the Material in Sales Order Processing

The process flow is as follows:

- Planned independent requirements are created for use in production and sales orders. The system generates *VSFB* requirements, as described in *Planning at Assembly Level (70)*.
- The *Procurement before sales order* stage is carried out as normal.
- During sales order processing, the system performs an availability check according to ATP logic and finds requirements type *KSV*, as in *Planning with Final Assembly (40)*.
- There is no *Procurement after sales* stage.
- Goods issue functions in the same way as for *Planning with Final Assembly (40)*.

As seen in the report *Display Total Requirements (Logistics → Production → Demand Management → Evaluations → Display total reqmts)* the *VSFB* requirements are consumed by a production order (element *RESE* in the total requirements list) and a sales order (customer requirements, element *CREQ*).

Material	ShortTxt	PInt	RTyp	Version	ReqntPlanNo	Allocated quantity	Total qty Un
SZ-70	strategy 70	0001					100.000
VSFB	00 Active				M 04/1998	60.000	300.000
					M 05/1998	10.000	100.000
					M 06/1998		100.000
RESE >	000000002 / 0001				11/28/1997	50.000	
CREQ	340 / 000010				12/11/1997	10.000	

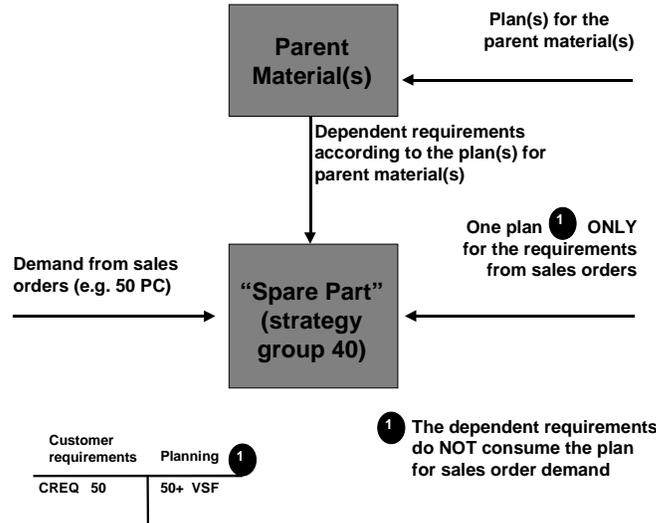
## Planning Requirements Separately

This procedure for a multi-use material involves creating separate requirements for a component used in producing a finished product and for use in sales orders. In this case, the components (usually spare parts) are sold with sales orders, but you can choose between the following two options for planning the multi-use material for production of a finished product. You can:

- Use both a plan for the parent material and a separate plan for sales orders.
- Plan the components independently of the parent material.

### Planning with Requirements from the Parent Material

This procedure assumes that usable dependent requirements exist at the parent level. The parent material(s) of the component can be easily planned, and you want to use the results of this planning. You may apply any planning strategy for the parent materials. This procedure is typically employed if the component is only used in a limited number of parent materials. Additionally, you want to plan demand for “spare parts.”



The stock/requirements list contains two requirements elements:

- Dependent requirements (Dep Req) from the parent material(s)  
 The dependent requirements do not consume the plan for sales order requirements (for example, for spare parts).
- Planned independent requirements (Ind Req, VSF) for additional sales orders  
 These requirements are consumed by sales orders for spare parts, for instance.

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			150
<reqdat1>	DepReq	<Parent material>	50 -	100
<reqdat2>	IndReq	VSF	200 -	100 -
<reqdat3>	PlOrd.	0123/Stck	100 +	0

#### Procedure

1. Maintain strategy group 40 on the MRP screen of the material master for the component (spare part) to support this scenario.

2. Set the consumption fields (*Consumption mode, Fwd consumption, Bwd consumption*) to enable consumption of the planned independent requirements.
3. Enter 2 for *Individual/coll.* if you are working in a make-to-order environment.

**Result**

To use the component in production of a finished product, ensure that:

- No planned independent requirements are created for the component.
- There is no procurement of the component without dependent requirements.
- Dependent requirements are generated by a sales order for the parent material (or by means of normal production).
- Procurement of the components takes place.
- Goods issue takes place.

The process flow for use of the component in sales orders is identical to the process flow described in chapter 2, *Planning with Final Assembly (40)*.

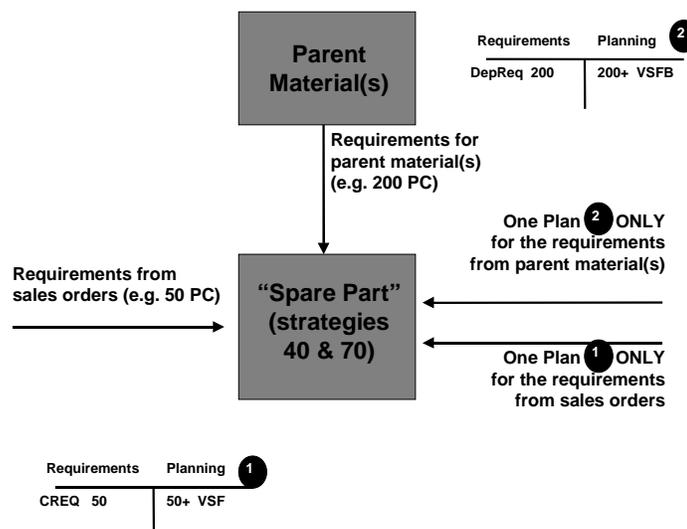
**Planning Without Requirements from the Parent Material**

This procedure assumes that no usable dependent requirements exist at parent level. The parent material(s) of the component cannot be easily planned. This issue may be due to one of the following reasons:

- The component is used in completely different parent materials (where any planning strategy can be used at parent level).
- The parent material(s) is/are planned on the basis of consumption.

The issue is further complicated when this multi-use material is sold in sales orders (for example, as a spare part).

In this procedure, there are independent plans for use of this component in production of a finished product and for use of this component in sales orders.



Procedure

1. Create a new strategy in the IMG for production (choose *Master Planning* → *Demand Management* → *Planned Independent Requirements* → *Planning Strategy* → *Define strategy group*), which combines strategy 40 and strategy 70, where strategy 40 is the main strategy.
2. Maintain the following production plan for the use as a component in production:
  - Maintain *VSFB* as the requirements type (these are requirements that are consumed in production) for planned independent requirements in the IMG for production (choose *Master Planning* → *Demand Management* → *Planned Independent Requirements* → *Planning Strategy* → *Define strategy group*)
  - In the initial screen for maintaining planned independent requirements (*Production* → *Master Planning* → *Demand Management* → *Planned independent requirements* → *Create/Change* → *Requirements parameters*), enter 2 for the *Consumption indicator*.
3. Maintain the following production plan for the use of the component in sales orders (as a spare part, for example):
  - Maintain *VSF* as the requirements type (these are requirements that are consumed in sales orders) for planned independent requirements in the IMG for production (choose *Master Planning* → *Demand Management* → *Planned Independent Requirements* → *Planning Strategy* → *Define strategy group*)
  - In the initial screen for maintaining planned independent requirements (*Production* → *Master Planning* → *Demand Management* → *Planned independent requirements* → *Create/Change* → *Requirements parameters*), enter 1 for the *Consumption indicator*.

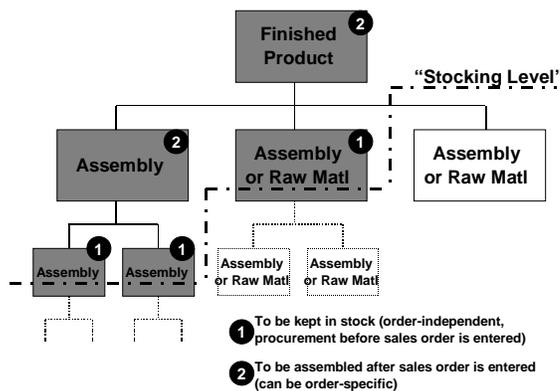
Result

The process flow for use as a component is exactly the same as described in *Planning at Assembly Level (70)*, earlier this chapter. The process flow for use in sales orders is exactly the same as described in *Planning with Final Assembly (40)* at the beginning of chapter 2.

## Stock-keeping at Different BOM Levels

When using strategy 52, 63, 50, 60, or similar strategies for the finished product, certain issues arise as to the level at which the materials should be kept in stock.

You can choose between the following options, illustrated in the graphic that follows:



## Stocking Level—Two Levels Below the Finished Product

This manner of stock-keeping corresponds to the assembly on the left-hand side of the above graphic. The components should be assembled during the *Procurement After Sales Order* stage, whereas the components of the assembly should be kept in stock during the *Procurement Before Sales Order* stage (on the basis of planned independent requirements, and not assigned to a specific sales order).

Maintain the master data as follows:

- The assembly must have the *Special procurement* field set to 60 (Phantom in planning) on the *MRP* screen. Essentially, the assembly is not built until a sales order exists for the finished product. There will, however, be a planned order (and production order) for the assembly once the sales order has been entered.
- The *Individual/coll.* indicator must be set to 2 on the *MRP* screen for the components of the assembly. The components are procured in accordance with the planning at finished product level.

## Stocking Level—One Level Below the Finished Product

This manner of stock-keeping corresponds to the assembly in the center of the above graphic. The components should be assembled during the *Procurement Before Sales Order* stage and should be kept in stock, without being assigned to a specific sales order.

Maintain the master data as follows:

- Enter 2 for the *Individual/coll.* indicator on the *MRP* screen for the component/assembly. The components are procured in accordance with the planning at finished product level.
- This manner of stock-keeping is probably the most common way of using the strategies without final assembly (52, 63, 50, 60).

## No Components Stored on Level Below the Finished Product

This manner of stock-keeping corresponds to the component/assembly on the right-hand side of the above graphic. The components should be assembled during the *Procurement After Sales Order* stage, and not kept in stock. If the finished product is assembled according to make-to-order (strategy 50 or 60), the component is also assembled according to make-to-order. Therefore, a customer-specific segment will exist in the stock/requirements list.

To maintain the master data, enter 1 for the *Individual/coll.* indicator or leave it blank on the *MRP* screen for the component/assembly. The components are not procured until a sales order exists for the finished product. If you work in a make-to-order environment, do not forget to set the *Individual/coll.* indicator again for the levels below this assembly until you reach an assembly that is either set to 2, or not planned at all. Otherwise, the whole structure below this assembly will be produced according to make-to-order.

## Replenishment Lead Time

### Definition

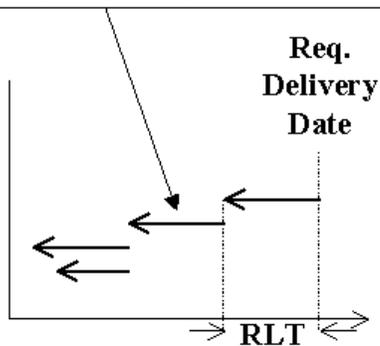
Replenishment lead time is the total time for either in-house production or the external procurement of a product. In in-house production, the replenishment lead time is determined to cover all BOM levels.

### Use

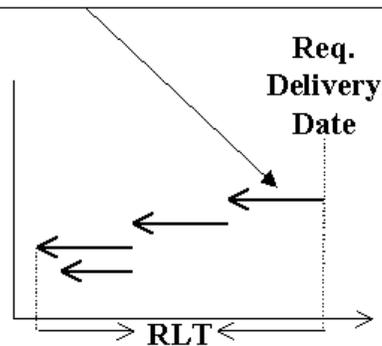
As a rule, the replenishment lead time is used in the availability check. If the replenishment lead time is not maintained, then the system uses the in-house production time (for internally produced materials) or the planned delivery time (for externally procured materials) to determine component availability. If both are maintained, the in-house production time and the planned delivery time have higher priority than the replenishment lead time.

### Integration

#### Planning on Component Level



#### Planning on Finished Prod. Level



The replenishment lead time is interpreted as follows:

- When planning at component level, the replenishment lead time is reduced to the *in-house production time*.
- When planning at finished product level, the replenishment lead time is considered to be the production time of the overall structure. Therefore, if you want to react quickly to customer demand, you need to ensure the following:
  - Planned independent requirements are maintained at finished product level.
  - Sales orders are entered a long time in advance.

## Chapter 4: Strategies for Make-to-Order (MTO) Production

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## Overview

The planning strategies in this section are designed to produce a material for an individual sales order. That is, you do not want to produce finished products until you receive a sales order. Therefore, make-to-order strategies always support a very close customer-vendor relationship because sales orders are closely linked to production. Make-to-order is also used in production using variant configuration and assemble-to-order environments. The usage in these areas is due to the close relationship between the sales order and production that exists in a make-to-order environment and is required in assemble-to-order and variant configuration.

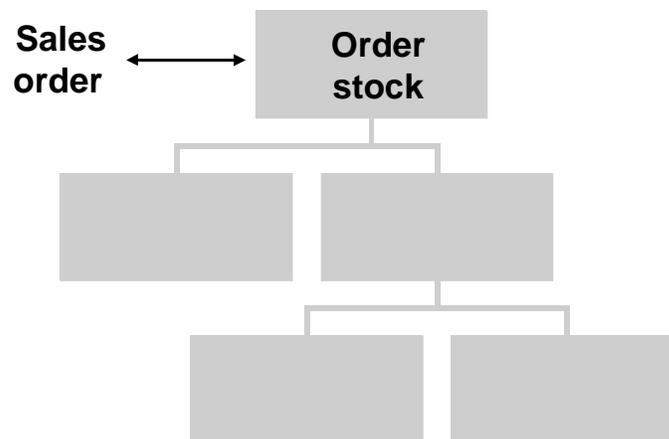
## Prerequisites

Choose a make-to-order strategy, if:

- The materials are segregated and uniquely assigned to specific sales orders.
- Costs need to be tracked at sales order, not at material level.

For the sake of clarifying the master data settings, Make-to-order strategies should always be combined with lot-size key *EX* (lot-for-lot), and rounding values should not be used. Even if you would maintain other lot-size keys or rounding values these values do not take effect in make-to-order strategies.

## Process Flow



Extensive options exist that enable you to procure components for specific sales order items. You may, however, want to use a different planning strategy to procure components without having a sales order yet. Using one of these planning strategies allows you to keep your replenishment lead time low.

You can keep the replenishment lead time low by:

- Planning on the basis of the finished product [see the next section, *Planning Without Final Assembly (50)*, or *Planning with a Planning Material (60)* later this chapter.]
- Planning at component level (see *Strategies for Planning Components* in chapter 3)
- Using consumption-based or Kanban-controlled components

Customer stock can exist on any BOM level. See *Stockkeeping at Different BOM Levels* in chapter 3 for more information. The close link of sales orders to stock results in the customer section of the stock/requirements list.

In the basic make-to-order strategy, *Make-to-Order Production (20)*, no specific product structures are required. Therefore, it does not matter if the material has a BOM or not. The material can be produced in-house or procured externally. No planning is involved in this strategy.

*Planning Without Final Assembly (50)* and *Planning with a Planning Material (60)* do require a specific product structure (that is, a BOM, which means the BOM header material is always produced in-house). These planning strategies assume that you want to plan the procurement (production or purchasing) of your components by planning the finished products. This strategy means you need a fairly stable demand for your finished products. If, however, you can plan more easily at component level than at finished product level, see *Strategies for Planning Components*.

## Planning Without Final Assembly (50)

### Purpose

It makes sense to use this planning strategy when the main value-added process is final assembly. This strategy and *Planning with a Planning Material (60)* are probably the most widely used strategies in a make-to-order environment. Like all make-to-order strategies, use strategy 50 if production is unique for every customer, where it is impossible to change the stock for different sales orders.

### Prerequisites

Maintain the following master data for the finished product:

- Strategy group *50* on the *MRP* screen.
- Consumption parameters (*Consumption mode*, *Bwd consumption*, *Fwd consumption*) so that the independent requirements can be found.

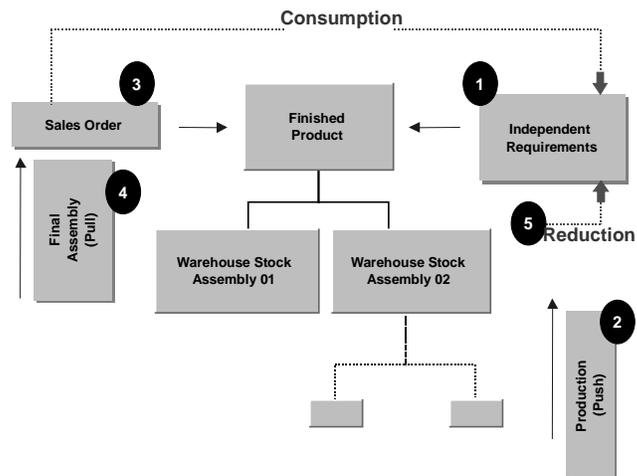
If no independent requirements can be found, default values are taken from the MRP group. For more information, see *Consumption Strategies and Logic*.

- Item category group (for example, *NORM*) on the *Sales Organization* screen.

A BOM is required for the finished product. There are no major implications for the BOM components. However, you need to maintain the following settings for the BOM components:

- Set the MRP type to *P\** (or *M\**) to plan the components in MRP (of course you are also free to use, for example, consumption-based components).
- You may want to consider setting the *Individual/coll.* indicator to *2* for a make-to-stock procurement of components in a make-to-order environment.

## Process Flow



For a detailed example of the entire process, see *Sample Scenario: Strategy 50*.

## Key Properties of Strategy 50

- Production quantities can be planned effectively. You can use information from the Sales Information System, SOP, or other planning tools to plan production quantities.
- Procurement of the components is organized by means of planned independent requirements entered at finished product level. The system creates special planned orders at finished product level for these planned independent requirements. These orders are only relevant for production once a sales order for the finished product exists.
- Planned independent requirements that are scheduled using this particular strategy are listed in a separate segment in the MRP list. The planned orders are created with the order type *VP* and are unconvertible. The sales orders for this strategy are entered as individual customer requirements and maintained in a separate segment in the planning run.
- The assemblies are, however, produced or procured before the sales order is entered. Production is carried out up to one level before the finished product level, and the assemblies and components required for producing the finished product are placed in stock to await the incoming sales order.
- Final assembly is triggered once a sales order has been entered.
- An availability check is performed on the basis of planned independent requirements. Therefore, unplanned stock (such as returns) is not considered for sales.
- The incoming sales order consumes the planned independent requirements, and this in turn reduces the unconvertible planned order quantity.
- The system creates a new convertible planned order for the sales order quantity. If the unconvertible planned order quantity is not exhausted by the sales order quantity, it remains in the system. If the sales order quantity exceeds the planned independent requirements quantity, the unconvertible planned order quantity is increased. For additional information, see the section *Coping with Insufficient Coverage of Components* in chapter 2.

- The planned independent requirement quantities that remain unconsumed increase the warehouse stock of the components and cause procurement to decrease or not take place at all in the next period. This process is called netting.

Strategies 50 and 60 are very similar to strategies 52 and 63. The following differences exist, however:

Strategy	50, 60	52, 63
Costing, settlement, work-in-progress, etc.	Make-to-order	Make-to-stock
Finished product stock (and component stock (if required))	Segregated per sales order item	Not segregated
Lot-size indicator and rounding values	Lot-size indicator and rounding values being ignored	User has to ensure that the appropriate values are set

## Other Areas

### Stocking Levels

See *Stockkeeping at Different BOM Levels* in chapter 3.

### Availability Check

In this strategy, there is only an availability check against planned independent requirements. A material is considered available if a planned independent requirement can be consumed. Therefore, unplanned stock (returns or unplanned production quantities such as over-deliveries) is not taken into account. The *Availability check* indicator (*MRP* and *Sales: General/Plant Data* screens) is not relevant in this case because an availability check according to ATP logic does not take place.

## Sample Scenario: Strategy 50

The process flow for strategy 50 is very similar to strategy 52. This sample scenario therefore refers to *Sample Scenario: Strategy 52* in chapter 2. This example is based on a production plan in which 100 pieces are planned for <reqdat1>, <reqdat2>, and <reqdat3>.

### Stage 1: Demand Management

This stage is the same as strategy 52, which means planned independent requirements are created for the production plan, and the system finds requirements type *VSE*. See the *Table of Planning Strategy Assignments* in chapter 1.

The requirements are passed onto MRP. The stock/requirements list (*Logistics* → *Production* → *MRP* → *Evaluations* → *Stock/reqmts list*) for this example would appear as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	→ Planning w/o assembly			
<reqdat1>	IndReq	VSE	100 -	100 -
<reqdat2>	IndReq	VSE	100 -	200 -
<reqdat3>	IndReq	VSE	100 -	300 -

### Stage 2: Procurement Before Sales

This stage is the also the same as strategy 52, which means non-convertible planned orders are created for the finished product. Procurement for the components takes place.

### Stage 3: Sales Order and Allocation

A sales order is created for the parent material. Unlike strategy 52, the system finds the requirements type *KEV* because the strategy group is set to 50. See the *Table of Planning Strategy Assignments* in chapter 1.

Like strategy 52, the following things happen:

- A quantity that was previously planned (such as 100 pieces for each schedule line in this example) can be confirmed (*Edit* → *Item availability* in the sales order menu). Note the header text that says *Assignment of Planned Independent Requirements*. This header signifies that the availability check is not performed according to ATP logic, but instead it is based on planned independent requirements.
- The system finds the schedule line category *CP* and the item category *TAN* because the item category group was set to *NORM*.

After the sales order has been entered, the stock/requirements list for the parent material appears as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	Cstock	000333/0010		0
<today>	Order	000333/0010/001	90 -	90 -
<today>	→ Planning w/o assembly			
<reqdat1>	PlOrd.	1234/IndR	100	100
<reqdat1>	IndReq	VSE	10 -	90
<reqdat2>	PlOrd.	1235/ IndR	100	190
<reqdat2>	IndReq	VSE	100 -	90
<reqdat3>	PlOrd.	1236/ IndR	100	190
<reqdat3>	IndReq	VSE	100 -	90

The only difference between this stock/requirements list and the one at the same point in strategy 52 is the *Cstock* line that segregates the different sales order stocks.

#### Stage 4: Procurement After Sales

This stage is similar to strategy 52. The stock/requirements list for the parent material appears as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	Cstock	000333/0010		0
<today>	Order	000333/0010/001	90 -	0
<t+rlt>	PlOrd.	1237/Ord.	90	0
<today>	→ Planning w/o assembly			
<reqdat1>	PlOrd.	1234/IndR	10	10
<reqdat1>	IndReq	VSE	10 -	0
<reqdat2>	PlOrd.	1235/IndR	100	100
<reqdat2>	IndReq	VSE	100 -	0
<reqdat3>	PlOrd.	1236/IndR	100	100
<reqdat3>	IndReq	VSE	100 -	0

Here the difference between this strategy and strategy 52 is that the system creates a planned order with order type *ORD* (make-to-order) instead of *STCK*.

The goods receipt from production results in a customer stock and the stock/requirements list then appears as follows (note the stock in the *Cstock* line):

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	Cstock	000333/0010		90
<today>	Order	000333/0010/001	90 -	90 -
<today>	→ Planning w/o assembly			
<reqdat1>	PlOrd.	1234/IndR	10	10
<reqdat1>	IndReq	VSE	10 -	0
<reqdat2>	PlOrd.	1235/IndR	100	100
<reqdat2>	IndReq	VSE	100 -	0
<reqdat3>	PlOrd.	1236/IndR	100	100
<reqdat3>	IndReq	VSE	100 -	0

As long as you have set the *Individual/coll.* indicator to 2, there are no differences at component level.

### Stage 5: Goods Issue for Delivery and Reduction of Planned Independent Requirements

This stage is the also the same as strategy 52, which means that the planned independent requirements are physically reduced.

## Planning with a Planning Material (60)

### Purpose

This planning strategy is particularly useful for planning BOMs that contain variant and non-variable parts. The important feature of this strategy is that you can procure non-variable components based on planning in Demand Management. Production of the finished product is based on actual sales orders. This procedure ensures that you can quickly react to customer requirements even if the finished product has a long overall lead time. You can avoid the main value-added process until you have a customer.

This strategy lends itself to planning the *variants* of one product. The term variant is used here to indicate similar products. It is not used in the sense of variant configuration. You need to imagine similar parts

sharing a BOM group so that you can easily exchange a component in all similar BOMs, for example. You usually have several dozen variants, whereas variance would be much higher in variant configuration.

### Examples from Industry

This strategy lends itself to the planning of different sizes or packages for one product. For instance, you may want to sell a product in packages:

- Containing 1 liter, 2 liters, and 1 gallon
- Labeled in English, German, and Japanese

### Prerequisites

You need to create a separate material master record for the planning material and enter the planning material in the material master record (on the *MRP* screen) of all finished products that are to be planned using this planning strategy.

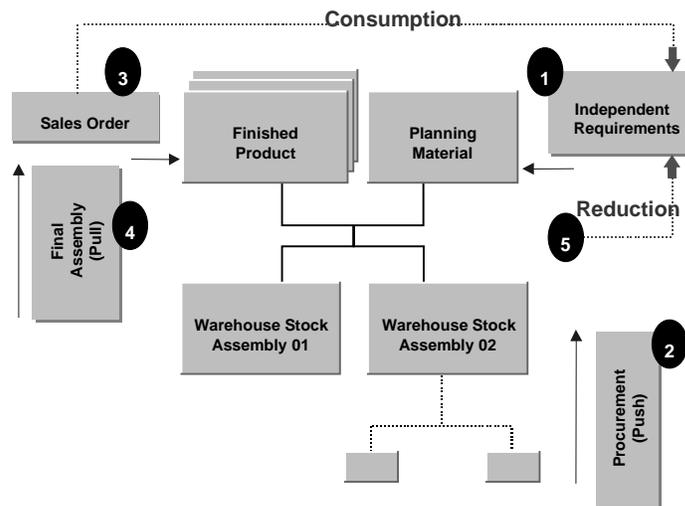
Maintain the products in the following fashion:

	Variant products	Planning material
Strategy group ( <i>MRP</i> screen)	60	60
Item category group ( <i>Sales organization</i> screen)	for example, <i>NORM</i>	Sales organization screens are not required
Consumption parameters ( <i>Consumption mode, Bwd consumption per., Fwd Consumption per.</i> ) ( <i>MRP</i> screen)	<b>Not</b> to be maintained, the values of the planning material are used.	Need to be maintained so that the planned independent requirements can be found. (See <i>Consumption Strategies and Logic</i> in chapter 1)
<i>Planning material, Planning plant</i> and <i>Plng conv. Factor</i> ( <i>MRP</i> screen)	Need to be maintained.	
Bill of material	Required Contains all parts	Required Contains the non-variable parts

There are no major implications for the BOM components. However, you:

- Need to enter **P\*** or **M\*** for *MRP type* (on the *MRP* screen) to plan the component in *MRP*.
- May want to consider setting the *Individual/coll.* indicator (on the *MRP* Screen) to 2 for a make-to-stock procurement of components in a make-to-order environment.

## Process Flow



For a detailed example of the entire process, see the next section, *Sample Scenario: Strategy 60*. This strategy has the same basic features as strategy 50. In addition, many materials can consume the planned independent requirements of one planning material. For more information on the differences between these strategies, see *Planning Without Final Assembly (50)*.

In the current strategy the non-variable parts are planned using the BOM of a so-called *planning material*. In this instance, the planning material is used purely for planning purposes. It is not actually produced itself, but rather used to pass on the dependent requirements of the non-variable parts from the finished product. The variant parts can be planned using the strategy *Planning at Assembly Level (70)* in chapter 3. The advantage of planning with a planning material is that you can plan all the non-variable parts included in several finished products together.

These *variant* components cannot be planned exactly using this strategy. Instead you need ensure that the variant components are:

- Consumption-based
- Independently planned using a planning strategy for components (see *Strategies for Planning Components* in chapter 3 for more information)

Alternatively, you can accept an over-planning or under-planning of the variant components.

If you have high variance in your products, you may want to automate the planning of components. See *Strategies for Configurable Materials* in chapter 5 for more information. This strategy can also be used as a cross-plant version of strategy 50. See *Cross-Plant Planning* in chapter 1 for more information.

## Sample Scenario: Strategy 60

The process flow for strategy 60 is very similar to the process for strategy 63. This sample scenario therefore refers to *Sample Scenario: Strategy 63* in chapter 2. This example is based on a production plan in which 100 pieces are planned for <reqdat1>, <reqdat2>, and <reqdat3>.

### Stage 1: Demand Management

This stage is the same as for strategy 63, which means planned independent requirements are created for the planning material, and the system finds requirements type *VSEV*. See the *Table of Planning Strategy Assignments* in chapter 1. The requirements are passed onto MRP.

The stock/requirements list for the planning material (*Logistics → Production → MRP → Evaluations → Stock/reqmts list*) for the above example would appear as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	→ Planning without assembly			
<reqdat1>	IndReq	VSEV	100 -	100 -
<reqdat2>	IndReq	VSEV	100 -	200 -
<reqdat3>	IndReq	VSEV	100 -	300 -

### Stage 2: Procurement Before Sales

This stage is also the same as strategy 63, which means non-convertible planned orders are created for the planning material. Procurement for the components of the planning material takes place.

### Stage 3: Sales Order and Allocation

A sales order is created for the variant material. Unlike strategy 52, the system finds the requirements type *KEVV* because the strategy group is set to *60*. See the *Table of Planning Strategy Assignments* in chapter 1.

Similar to strategy 52, the following things happen:

- A previously planned quantity (such as 100 pieces for each schedule line in this example) can be confirmed (*Edit → Item availability* in the sales order menu). Note the header text that says *Assignment of Planned Independent Requirements*. This header signifies that the availability check is not performed according to ATP logic, but is based instead on planned independent requirements.
- The system finds the schedule line category *CP* and the item category *TAN* because the item category group was set to *NORM*.

After the sales order has been entered, the stock/requirements list for the variant material appears as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	Cstock	00035/0010		0
<orderdat>	Order	00035/0010/001	90 -	90-

The stock/requirements list for the planning material changes as follows, because an allocation has taken place:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	→ Planning w/o assembly			
<reqdat1>	PlOrd.	1234/IndR	100	100
<reqdat1>	IndReq	VSEV	10 -	90
<reqdat2>	PlOrd.	1235/ IndR	100	190
<reqdat2>	IndReq	VSEV	100 -	90
<reqdat3>	PlOrd.	1236/ IndR	100	190
<reqdat3>	IndReq	VSEV	100 -	90

At component level, the requirement from the planning material switches to a requirement from the variant material. The sum of requirements remains the same.

#### Stage 4: Procurement After Sales

This stage is similar to strategy 63. The stock/requirements list for the variant material appears as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	Cstock	000335/0010		90
<orderdat>	PlOrd.	000335/Ord.	90	90
<orderdat>	Order	000333/0010/001	90 -	0

At this point, the difference between this strategy and strategy 63 is that the system creates a planned order with order type *ORD*. (make-to-order) instead of *STCK*. The planned order for the variant material is now convertible and triggers production after the sales order has been entered. As long as you have set the *Individual/coll.* indicator to 2 on the *MRP* screen (to ensure a make-to-stock procurement of components in a make-to-order environment), there are no differences at component level.

### Stage 5: Goods Issue for Delivery and Reduction of Planned Independent Requirements

This stage is the also the same as for strategy 63, which means that the planned independent requirements are physically reduced.

## Make-to-Order Production (20)

### Purpose

As the name would suggest, in make-to-order production, a product is produced specifically for an individual sales order. This planning strategy is used when planning of the (parent) product is neither required nor possible. Demand Management is not involved in this process, nor is there an allocation mechanism. Orders are taken as they come. This strategy represents a production procedure where, in theory, each product is only produced once, although over time the same or similar production processes are repeated. Each product is specifically produced for an individual customer; therefore the finished product is rarely placed in stock.

### Prerequisites

Considering the purpose of this strategy the following requirements have to be met by the components:

- Procure all necessary components within the total replenishment lead time
- Plan on component level, if required
- Use consumption-based components or Kanban-based components

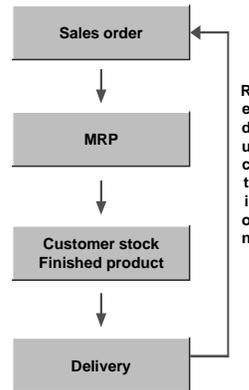
Alternatively, you can receive the sales orders at a very early stage with regard to the replenishment lead time.

You also need to maintain the following master data settings for the finished product:

- Strategy group 20 on the *MRP* screen
- Item category group (such as *NORM*) on the *Sales Organization* screen

No specific product structure is required. Therefore, it does not matter if the material has a BOM (internal production) or not (and is procured externally). The material is, however, usually produced in-house as in the subsequent sample scenario.

## Process Flow



For a detailed example of the entire process, see *Sample Scenario: Strategy 20* earlier in this chapter.

## Key Properties of Strategy 20

- The sales order quantities are planned for production using the sales order number.  
The quantities produced for the individual sales orders cannot be changed. Each quantity is maintained specifically for the individual sales order. A separate segment is created in the MRP list for make-to-order production.
- Starting from the sales order, you can apply this type of planning to as many levels of the BOM as you want.  
Assemblies and components are also produced or procured specifically for the pegged order, and stock is also managed separately for this sales order.
- The production and procurement costs are maintained for each sales order in either a settlement order or in a project at sales order item level.  
A detailed analysis of the planned and actual costs is ensured.
- You can also use this production technique to create *assembly orders*.  
The assembly order triggers the creation of either a production order or a planned order and provides you with a precise delivery schedule. The delivery schedule is based on availability and the production requirements of the relevant assemblies and components.

## Other Areas

### Stocking Level

See *Stockkeeping at Different BOM Levels* in chapter 3 for more information.

## Sample Scenario: Strategy 20

### Stage 1: Demand Management

This stage does not apply to this strategy.

### Stage 2: Procurement Before Sales

This stage does not apply to this strategy in the sense that there is no production without a sales order. If sales orders exist in the system in advance, production is performed before the required delivery date.

### Stage 3: Sales Order and Allocation

Once a sales order is created, the following can happen:

- Any quantity can be confirmed according to the ATP checking rule for a make-to-order environment, *AE*. Note the header text, which says *Availability Control*. This statement indicates that this is an availability check according to ATP logic.
- The system finds the schedule line category *CP* and item category *TAN* because the item category group was set to *NORM*.
- The system finds the requirements type *KE* (under the *Overview* → *Procurement* in the sales order menu) because the strategy group has been set to *20*.
- In this scenario, an order with a quantity of 10 pieces is now entered with a required delivery date of today. This order can be confirmed after the replenishment lead time.

Once the sales order has been entered, the stock/requirements list appears as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	Cstock	000333/0010		0
<today>	Order	000333/0010/001	10 -	10 -

Note the *Cstock* lines divide the total stock into independent customer sections.

### Stage 4: Procurement After Sales

A procurement requisition is created in the MRP run (*Logistics* → *Production* → *MRP* → *Total planning*). The stock/requirements list is then as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	Cstock	000333/0010		0
<today>	Order	000333/0010/001	10 -	10 -
<t+rlt>	PlOrd.	000214/Stck	10	0

t + rlt = today + replenishment lead time

This procurement requisition is the starting point for production or external procurement. Various possibilities exist for handling the procurement process in the R/3 System. One option would be to convert the planned order into a production order, and release the production order and a goods receipt of the yield quantity.

After goods receipt for the order and a second MRP run, the stock/requirements list appears as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	Cstock	000333/0010		10
<today>	Order	000333/0010/001	10 -	0

#### Stage 5: Goods Issue for Delivery

After goods issue for the delivery (*Logistics* → *Sales and distribution* → *Shipping* → *Delivery* → *Create*), the stock/requirements list is reset to empty.

# Chapter 5: Production with Variant Configuration

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## Overview

This chapter explains the issues involved in the planning of configurable materials. This chapter is not about variant configuration as such. We must infer that you are familiar with variant configuration (refer to the online help if necessary).

All strategies, newly explained in this chapter, are make-to-order strategies. Refer to chapter 4 for more information on issues such as:

- Costing
- Segregated materials management

The variance of your product(s) is the key driver to choosing the right planning strategies. Planning with only a few variants differs fundamentally from planning thousands or millions of variants.

Some examples for configurable products are bicycles, personal computers, automobiles, or elevators. This series of products shows increasing variance.

- A bicycle might have only a few characteristics (for example, color and frame type).
- A personal computer might have more characteristics (for example, hard-disk, casing, CPU, country, color).
- A car might have hundreds of characteristics, each with a number of characteristics values.
- An elevator includes a set of components that cannot be reasonably assembled without constructing new parts for each elevator.

The number of characteristics and characteristic values leads to different approaches on the way these materials could be planned. To make this point clear, you should consider the number of possible variants:

- A bicycle might have 7 colors and 2 frame types, which result in  $7 * 2 = 14$  variants.
- A personal computer might have 2 hard-disk types, 3 casing types, 2 CPU types, 2 country versions, and 3 possible colors, resulting in  $2 * 3 * 2 * 2 * 3 = 72$  variants.
- A car with some dozens variants can easily have a million or more variants.
- An elevator might have millions of *standard variants* and an unlimited number of *additional variants* (that is, parts that are produced customer-specific).

After further examination, you could reduce the variants for planning purposes:

- The colors of the bicycle are typically cheap and planned-consumption based. You might want to plan only the two variants of the frame type.
- A similar reduction could be applied to the PC as well. For example, you could use consumption-based procurement for cheap components and certain software components. Then you would plan only the expensive components (for example, you might want to plan only CPU types and casing types, resulting in 6 variants)

- Similar planning approaches can be used for more complex products such as cars and elevators.

This reduction makes a planning of the variant products easier. Up to a certain complexity you can plan on the finished product level. For example, you could plan as follows:

- Planning 600 PC of men's bicycles and 400 PC of women's bicycles.
- Planning the amount of different PCs (for example, 100 PC of Desktop PC with a Pentium processor, 80 PC of Tower PC with a 486 processor, and so on).

The planning of products such as cars could occur with two different approaches.

- If you let your customers configure the product fully you could plan the components directly (for example, using strategy *Planning at Assembly Level (70)* from chapter 3). This approach would result in one set of planned independent requirements for all components (which are not procured consumption-based or Kanban-controlled). The generation of these planned independent requirements could be performed manually, from a technical point of view. Yet to simplify this process you might want to plan the characteristics directly and have the system generate the planned independent requirements of the components (the characteristics planning sections explain the details on this procedure).
- A totally different approach, even for complex products such as cars, would be to define a set of variants (formerly called *stockable-types*) that are produced make-to-stock. The advantage of this approach is that your customers can be served immediately from stock. The downside is that your customers cannot fully configure the product; they need to willingly buy from stock.

## Strategies for Variants

This chapter describes potential ways to cope with products that have a practical limited number of possible permutations of characteristics and characteristic values (*low variance*). Essentially, this chapter describes the use of variants to sell configurable materials.

*Variants* can be used to facilitate work with configurable materials. Variants of a configurable material are, for example, defined to prefabricate frequently required configurations and place them in stock (For that reason, variants were formerly called *stockable types*).

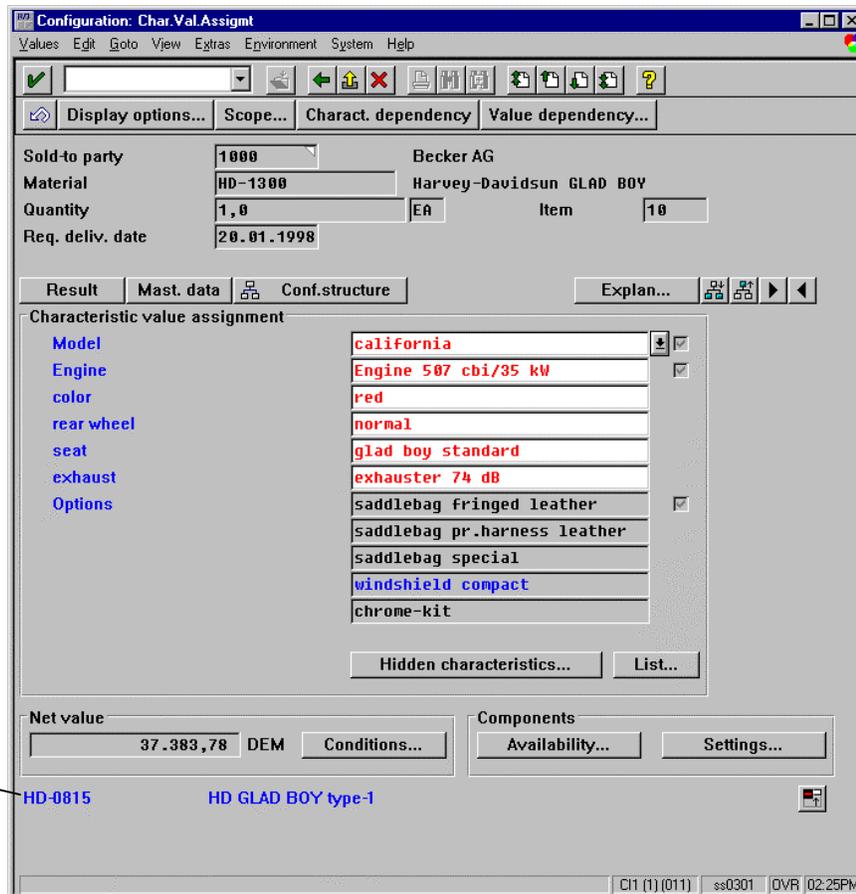
For some configurable materials, it may be difficult to determine the possible variants. To use strategies for variants effectively you must have an estimate of future consumption for each variant. If the configuration is not changed during the sales order stage, production can occur at the *production before sales order*' stage. The customers need to be willing to purchase the variants as they are or as they were planned. The benefit of this strategy is that products can be immediately shipped to the customers if they are in stock.

## Variants and Variant Determination

Variants can be used for products as complex as cars, for example. The variance is reduced artificially. Manufacturers define a set of variants ranging from basic versions to heavily equipped models. Including the different colors, there are several hundred variants to be planned, even if there are theoretically billions of possible variants.

Variant determination is often used to find the variants, since each variant needs a unique material number and the sales personnel might not know the material numbers of all variants. To use variant determination, enter a material number for a configurable material and configure/value the characteristics. As soon as you have chosen characteristics values this variant displays at the bottom of the configuration screen as shown below. You can display the detailed configuration of the variant by double-clicking on it.

Depending on the strategy, in *Logistics* → *Central Functions* → *Var.Configuration*, *Environment* → *Conf.Simulation*, *Goto* → *Var.value assignmt.* the variant has to match the configurable material partly or completely.



Notification of Variant

### Settings for Variant Determination and Ability to Change the Variant

In the standard R/3 System, the configurable material entered in the sales order will be replaced by a variant material. Depending on the configuration, you could instead receive a notification asking if you want the configurable material replaced with the variant. This option is set by choosing *IMG* → *Sales and Distribution* → *Sales* → *Sales Documents* → *Sales Document Item* → *Define Item Categories*; this notification is not a feature of variant configuration or Demand Management itself.

Variant determination is not possible if you either:

- Deal with multi-level configuration
- Have not maintained the sales views in the material master of the variants

In addition, you can decide if the configuration of the variant can be changed or not. This change depends on:

- The *structure scope* in *IMG → Sales and Distribution → Sales → Sales Documents → Sales Document Item → Define Item Categories*, that is, control by the item category and/or by the item category group of the material master
- The *Cnfg.* field in *IMG → Sales and Distribution → Basic Data → Availability check and transfer of requirements → Transfer of Requirements → Define Requirement Class*, that is, control by requirements class, requirements type, and ultimately by the strategy group in the material master.

In the system, one or both of the following master data settings allow the variant to be configured:

- Item category group for configuration, for example *0002*, resulting in item category *TAC*
- Strategy groups for configuration, for example *54, 55, 56, 65*.

On the contrary, item category group *NORM* **and** the strategy group *Planning without Final Assembly (50)* would not allow for the configuration of the variant.

### Master Data Settings

In addition to the usual configuration data such as characteristics, classes, dependencies, and configuration profiles for the configurable material, you have to maintain the following data for a variant:

- To create a variant, maintain the following data in its material master:
  - Leave the *Material is Configurable* field on the basic data screen blank.
  - Enter the configurable material on the basic data or MRP2 screen.
  - Maintain configuration (you will be prompted for it after entering the configurable material).
  - Maintain the usual materials master settings, such as item category group, availability check, MRP type, and consumption parameters.
- The configurable material has to be maintained such that:
  - An item category will be found which features variant determination such as *TAC*. Thus, maintain a suitable item category group such as *0002* in the standard system.
  - You consider choosing continuous testing on existing variants during the configuration of the configurable material. Select *Find continuous* in *Logistics → Central Functions → var.Configuration, Environment → Conf. Simulation, Goto → Var.value assignmt.* in the application menu.
- To use the same BOM and routing for the variants and the configurable material:
  - Use *Goto → Header overview, Routing → Material allocation* in the transaction to change the routing (*Logistics → Production → Master Data → Routings, Routings → Routings → Change*) and enter the variant material.
  - Use *Bills of Material → Material BOM → Alloc. Config. Mat → Create* in the BOM menu and enter the variant and the BOM group number

### Make-to-Stock Production for Variants

Variants can be planned on the finished product level using any make-to-stock strategy, such as *Planning with Final Assembly (40)* or *Net Requirement Planning (10)*. Refer to chapter 2 for how to work with these strategies.

The planning of variants with make-to-stock strategies combines the advantages of make-to-stock production (that is, very short delivery time) with the advantages of variant configuration (that is, one BOM and one routing for a whole product family).

Planning via variants can be combined with the strategy *Characteristics Planning with Dependent Requirements (56)*, if you want to accept additional sales orders for any configuration.

### Make-to-Order Production for Variants

Variants can be planned on the finished product level using any make-to-order strategy, such as *Planning without Final Assembly (50)* or *Planning with a Planning Material (60)*. Refer to chapter 4 for how to work with these strategies.

The planning of variants with make-to-order strategies combines the advantages of make-to-order production (that is, very short delivery time or cost tracking on sales order level) with the advantages of variant configuration (that is, one BOM and one routing for a whole product family).

The following table illustrates which stages are involved in which strategies:

Strategy/Stage	55	26	65
Similar Make-to-Order Strategy	50	20	60
1. Demand Management	Yes	No	Yes
2. Procurement before Sales	Yes	No	Yes
3. Sales Order	Yes	Yes	Yes
4. Procurement after Sales	Yes	Yes	Yes
5. Goods Issue for Delivery and reduction of PIR	Yes	Yes	Yes

### Make-to-Order for Material Variants (26)

The strategy *Make-to-Order for Material Variants (26)* is similar to the strategy *Make-to-Order Production (20)* as described in chapter 4. The difference is that *Make-to-Order for Material Variants (26)* lets you change the configuration of the variant.

See the following matrix for differences and commonalties between strategies 25 and 26.

Strategy	25	26
Configuration (of a variant)	<b>Must</b>	<b>Can</b>
Material used in sales order	Configurable material	Variant
Default configuration (frequently used configurations can be stored)	<b>One</b> configuration can be defaulted per configurable material using the defaults in characteristics	Several configurations can be stored, that is one configuration can be stored per variant
Entry in SD order	Configurable material	Variant

### Master Data Settings

The master data settings include the following:

- One configurable material with the usual configuration data, such as characteristics, classes, configuration profiles, etc.
- One variant for defined combinations of characteristics values, where the number of permutations must be limited practically.

The requirements type display for strategy 26 is *KEL*, as seen in the *Procurement* → *Overview* screen of the sales order.

### Process Flow

#### 1. Demand Management

Does not apply.

#### 2. Procurement before sales

Does not apply.

#### 3. Sales order

Creation of sales orders either directly by entering a variant or by entering a configurable material and using variant determination.

The requirements type display for strategy 26 is *KEL*, as seen in the *Procurement* → *Overview* screen of the sales order.

#### 4. Production after sales

Make-to-order production of the finished product takes place.

#### 5. Delivery

Delivery of the finished product takes place.

### Planning Variants Without Final Assembly (55)

The strategy *Planning Variants Without Final Assembly (55)*, plans variants in a manner similar to the strategy *Planning without Final Assembly (50)* for non-configurable materials, as described in chapter 4. The

difference between these two strategies is that *Planning Variants Without Final Assembly (55)* allows the user to reconfigure the variant during a sales order.



Changes to the configuration **must not** affect planned components. Planned independent requirements for variants do not make sense when changing the configuration of the variant in the sales order. The result can be a sold item that has no relation of the configuration of the planned variant. For this reason, perform configuration changes to *Planning Variants Without Final Assembly (55)* with care.

#### Master Data Settings

Master data settings include the following:

- One configurable material with the usual configuration, such as characteristics, classes, configuration profiles, etc.
- One variant per possible permutation of characteristics values, hence the number of permutations must be practically limited

#### Process Flow

##### 1. Demand Management

One planned independent requirement per variant. The variant has to be completely configured.

##### 2. Procurement before sales

Procurement of the variants' components takes place.

##### 3. Sales order

Creation of sales orders either directly by entering a variant or by entering a configurable material and using variant determination. The requirements type display for strategy *55* is *KELV*, as seen in the *Procurement* → *Overview* screen of the sales order. The system automatic adjusts the master plan, if no planning variant can be found.

##### 4. Production after sales

Make-to-order production (assembly) of the finished product takes place.

##### 5. Delivery

Delivery of the finished product takes place.

#### Planning Variants with a Planning Material (65)

The strategy *Planning Variants with a Planning Material (65)* plans variants in a manner similar to the strategy *Planning without Final Assembly (60)* for non-configurable materials, as described in chapter 4. The difference between these two strategies is that *Planning Variants with a Planning Material (65)* allows the user to reconfigure the variant during a sales order.



Changes to the configuration must not affect planned components. Planned independent requirements for variants do not make sense when changing the configuration of the variant in the sales order. The result can be a sold item that has no relation of the configuration of the planned variant. For this reason, perform configuration changes to *Planning Variants with a Planning Material (65)* with care.

### Master Data Settings

Master data settings include the following:

- One configurable material with strategy group *65* and the usual configuration such as characteristics, classes, configuration profiles, etc.
- One planning material that contains the non-variable parts.

The variable components cannot be planned with strategy *65*. The reasons are described in *Planning with Planning Material without Make-to-Order (63)* and *Planning with Planning Material (60)*. Set strategy group *65* and the consumption parameters (*Fwd. consumption*, *Bwd. Consumption*, and *consumption mode*).

- One variant material per each actual permutation of the characteristic values.

The number of realistic permutations, and therefore variant materials, must be limited for this strategy.

### Process Flow

#### 1. Demand Management

One planned independent requirement per variant. The variant has to be completely configured.

#### 2. Procurement before sales

Procurement of the variants' components takes place.

#### 3. Sales order

Creation of sales orders either directly by entering a variant, or by entering a configurable material and using variant determination.

The requirements type display for strategy *55* is *ELVV*, as seen in the *Procurement → Overview* screen of the sales order.

#### 4. Production after sales

Make-to-order production (assembly) of the finished product takes place.

#### 5. Delivery

Delivery of the finished product takes place

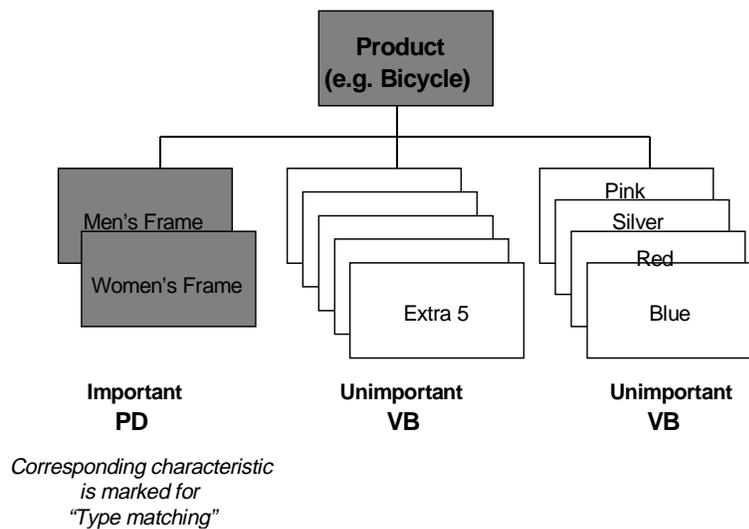
## Planning Variants (54)

The strategy described in this section has the following intention: planned independent requirements are only used to procure components, which are *important* for planning purposes. Important components are

either expensive, or have long replenishment lead times. In the following example, only the frame of a bicycle is considered important. Such components should be MRP driven, (MRP type of  $P^*$  or  $M^*$  on the *MRP* screen).

Unimportant components are either inexpensive, or have a short replenishment lead time. In the following example, all other components of a bicycle are considered *unimportant*. These components should have an MRP type that is consumption-based,  $V^*$  on the *MRP* screen, for example. Components marked *consumption-based planning* do not generate requirements at the *planning* or *production before sales order* stage.

## Planning of “Important” Components



Strategy *Planning Variants (54)* allows for the planning of important components. This planning is done by:

- Creating *planning variants*

These planning variants represent configurations that are used to procure the components with long replenishment lead times.

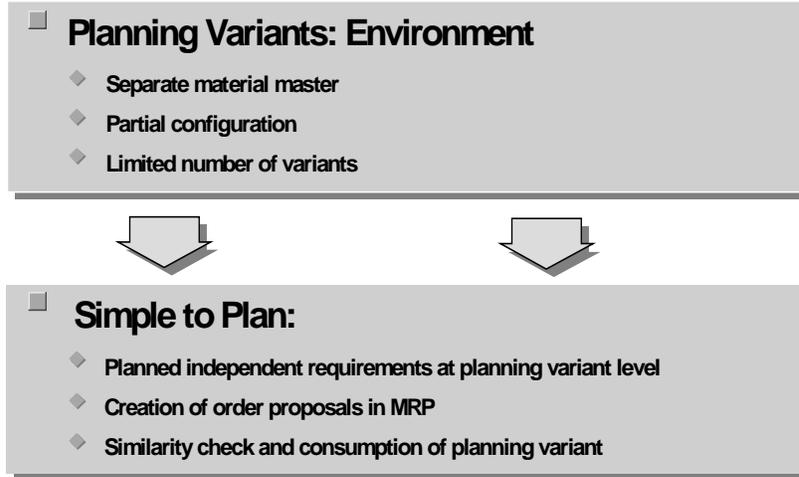
- Allocating the actual quantity sold to a planning variant during the sales order stage that has the closest configuration

This allocation is called a *similarity check*.

This procedure requires that the characteristics that determine the similarity check match the components that are *important* for planning purposes. The remaining characteristics should influence only components that are *unimportant* for planning purposes, such as consumption-based components.

The challenge is to describe the products in a way that characteristics are connected to important components using the *type matching* function. With strategy 54, you have to perform that task on your own, whereas strategy 56 calculates the dependencies automatically. Moreover you need to estimate or forecast each of the planning variants, for example, based on past data.

## Planning Variants



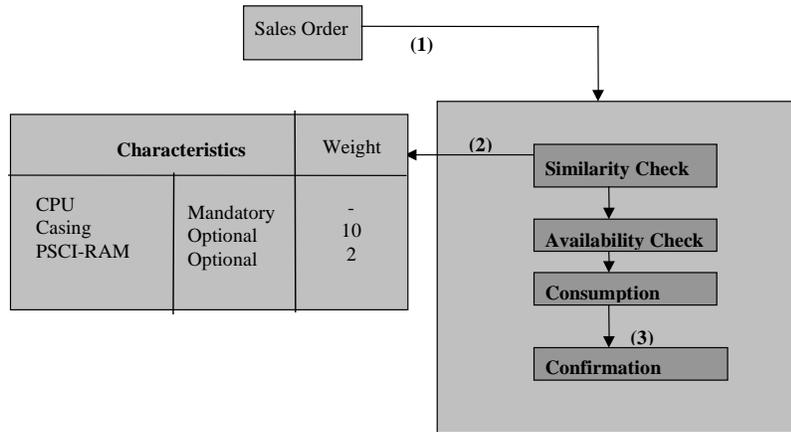
## Master Data Setup

	Configurable Material	Planning Variant(s)
Strategy group	54	54
Consumption parameters (Consumption Mode, Bwd Consumption, Fwd Consumption)	Will be ignored	To be maintained such that planned independent requirements can be found
Item category group	0002	(No SD screens necessary for the planning variants)

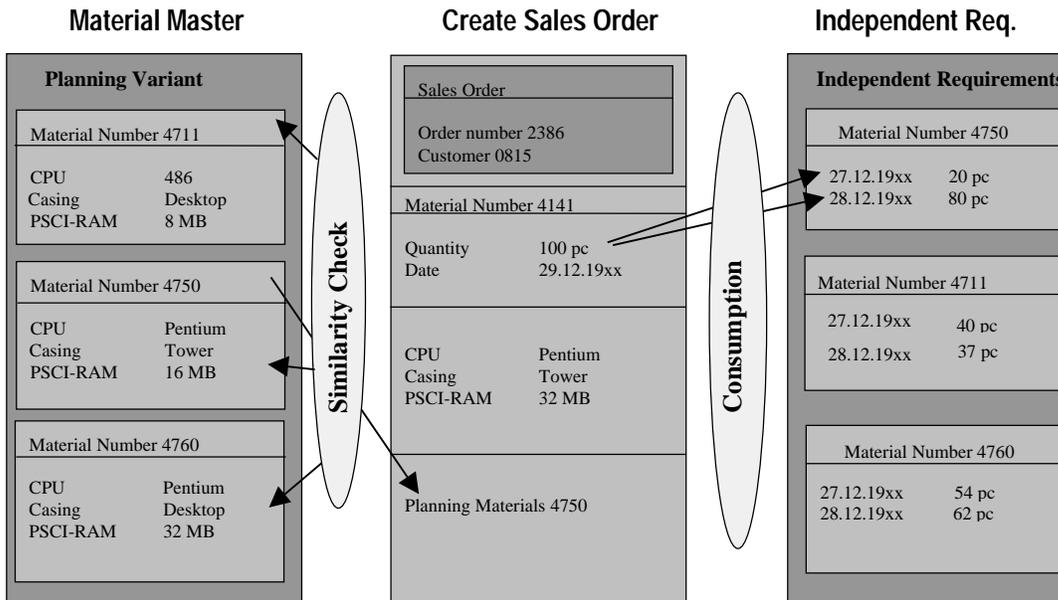
For type matching:

The important characteristics are set as required in *Logistics* → *Central Functions* → *Var. configuration* → *Environment* → *Conf. Simulation*, enter the configurable material and choose *Goto* → *Char. Value assignment* then chose *Environment* → *Modelling* → *Planning* → *Type matching*. In the *Type matching* screen, select the names of the important characteristics. Set their type matching value to *Required*, using the radio buttons. Those characteristics that are not important for planning set to *Optional*. You can set a weight number for the optional characteristics, so that the most important characteristics in selecting a variant material have the largest weight number. This number is not a percent value. It is a value relative to the weight value of the other characteristics.

## Similarity Check



## Similarity Check and Consumption



## Process Flow

### Stage 1: Demand Management

Determine which characteristics are important for planning, that is which characteristics should be used for type matching.

Create a material master for all planning variants and value the characteristics according to planning needs. The planning variant must be completely configured. You should choose practical configurations that are aimed for the proper planning of components and not for representing complete assemblies.

Planned independent requirements have to be entered for the planning variants. This stage is similar to the strategy *Planning without Final assembly (50)*.

### Stage 2: Procurement Before Sales

The procurement of the planning variants' components takes place after the next MRP run. Ideally the MRP run should generate only proposals for the important components.

### Stage 3: Sales Order

This stage represents the creation of sales orders by entering the configurable material.

First, the system checks if a variant exists. If it does exist, then the configurable material is replaced as described in *Variants and Variant Determination*, earlier this chapter.

Second, if no (material) variant is found, the system tries to allocate a planning variant to the configurable material. Unlike the strategy *Planning Variants Without Final Assembly (55)* discussed earlier this chapter, the configurable material is not replaced. You can check the type matching results in the sales order in the configuration screen by choosing *Environment → Planning → Type Matching*.

The requirements type display for strategy 54 is *KEKT*, as seen in the *Procurement → Overview* screen of the sales order.

After entering the sales order, the total requirements for a planning variant *DPC6-T02* list appears as follows (where *DPC6* is the configurable material that was entered in the sales order):

Material	ShortText	ReqmtPlanNo	Total qty	Unit
DPC6-T02	Desktop PC6 Standard 02 Prepl. 54		1200	
USE 00	Active		60,000	PC
	M 03.1997		10,000	
	M 04.1997		10,000	
	M 05.1997		10,000	
	M 06.1997		10,000	
	M 07.1997		10,000	
	M 08.1997		10,000	
			10,000	
CREQ 50000025	/ 000010	12.02.1998	10,000	
DPC6		/ 1200		

No allocation takes place if no planning variant can be found. The sales order increases the production plan (automatic adjustment of master plan).

#### Stage 4: Production After Sales

Make-to-order production (assembly) of the finished product takes place. Perform a goods issue of the components and a goods receipt of the configurable material.

#### Stage 5: Delivery

Delivery of the finished product (configurable material) takes place.

## Other Areas/FAQs

### Differences Between Strategies 55 and 54

The differences between strategies 55 and 54 are described in the following matrix:

Strategy	55	54
Master data	A lot of variants (one variant for each and every possible permutation of characteristics)	Relatively few planning variants (planning variant for planning purposes only)
Additional characteristics settings	(No)	<i>Logistics → Central Functions → Var. configuration → Environment → Conf. Simulation → Goto → Char. Value assignment → Environment → Modelling → Planning → Type Matching</i>
Goal of variant	The variants must be completely configured. The configuration must be such that it could be practically assembled.	The planning variant must be completely configured (for the planning relevant characteristics). You should choose practical configurations that aim for a proper planning of components and not for representing complete assemblies.
Major SD function involved	Variant determination	Similarity check
Allocation Level	Material variant	Configurable material
Production plan (“Forecast”)	Can be created for each variant, that is, for each combination of characteristic values. A sales history should exist for each variant.	A sales history is only for the necessary <i>important</i> components.

The following picture compares the number of necessary variants (full black bullets) for one material.

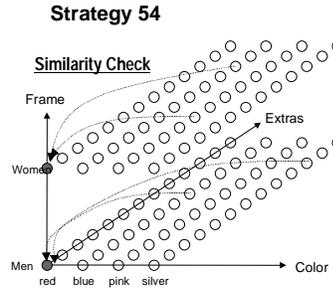
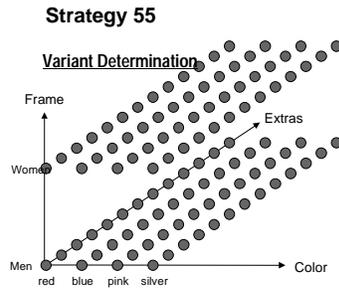
### Difference 55/54

Example: Bicycle with 3 characteristics

- Frame (men/women frame)
- Extras (5 extras)
- Color(4 colors)

Number of Variants

- 2
  - $32 = 0 \text{ of } 5 + 1 \text{ of } 5 + 2 \text{ of } 5 + 3 \text{ of } 5 + 4 \text{ of } 5 + 5 \text{ of } 5$
  - 4
- Total Variants:  $256 = 2 * 32 * 4$



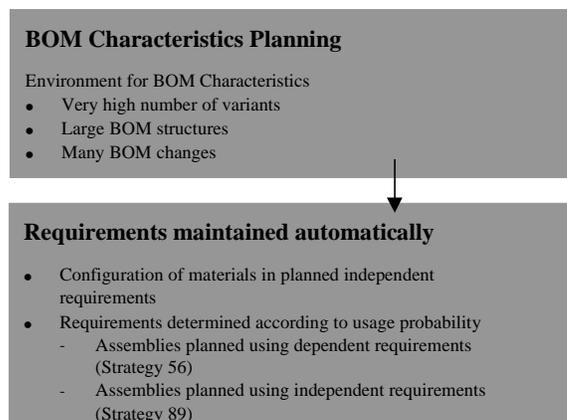
## Characteristics Planning

### Overview

This section describes how to plan products with an almost unlimited number of possible combinations of characteristics and characteristics values (*high variance*). We assume that you want to sell any feasible combination of characteristic values, and that you do not want to do *final assembly* for your finished products. Typical examples for such products can be cars, elevators, forklifts, trucks, busses, etc.

Variants as described earlier this chapter in the section *Strategies for Variants* cannot be used to plan these products because you would have to create billions of variants. Entering usage probabilities for characteristic values instead allows you to plan materials that have a large number of variants. This procedure also improves change management for the components because planning is separated from construction changes.

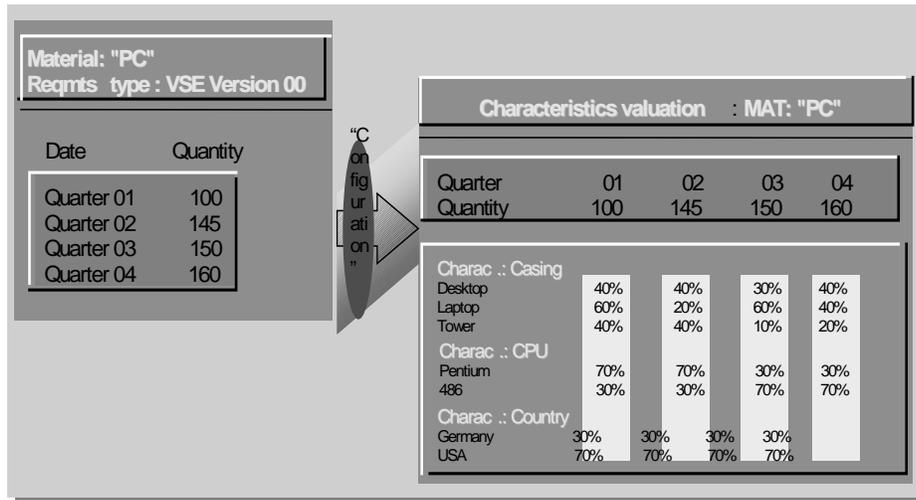
### BOM Characteristics Planning



## Creating Planned Independent Requirements for Characteristics Planning

When creating or changing the planned independent requirements for configurable materials, the usage probabilities, and the quantities and dates of the planned independent requirements are maintained individually per date and quantity.

### Maintaining Usage Probabilities



### Prerequisites

To maintain usage probabilities, the following items are mandatory:

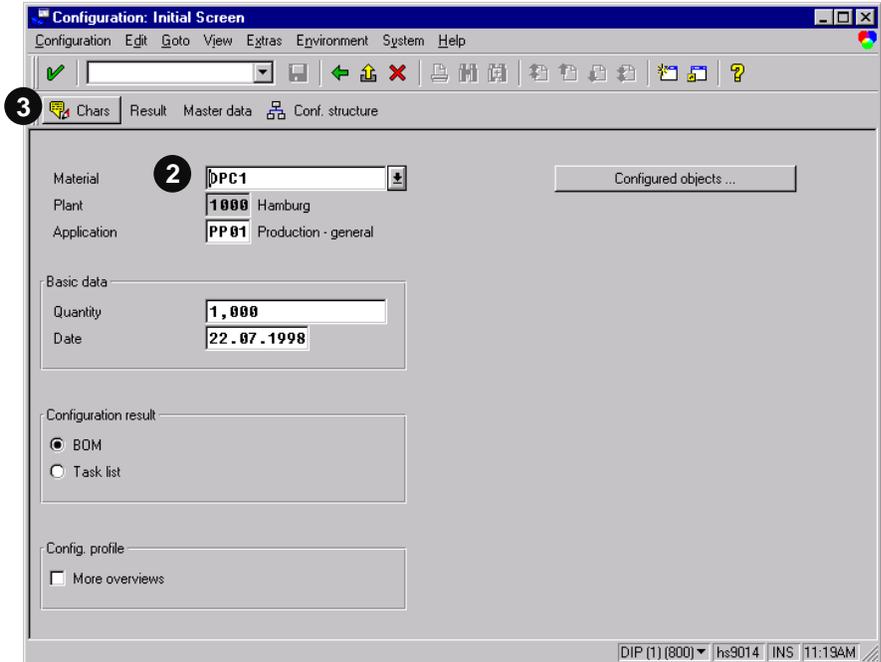
- The material must be a configurable material.
- Strategy groups 56 (Characteristics Planning with Dependent Requirements), 89 (Assembly Processing with Characteristics Planning), or a similar custom strategy must be maintained in the material master record.
- The characteristics of the configurable material to be planned must be flagged *relevant to planning*.

To make configurable materials relevant to planning, perform the following steps.

1. Choose *Logistics* → *Central Functions* → *Var. configuration* → *Environment* → *Conf. Simulation*.

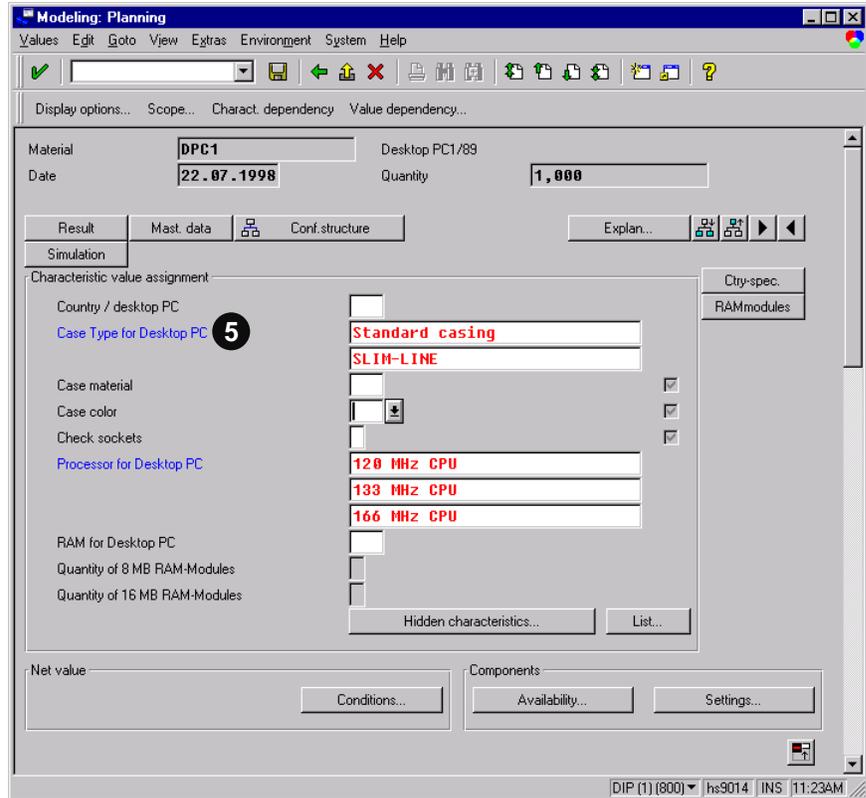
The *Configuration: Initial Screen* appears.

2. Enter the configurable material.
3. Click *Chars* or choose *Goto* → *Char. Value assignment*.
4. On the *Configuration: Char. Val. Asgmt* screen, choose *Environment* → *Modeling* → *Planning* → *Relevant to planning*.



On the *Modeling: Planning* screen, all characteristics are optional by default. After a characteristic is marked *required*, its name appears in blue.

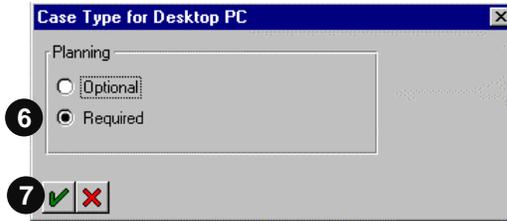
5. To make a characteristic *relevant for planning*, double-click on the characteristic (for example, *Case Type for Desktop PC*).



Marking as relevant for planning should not be confused with marking characteristics as *Entry required* in the transaction *Create/Change Characteristics*. When you make that selection you must enter a characteristic value in the *Configuration* screen.

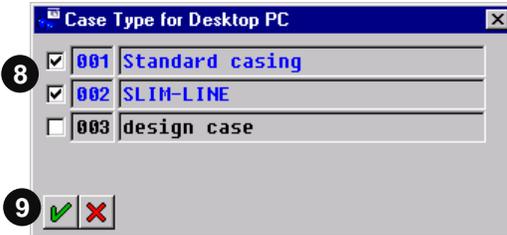
6. Select *Required*.

- *Optional* characteristics do not need a sum of *usage probabilities* of 100%.
- *Required* characteristics need a sum of *usage probabilities* of 100%.



7. Click *Enter*.

8. A dialog box appears containing the allowed values of the characteristics. The characteristics values you select here can have a usage probability relevant for MRP.



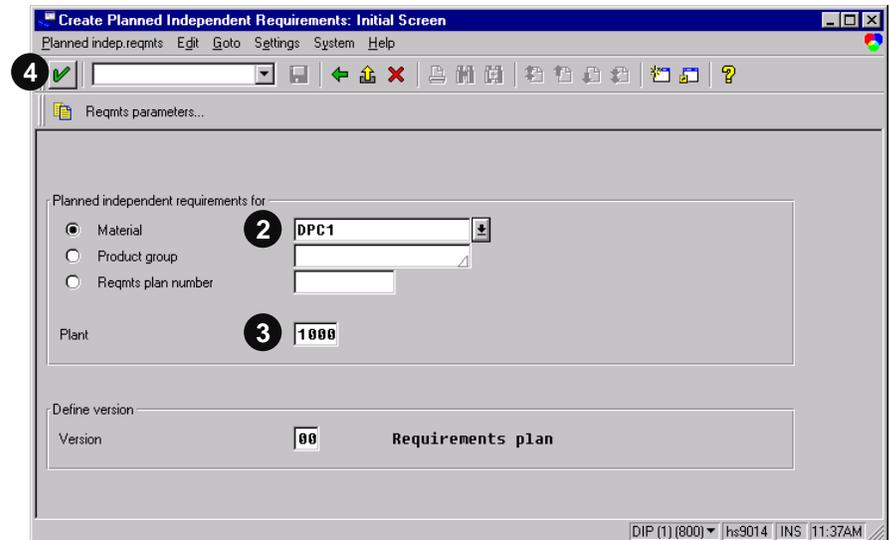
9. Click *Enter*.

You enter usage probabilities when you create planned independent requirements in Demand Management as described below. You can plan only the characteristics values that you defined as relevant for planning. You cannot plan characteristics that you have not defined as relevant. Underplanning or overplanning of characteristics can occur while creating the planned independent requirements, resulting in a warning.

**Procedure**

SAP recommends the following procedure for maintaining usage probabilities:

1. Choose *Logistics* → *Production* → *Master Planning* → *Demand Management* → *Planned Independent Requirements* → *Create*.
2. In *Material*, enter the configurable material to be planned.
3. In *Plant*, enter the appropriate plant.
4. Click *Enter*.



5. Enter the *Schedule lines*.
6. Select the necessary schedule line(s). To create or change usage probabilities for planned independent requirements.



To see all dates in the configuration table, select all schedule lines.

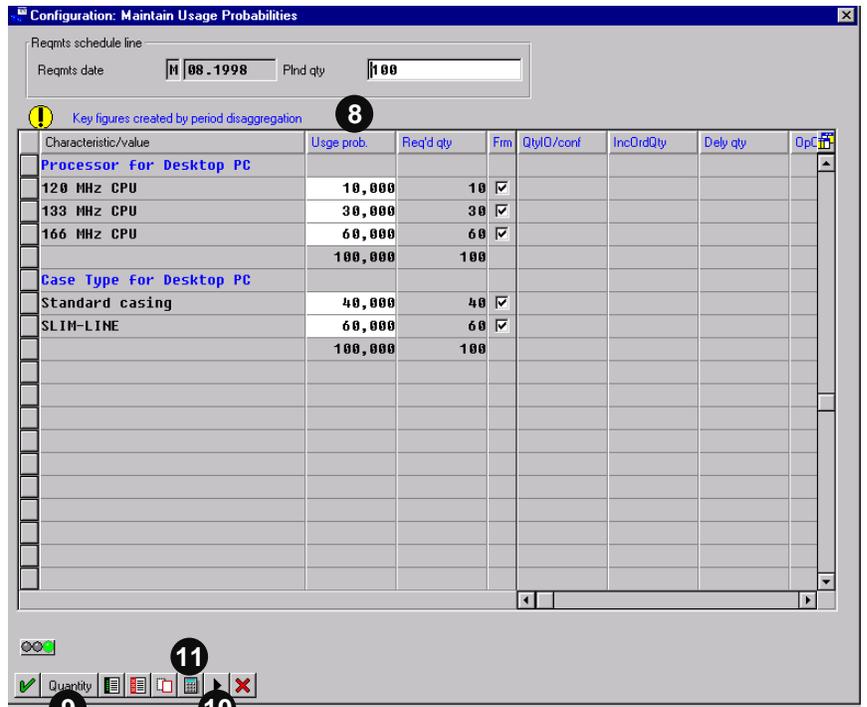
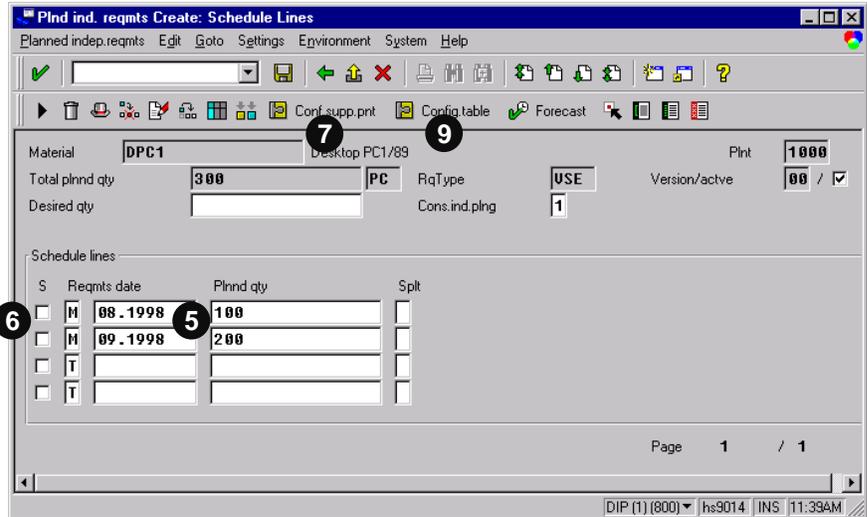
7. Click *Conf. Supp. Pnt.*

The *Configuration: Maintain Usage Probabilities* window appears, and displays all characteristic values relevant for planning for each schedule line date.

8. To enter usage probabilities as percentages, enter data in the *Usge prob.* column.
9. To enter the usage probabilities as quantities, click *Quantity*. Enter data in the *Usge prob.* column.

Manual entries are automatically provided with a firming indicator, and are thus protected from automatic changes.

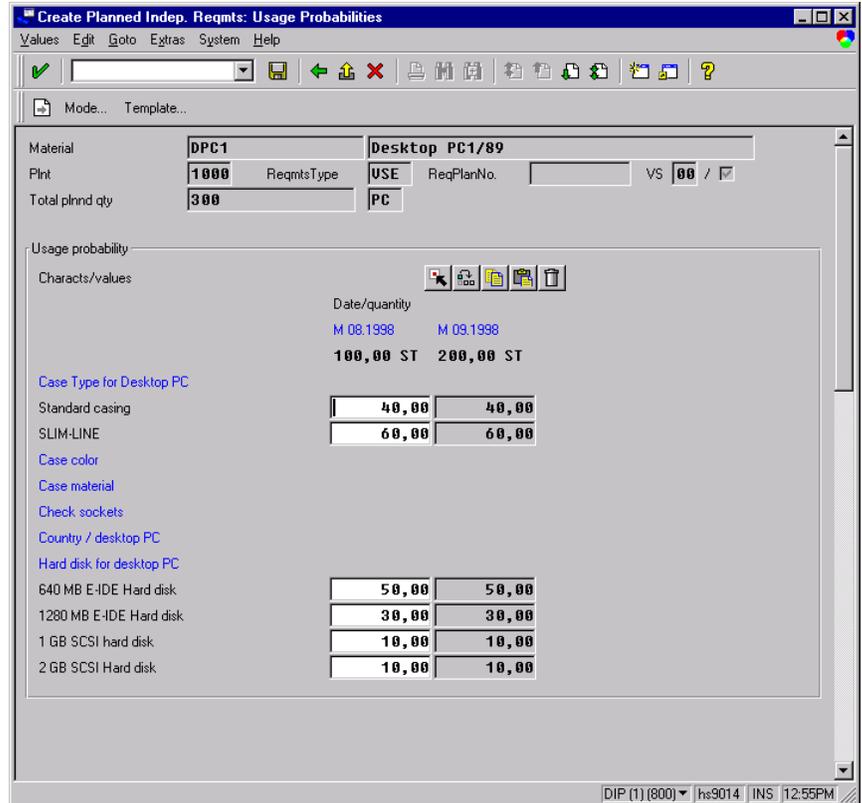
10. Click *Next schedule line* to go to the next line.
11. Click *Auto.consistency* to check the consistency of the usage probabilities.



Only the characteristics values selected as relevant for planning appear in this screen. Compare to step 8 of the previous section *Prerequisites*.

- As an alternative to step 7, click *Config. table* on the *Plnd ind. Reqmts Create: Schedule Lines* screen if you require an overview of usage probabilities.

The system displays scheduled dates and quantities.



When **creating** the planned independent requirements, all scheduled dates are proposed for processing. When **changing** the planned independent requirements, only the scheduled dates that were given values when created appear.

### Copying Data per Column

- To copy usage probabilities and absolute quantities for each column, select the date with the value you want to copy. The heading of the column contains the quantity and the date of the schedule line.
- Click *Select mode/select*. The column is highlighted.
- Click *Copy*. The highlighted column is copied.
- Position the cursor on the date to which you want to insert the copied values.
- Click *Insert*.

### Copying Data per Line

- To copy usage probabilities and absolute quantities for each line, select the characteristic with the values you want to copy.
- Click *Select mode/select*. The column is highlighted.
- Click *Copy*. The highlighted column is copied.
- Select the characteristic to which you want to insert the copied values.
- Click *Insert*. The system adds the values to the column selected.

## Integrating Logistics Information System (LIS)

To copy data from LIS, proceed as follows:

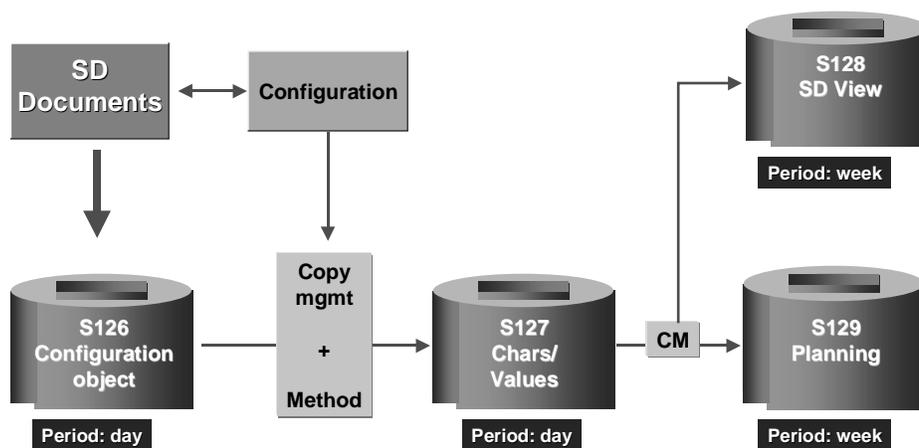
1. In the transaction *Create/maintain Planned Independent Requirements*, choose *Settings* → *Assign info.structure*.
2. Enter the info structure of the combination keys, and the appropriate version of the info structure. The info structure is assigned to the current version of the planned independent requirements.
3. Click *Conf. supporting pnt*.
4. The system displays the dialog box, *Configuration: Maintaining Usage Probabilities*. Only the info structure for the combination keys is relevant. The key figures contained in the info structure are displayed with reference to the individual combination keys in the statistics column.
5. To copy the key figures to the usage probabilities, select the combination keys of the key figures you intend to copy, and position the cursor in the statistics column to be copied.
6. Click *Copy*.

Firmed combination keys are not changed, just as they are unchanged in the automatic correction. Combination keys are automatically firmed when you enter them manually on the *Configuration supporting point* screen. See the previous section *Processing Configuration Supporting Points*.

The key figure appears as a quantity or as a probability depending on whether a required quantity or a usage probability is maintained.

7. If no info structure is assigned, the system automatically assigns the standard info structure, *S137* or *S136* with version *000*.

## Updating Products with Variants



## Characteristics Planning with Dependent Requirements (56)

### Strategy Focus

With this strategy, planned independent requirements are created for configurable materials. In addition, the usage probabilities for characteristics are entered into a configuration table. The requirements for components are automatically calculated as a component quantity multiplied by a usage probability, which also takes into account the dependencies between characteristics.

The allocation takes place on the header level; that is, sales orders consume the configurable material's independent requirement, **not** the component's dependent requirements.

### Master Data Settings

In addition to the usual master data settings such as creation of BOMs and routings, and the various configuration data (configuration classes, characteristics, profiles, and object dependencies) the following has to be set up:

- Material master
  - Enter the *Item category group* (for example, 0002).
  - Enter 56 for *Strategy group*.
  - Set consumption parameters (*Consumption Mode, Fwd Consumption, Bwd Consumption*), such that planned independent requirements can be found.
- Components
  - Consider setting the *Individual/Collective* indicator to 2, as described in chapter 3.
  - Components should **not** have strategy group 70 or 59, in order to take dependent requirements from the planning of configurable material.
- Select *Relevant for planning* for those characteristics that should have a usage probability in Demand Management.

### Process Flow

#### Stage 1: Planning

Planned independent requirements are entered at configurable material level, as described in the section *Creating Planned Independent Requirements for Characteristics Planning* earlier this chapter.

For the configurable material, the planning results in a stock/requirements list that could appear as follows:

Date	MRP Element		Received/Required	Available Quantity
<today>	Stock			0
<today>	→	Planning without assembly		
<reqdat1>	IndReq	VSE	100-	100-
<reqdat2>	IndReq	VSE	100-	200-
<reqdat3>	IndReq	VSE	100-	300-

Stage 2: Procurement Before Sales

Dependent requirements are created in the MRP run. The actual required component quantity is calculated as the product of usage probability and the original component quantity from the BOM.

The following example may illustrate the functionality:

BOM Item	BOM Quantity	Object Dependency	Usage Probability of Characteristic_A	Usage Probability of Characteristic_B	Required Quantity
A	100	Characteristic_A = '<CVA>'	40%		40
B	100	Characteristic_B = '<CVB>'		60%	60
C	100	Characteristic_A = '<CVA>' AND Characteristic_B = '<CVB>'	40%	60%	24

Different characteristics are assumed to be statistically independent. The required quantity for item C is calculated as  $100 * 40\% * 60\%$ , resulting in 24 pieces.

For a component planned with a usage probability of 40%, the following stock/requirements list results:

Date	MRP Element		Received/Required	Available Quantity
<today>	Stock			0
<reqdat1>	DepReq	DPC1	40-	40-
<reqdat1>	PlOrd.	001234/ExtP	40+	0
<reqdat2>	DepReq	DPC1	40-	40-
<reqdat2>	PlOrd.	001235/ExtP	40+	0
<reqdat3>	DepReq	DPC1	40-	40-
<reqdat3>	PlOrd.	000126/ExtP	40+	0

The procurement proposals lead to the stock for the components.

Stage 3: Sales Order

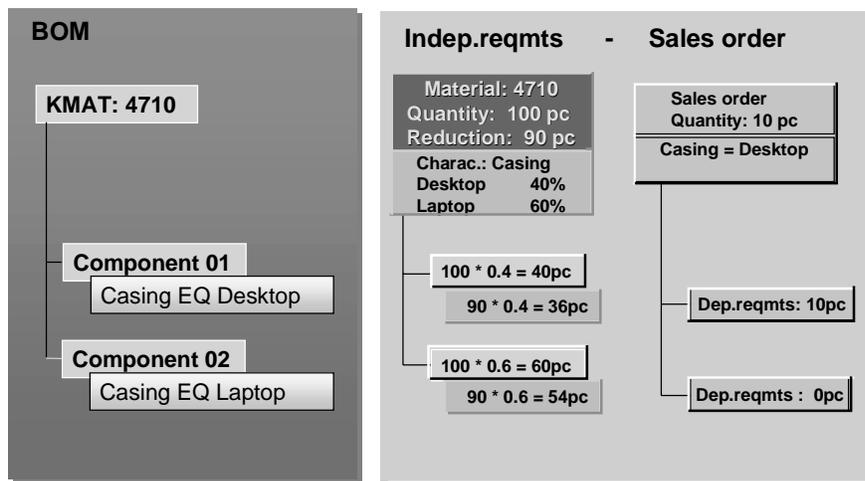
The entry of a sales order with a specific configuration results in an allocation of the planned independent requirement for the configurable material, similar to strategy 50.

Date	MRP Element		Received/ Required	Available Quantity
<today>	Stock			0
<today>	Cstock	000987/0010		0
<orddat>	Order	987/0010/001	10-	10-
<today>	→	Planning without assembly		
<reqdat1>	IndReq	VSE	90-	90-
<reqdat1>	PIOrd.	00456/IndR	100+	10+
<reqdat2>	IndReq	VSE	100-	90-
<reqdat2>	PIOrd.	00457/IndR	100+	10+
<reqdat3>	IndReq	VSE	100-	90-
<reqdat3>	PIOrd.	00458/IndR	100+	10+

The requirements type display for strategy 56 is *KEKS*, as seen in the *Procurement* → *Overview* screen of the sales order.

Note that the allocation at the configurable material level leads to a reduction of **all** the configurable material's dependent requirements. Also, the components not sold with the actual order will be reduced with the next MRP run.

### Consumption at Configurable Material Level



#### Stage 4: Procurement After Sales

Production of the configurable material takes place. This stage is similar to strategy 50.

### Stage 5: Goods Issue for Delivery and Reduction of Planned Independent Requirements

The goods issue of the configurable material takes place. This stage is similar to strategy 50.

## Assembly Processing with Characteristics Planning (89)

### Strategy Focus

This strategy creates automatically planned independent requirements for the configurable material's component. This procedure works as described in section *Planning at Assembly Level (70)* in chapter 2. The major advantage is you do not have to enter the component's quantities manually any more. They are calculated based on the quantities of the configurable material's planned independent requirements and the usage probabilities of the corresponding characteristics.

The allocation takes place at the component level, rather than the configurable material level. As a result, MRP planning runs do not reformulate the components' planned requirements based on allocation at the configurable material level, as seen in the section *Characteristics Planning with Dependent Requirements (56)* earlier this chapter.

The component's planned independent requirement may be entered manually, as described in strategy 70. However, an easier and more efficient method of producing independent requirements for the configurable material's component is through R/3's long-term planning process.

### Assembly Processing

This strategy incorporates assembly processing. See chapter 6 for more details. In a nutshell, assembly processing supports the following features, which are new in respect to the strategies previously discussed:

- Production is triggered within sales order processing (refer to chapter 6 on how to link different order types such as planned orders, production orders, or networks to assembly processing).
- The characteristic values assigned to the configurable material are passed onto the planned order, production order, or network.
- The BOM components and operations you require are selected on the basis of these characteristic values.
- An availability check at component level is possible (even multi-level availability check is possible when you work with collective orders or phantom assemblies; availability check is not possible for BOMs that contain other non-stockable configurable materials).

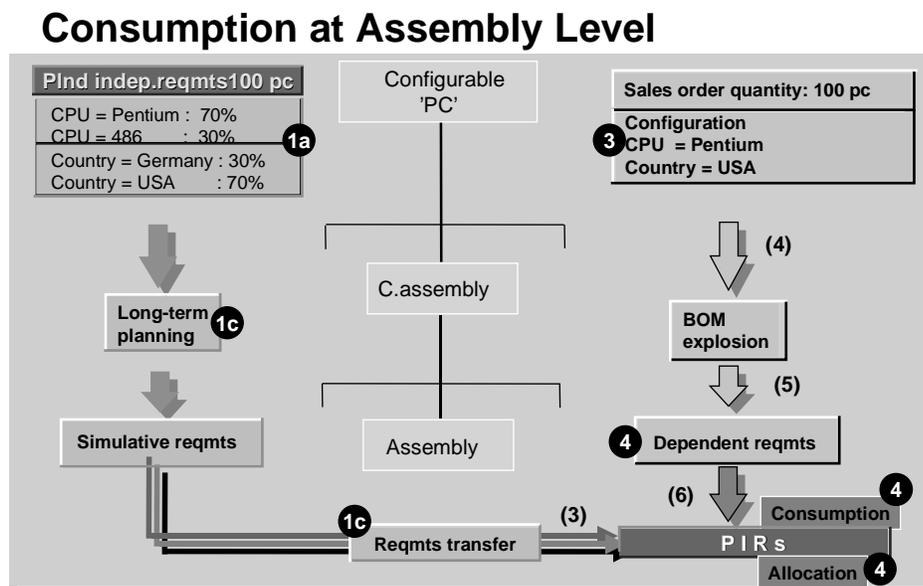
### Master Data Settings

In addition to the usual master data settings, such as creation of BOMs and routings and the various configuration data (configuration classes, characteristics, configuration profile, object dependencies), the following has to be set up:

- Material master
  - Enter the *Item Category group* (for example, 0002).
  - Enter 89 for *Strategy group*.
  - Enter 01 for *Availability check*, to transfer individual requirements.

- Components
  - Consider setting the *Individual/Collective* indicator to 2, as described in chapter 3.
  - Components have to have strategy group 70 (or 59 as described in chapter 3) in order to get dependent requirements from the planning of configurable materials.
  - You must enter 1 for *Mixed Indicator*.
  - Set consumption parameters (*Consumption Mode, Fwd Consumption, Bwd Consumption*), such that planned independent requirements can be impacted.
- Select *Relevant for planning* for those characteristics that should have a usage probability in Demand Management. See *Creating Planned Independent Requirements for Characteristics Planning* earlier this chapter.

### Process Flow



#### Stage 1a: Creating Inactive Planned Independent Requirements

Planned independent requirements are entered as described earlier this chapter in *Creating Planned Independent Requirements for Characteristics Planning*.

With this strategy, the planned independent requirements have to be entered in an *inactive version*. Make sure that the checkbox *Active* is not marked. Use a special version for all materials using this strategy because long-term planning requires a special version later on.

You cannot see the planned independent requirement in the stock/requirements list, because it is not active.

#### Stage 1b: Creating and Releasing the Planning Scenario in Long-Term Planning

*Long-Term Planning* utilizes the previously entered version numbers to differentiate these simulative versions from the demand program's operative versions. In Long-Term Planning, you can either create

new versions of planned independent requirements or you can copy existing planned independent requirements to a simulative version number. A special report is available to copy existing versions.

Create and release a planning scenario using *Logistics → Production → Master Planning → Long-Term Planning → Scenario → Create*. This scenario provides the control data for long-term planning.

- Allocate the plants to be planned according to this scenario. Choose *Edit → Plants* and click *New entry*
- Allocate the independent requirement's versions for planning. Only the version to be used in the *Version* field is required entry for this example. Choose *Edit → Plannd Indep Req.* and click *New entry*.
- Choose *Edit → Release and Save*.

Long-Term Planning is used in this discussion as a tool only. Refer to the online documentation *PP Long-Term Planning* for further information.

#### Stage 1c: Carry Out MRP for Long-Term Planning

This stage is similar to the operative planning that exists among other single item and multiple item MRP programs for long term planning. Use one of these programs (for example, *Logistics → Production → Master Planning → Long-Term planning → Planning run → As background job* for the created scenario) to create simulative dependent requirements in Long-Term Planning.

For the configurable material, only one stock/requirements list in Long-Term Planning could look as follows:

Date	MRP Element		Received/ Required	Available Quantity
<today>	Stock			0
<today>	→	Planning without assembly		
<reqdat1>	IndReq	VSE	100-	100-
<reqdat2>	IndReq	VSE	100-	200-
<reqdat3>	IndReq	VSE	100-	300-

#### Stage 1d: Transferring Requirements

In order to plan and consume requirements in the operative system, the simulative requirements created in Long-Term Planning must be copied to the operative system as independent requirements. This copying is accomplished by choosing *Logistics → Production → Master Planning → Long-Term Planning → Planned indep. requirements → Copy sim requirements*; specify the independent requirements target version, and the *Date Type* in the *Aggregation* field. The system will copy the simulative requirements from long-term planning to the operative system.

Now planned independent requirements exist for the configurable material's components that have been set up according to master data setup (that is, *strategy 70*, *Mixed Indicator 1*, and *Individual/Collective Indicator 2*). These settings have exactly the same properties as planned independent requirements created manually, as described in *Planning at Assembly Level (70)* in chapter 3.

For a component planned with a usage probability of 40%, the following stock/requirements list results in operative planning:

Date	MRP Element		Received/ Required	Available Quantity
<today>	Stock			0
<reqdat1>	IndReq	VSFB	40-	40-
<reqdat1>	PIOrd.	001234/ExtP	40+	0
<reqdat2>	IndReq	VSFB	40-	40-
<reqdat2>	PIOrd.	001235/ExtP	40+	0
<reqdat3>	IndReq	VSFB	40-	40-
<reqdat3>	PIOrd.	000126/ExtP	40+	0

The procurement proposals lead to the stock for the components.

#### Stage 2: Procurement Before Sales

The procurement of components is started based on the planned independent requirements created in stage 1, similar to strategy *Planning at Assembly Level (70)* in chapter 3.

#### Stage 3: Sales Order

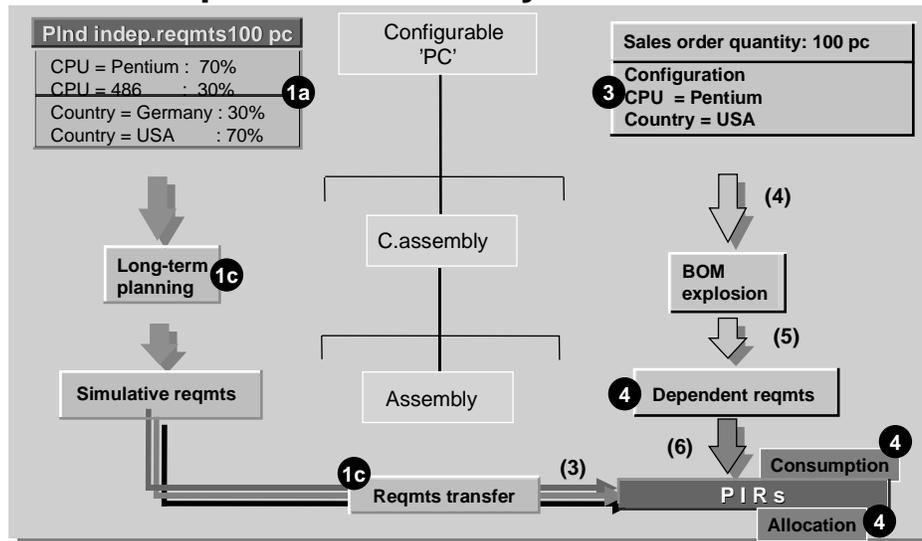
The sales order is created for the configurable material. No consumption takes place on the configurable material level.

#### Stage 4: Procurement After Sales

The operative MRP run creates dependent requirements for the components. Opposite from the strategy *Characteristics Planning with Dependent Requirements (56)* discussed earlier this chapter, the component requirements are allocated to the planned independent requirements, because these components should be scheduled using the strategy *Planning at Assembly Level (70)* in chapter 3.

In comparison to strategy 56 only the proper components get allocated when a sales order is entered.

## Consumption at Assembly Level



For the component mentioned above, the following stock/requirements list results in operative planning:

Date	MRP Element		Received/Required	Available Quantity
<today>	Stock			100
<reqdat1>	DepReq	DPC1	10-	90
<reqdat1>	IndReq	VSFB	30-	60
<reqdat2>	IndReq	VSFB	40-	20
<reqdat3>	IndReq	VSFB	40-	20-
<reqdat3>	PlOrd.	000126/ExtP	20+	0

### Stage 5: Goods Issue

The goods issue of the components reduces their planned independent requirements. The goods issue of the configurable material has no consequences, because the planned independent requirements for the configurable material are not active.

## Other Areas/FAQs

### Comparison Between Characteristics Planning with Dependent and Independent Requirements

Technical differences:

	<b>Characteristics Planning with Dependent Requirements (56)</b>	<b>Assembly Processing with Characteristics Planning (89)</b>
<b>Long-Term Planning</b>	-	LTP scenario
<b>Components</b>	No specific strategy group at component level	Strategy group 70, mixed MRP = 1
<b>Creation of Planned Independent Requirements</b>	Active version	Inactive version
<b>Consumption and Reduction at header level</b>	Allocation at configured material level, and indirectly (after MPR) reduction of all components	No allocation
<b>Consumption and Reduction at Component Level</b>	Consumption at component level does not take place. However, requirements for components are indirectly reduced for all components after consumption at header level	Only components that are used in configuration are reduced
<b>Example for Reduction at Component Level:</b> Planned Quantity 100 PC Usage Probability of Characteristic value A = 70% Usage Probability of Characteristic value B = 70% Resulting in requirements for 70 PC of component A and 30 PC of component B.	An order for 20 PC (featuring characteristic A) is entered resulting in:  The requirement for the components change to: <ul style="list-style-type: none"> <li>• 56 PC (=80 PC * 70%) of component A</li> <li>• 24 PC (=80 PC * 30%) of component B</li> </ul>	An order for 20 PC (featuring characteristic A) is entered resulting in:  The requirement for the components change to: <ul style="list-style-type: none"> <li>• 50 PC (=70 PC - 20 PC) of component A</li> <li>• 30 PC (=30 PC - 0 PC) of component B</li> </ul>

This leads to the following conclusions:

	<b>Characteristics Planning with Dependent Requirements (56)</b>	<b>Assembly Processing with Characteristics Planning (89)</b>
<b>General</b>	Easier to handle (batch run after completion of planning, monthly), especially if you cannot plan precisely or if you only want to plan capacity on header level	<ul style="list-style-type: none"> <li>• More precise planning of components</li> <li>• Better overview of component situation</li> </ul>
<b>Performance</b>	MRP has to plan customer order AND planning of demands management all the time	Planning of Demand Management is done in LTP (typically only in the planning period, for example week or month) and independent of MRP

## Make-to-Order Production with Configurable Materials (25)

### Strategy Focus

This strategy shares the basic features with the strategy *Make-to-Order Production (20)*, therefore, this strategy is used when planning of the (parent) product is neither required nor possible. Components have to be planned by other means.

This strategy, *Make-to-Order Production with Configurable Materials (25)*, is used for configurable materials; configuration is required.

### Master Data Settings

Material master

- Item category group (for example, *0002*)
- Strategy group *25*

### Process Flow

#### Stage 1: Planning

Does not apply.

#### Stage 2: Procurement Before Sales

Does not apply.

#### Stage 3: Sales Order

The variant material and its configuration are entered. The configuration is entered from scratch. The default characteristic values apply, which could be used as default configuration.

**Stage 4: Procurement After Sales**

The production of variant materials occurs.

**Stage 5: Goods Issue for Delivery and Reduction of Planned Independent Requirements**

Goods issue occurs for the configurable material.



## Chapter 6: Assembly Orders

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## Overview

To provide your customers with more reliable delivery dates, you may want to check resources and the availability situation for make-to-order production when creating the sales order. You should recognize whether the desired quantity is available on the desired delivery date. If the complete quantity cannot be committed, you need to know the following information:

- When will the total quantity be available?
- Can you commit a partial quantity?

When the finished product is not usually kept in stock, it makes sense to check at component level.

Another important factor for ensuring that the customer is always provided with reliable information is the constant communication and feedback between sales and production. Information on changes to either quantities or dates in production, or in the procurement of components, must also be passed onto the sales order of the finished product, so you can revise any standing confirmations. This link with the sales order provides you the framework necessary for more precise planning.

In the R/3 System, these functions have been realized in the planning strategy called *Assembly Processing*. This strategy provides you with the functionality required to carry out an availability check at component level when the sales order is created (or a customer quotation or inquiry), with the following results:

- The committed order quantity of the sales order is based on the component with the smallest available quantity.
- The confirmed delivery date of the sales order is based on the availability date of the component that is latest on the available time axis.

Changes to quantities or dates in the sales order affect production and procurement. Changes to dates or quantities in production and procurement change the confirmation date and the committed quantity in the sales order.

## Assembly Processing—Procedure

When you create a sales order with the planning strategy *assembly processing*, the system automatically creates a procurement element—the assembly order. You can choose between the following procurement elements for the assembly order:

- Planned order
- Production order
- Process order
- Network (project)

Scheduling is carried out for the assembly order. If desired, when creating the sales order, you can also plan capacity. Furthermore, the bill of material is usually exploded for the assembly order to determine the corresponding components. The availability check is carried out automatically for the components. The check can be carried out either according to ATP logic or against planned independent requirements (planned independent requirements at assembly level). This check determines the committed quantity for the desired delivery date. If no quantity can be committed for the desired delivery date, the system

calculates and displays the missing parts. If necessary, it also determines a partial quantity and a total confirmation date (if you carry out the check using the ATP logic).

If a material is configured in the sales order, the results of the configuration are copied to the assembly order and the system checks the availability of the components selected on the basis of the configuration.

Any changes to the date or the quantity in the sales order are immediately passed onto the assembly order.

### Changes to the Planned Order

When you work with planned orders, the changes made to sales orders affect planned orders at all times.

### Changes to the Production Order

The following is valid for the production order:

- Changes made to the sales order are only valid for the production order until it is released.
- Changes to the assembly order automatically adjust the committed quantities and dates in the sales order. You can also set the system so that any changes made to the assembly order do not affect the sales order.

Additionally, the following procedures (*assembly types*) are supported:

- A 1:1 procedure, that is, exactly one procurement element exists for each sales order item (static procedure)
- A loose link exists between sales order items and procurement elements in which you can split quantities and dates in the sales orders and production (dynamic procedure)

## Custom Strategies

You can create your own planning strategies for assembly processing because you might want to change one of the following:

- Create assembly orders with your own order types
- Use specific methods of availability check for the components (for example, to display a missing parts list)
- Use specific methods for capacity check

In fact, the planning strategies delivered in the standard system for assembly processing provide examples on how you could proceed. Planning strategies 81, 82, and 86 are similar to the planning strategy *Make-to-Order Production (20)*, discussed in chapter 4, in terms of production planning. That is, no real production planning is involved; the order is merely created without the leveraging procurement started by planned independent requirements.

However, you could also set up planning strategies for assembly processing that would work similar to *Planning Without Final Assembly (50)* or *Planning with a Planning Material (60)*, both discussed in chapter 4. That is, you could set up planning strategies where you would create planned independent requirements first to procure the components and then assemble the finished product by using assembly processing.

A “recipe” to construct your own planning strategy for assembly processing requires you perform the following steps (for each step, use a number range starting with Z or 9):

1. Copy the proper *requirements classes* into your custom requirements class.
2. Create a *requirements type* and include your newly created requirements class.
3. Create a *planning strategy* and include your newly created requirements type.
4. Create a *strategy group* and include the newly created planning strategy.

The following sections describe each step in detail.

## Copy the Proper Requirements Classes into your Custom Requirements Class

1. In the IMG, choose *Sales and Distribution* → *Basic Functions* → *Availability check and transfer of requirements* → *Transfer of requirements*.
2. Select the line *Define requirements classes*.
3. Click *Execute*.
4. Select an existing requirements class line (in this example, *ReqC 201*).
5. Click *Copy as*.

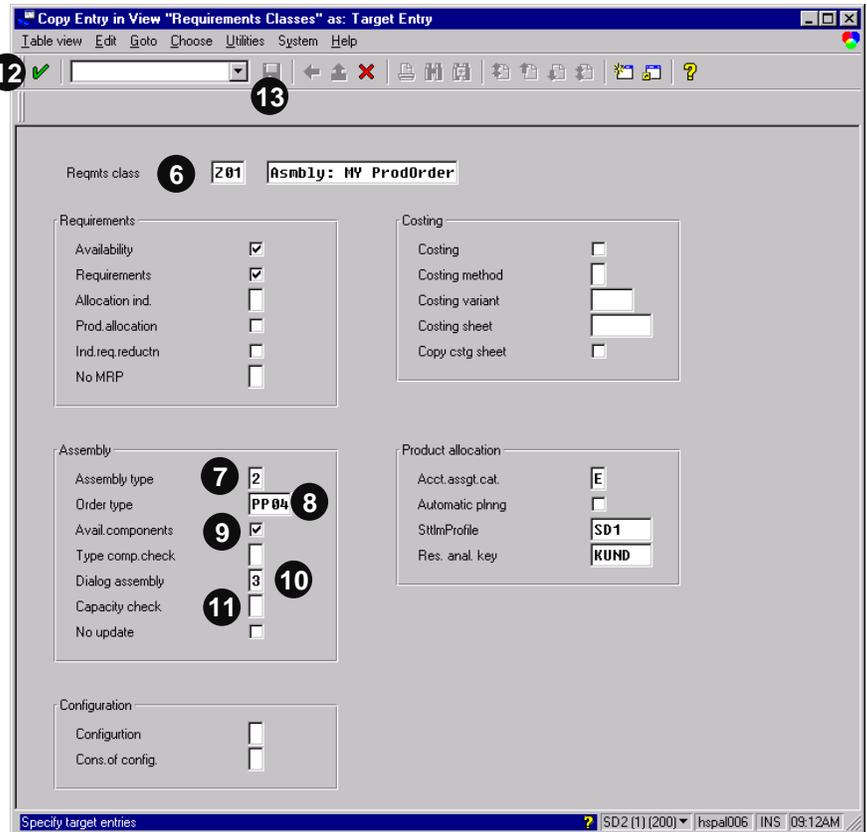
ReqC	Description	A	R	Alln	Pc	Rk	Nc	Cnfg	CCnfg	x	Type	C4	TCC	Dia	Cap	Nc	A	AF	SProf
075	Project w/o stock	<input type="checkbox"/>	<input type="checkbox"/>															D	
080	Mke-to-ord./ project	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>															D	
085	Mk->0./project/cons.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2														D	
090	Project/cons./plgMat	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3														D	
200	Assembly: plnd order	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							4		<input checked="" type="checkbox"/>		1			E		SD1
201	Assembly: prod.order	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							2	PP04	<input checked="" type="checkbox"/>		3			E		SD1
202	Network	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							2	PS05	<input type="checkbox"/>					E		SD1
203	Service order	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							2	PM01	<input type="checkbox"/>					E		SD1
206	Process order	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							2	PI01	<input checked="" type="checkbox"/>		1			E		SD1
212	Netplan/proj.settlmt	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							2	PS04	<input type="checkbox"/>					D		SD1



When choosing requirements class lines, select the requirements class:

- 200, 201, or 040 to get a planning strategy similar to *Make-to-Order Production (20)*
- 045 to get a planning strategy similar to *Planning Without Final Assembly (50)*
- 060 to get a planning strategy similar to *Planning with a Planning Material (60)*
- 200 to get a planning strategy similar to *Assembly Processing with Characteristics Planning (89)*

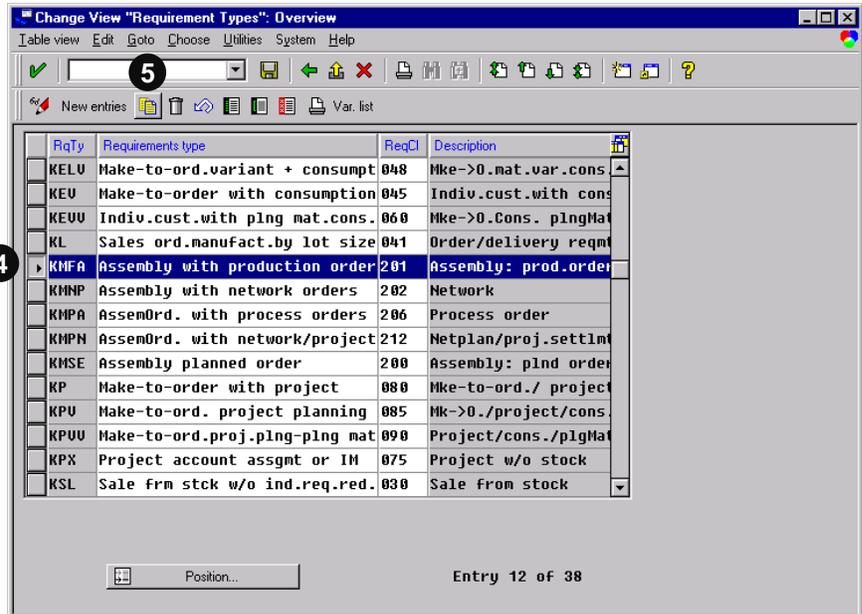
6. Change the *Reqmts class* key and add short text (to change the key, use a number range starting with z or 9).
7. Under *Assembly*, enter your *Assembly type* (for example 2).  
See the above section *Changes to the Production Order* concerning assembly types.
8. Enter your *Order type* (for example PP04). Change this field for production and process orders; leave blank for planned orders
9. Select *Avail. Components* if desired.
10. Enter your *Dialog assembly* (for example 3). This entry determines the reaction on the ATP check.
11. Enter *Capacity check* if desired.
12. Click *Enter*.
13. Click *Save*.



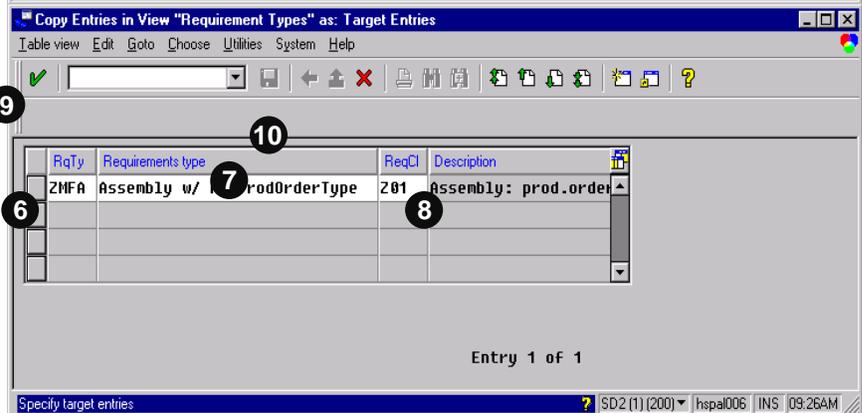
## Create a Requirements type and Include the Newly Created Requirements Class

1. In the IMG, choose *Production* → *Master Planning* → *Demand Management* → *Planned Independent Requirements* → *Requirements Types/Requirements Classes*.
2. Select the line *Define requirements types and allocate requirements class*.
3. Click *Execute*.

4. Select an existing requirements type line (in this example, *RqTy* *KMFA*).
5. Click *Copy as*.



6. Change the *RqTy* key. Use a number range starting with z or 9 (for example, change *KMFA* to *ZMFA*).
7. Enter short text for *Requirements* type.
8. Under *ReqCl*, enter the new requirements class created in the previous section. This step links your requirements type to that requirements class.
9. Click *Enter*.
10. Click *Save*.

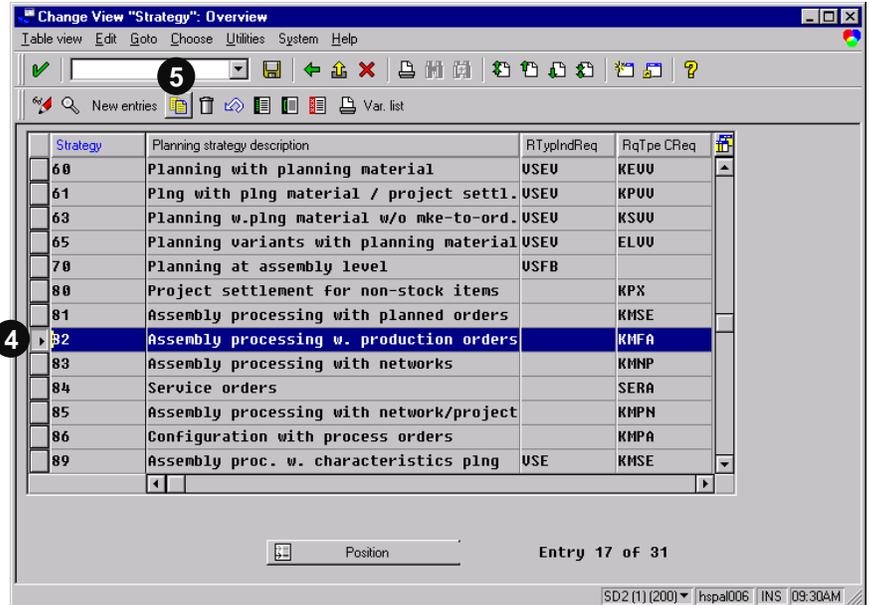


You will see the new requirements type in the sales order on the *Overview* → *Procurement* screen later on.

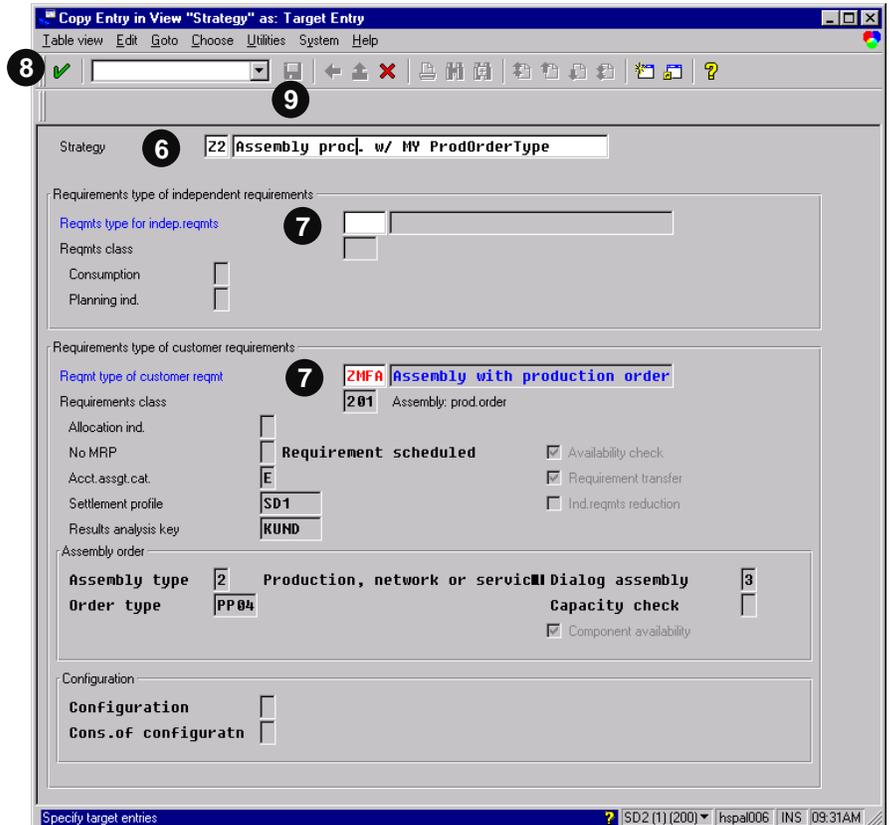
## Create a Planning Strategy

1. In the IMG, choose *Production* → *Master Planning* → *Demand Management* → *Planned Independent Requirements* → *Planning Strategy*.
2. Select the line *Define strategy*.
3. Click *Execute*.

4. Select an existing line (in this example, *Strategy 82*).
5. Click *Copy as*.



6. Change the *Strategy* key (use a number range starting with z or 9), and add short text.
7. Link this strategy to the newly created requirements type(s) (See the *Tips & Tricks* below).





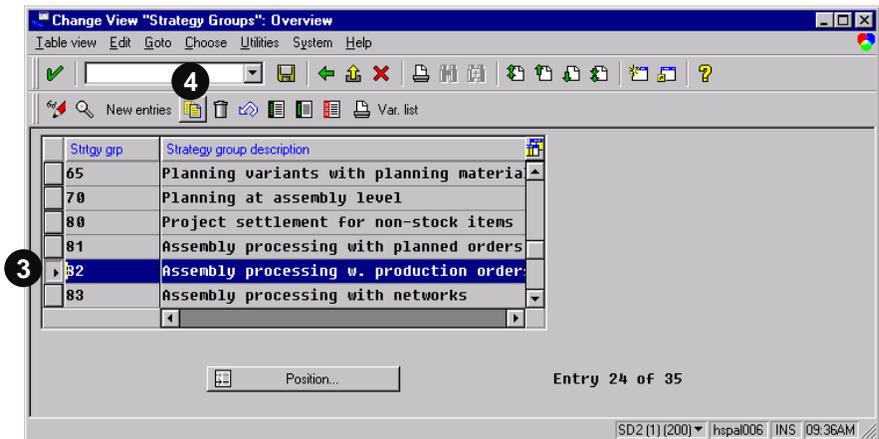
To link newly created requirements types you can either:

- Leave blank *Reqmt type for Indep reqmts*. In *Reqmt type of customer reqmt* enter the copy of the requirements type that links to requirements class 200, 201, or 040 to get a planning strategy similar to *Make-to-Order Production (20)*.
- In *Reqmts type for indep. Reqmts* enter requirements type vSE (which links to requirements class 103). In *Reqmt type of customer reqmt* enter the copy of the requirements type that links to requirements class 045 to get a planning strategy similar to *Planning Without Final Assembly (50)*.
- In *Reqmts type for indep. Reqmts* enter requirements type vSEV (which links to requirements class 104). For the *Reqmt type of customer reqmt* enter the copy of the requirements type that links to requirements class 060 to get a planning strategy similar to *Planning Without Planning Material (60)*
- In *Independent requirements* enter requirements type vSE (which links to requirements class 103). For *Reqmt type of customer reqmt* enter a copy of the requirements type that links to requirements class 200 to get a planning strategy similar to *Assembly Processing with Characteristics Planning (89)*.

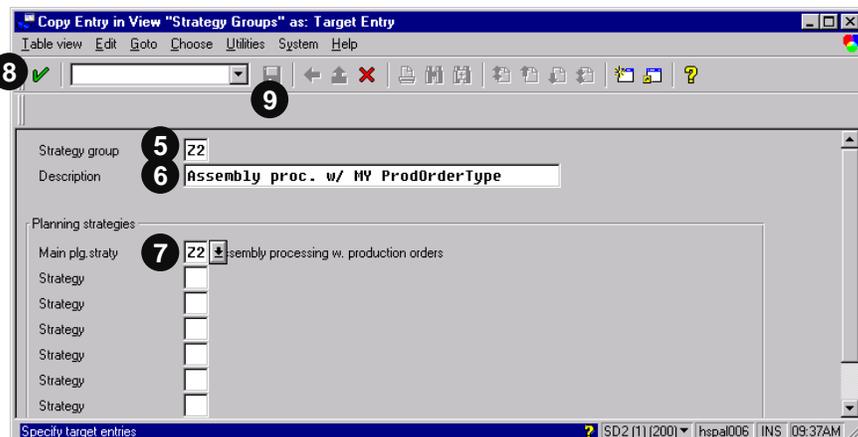
8. Click *Enter*.
9. Click *Save*.

## Create a Strategy Group and Include the Newly Created Planning Strategy

1. In the IMG, choose *Production* → *Master Planning* → *Demand Management* → *Planning Strategy*.
2. Select the line *Define strategy group* and click *Execute*.
3. Select an existing line (in this example, *Strtgy grp 82*).
4. Click *Copy as*.



5. Change the *Strategy group* key (use a number range starting with z or 9).
6. Enter the short text in *Description*.
7. Enter the new planning strategy in *Main plg. Straty* to link to the newly created planning strategy.
8. Click *Enter*.
9. Click *Save*.



You can now use the planning strategy in you material masters.

## Assembly Processing with Production Orders (82)

Assembly processing with production orders is particularly useful, if you:

- Require *status management* functionality
  - You can use status management, for example, to:
    - Document the current processing status of an object
    - Allow or forbid certain business transactions
    - Group or select objects by status (for example, all orders with the status *released*, or all components with the status *missing part*)
    - Trigger rework functions automatically (using trigger points)
- Want to carry out business functions at *operation level*, such as:
  - Releasing operations
  - Printing shop papers
  - Entering completion confirmations
- Keep track of *costs* during the production process

Every confirmation or goods movement carried out for the production order causes an update of the actual order costs.

- Want to use the *collective order* functionality

A collective order is a structure that links production orders over several manufacturing levels. It offers the following advantages:

- Any changes to dates or quantities have an immediate effect on any dependent orders within the collective order.
- No goods movements are required for subassemblies
- You can carry out an availability check across all production levels

Each production order is automatically settled to the superior production order. The top production order is then automatically settled to the sales order.

Collective orders are especially suited to the following types of production:

- Continuous flow production
- Production using parallel production lines
- Make-to-order production
- Want to use the *rework* functionality

You can use the rework functionality to compensate for malfunctions or errors that occur during the production process.

With *unplanned* malfunctions/errors, you can:

- insert rework operations
- insert reference operation sets
- create rework orders

With *planned* malfunctions/errors, you can control rework by using trigger points

- Produce *co-products*

Only if you set up assembly processing with production orders can you use co-products.

## Creating a Production Order Directly or Through a Planned Order

When creating a sales order, you can either:

- Create a production order directly  
You can make immediate use of all the production order functionality (such as the status maintenance).
- Create a planned order first, which is converted into a production order at a later date  
In this case, you can also implement planning decisions (such as external procurement or in-house production) later on in the assembly process.

Note that in assembly processing, you can only convert planned orders into production orders if you use a strategy group or requirements class with a *dynamic* assembly type. For more information, please refer to the sections later this chapter entitled, *Assembly Processing with Planned Orders* and *Assembly Processing with Projects*.

## Special Settings for Production Orders

All customizing settings required for assembly processing with production orders, such as strategy group, requirements class, and order type, are already predefined by SAP in the standard system.

### Strategy Groups

Strategy group 82, assembly processing with production orders, is predefined for production orders. In this strategy, the static procedure (that is, the 1:1 link between the production order and sales order) is preset as the assembly type.

### Requirements Type and Requirements Class

Strategy group 82 refers to both the following requirements type and requirements class in the standard system.

- Requirements type *KMFA*
- Requirements class *201*

### Order Type

Order type PP04, production order with assembly processing, is predefined in the requirements class 201. Note that if, for some reason, you want to use an order type different from the one predefined by SAP, you must ensure that the following scheduling parameters are set for that order type:

- Enter *Backward scheduling*.
- Select *Adjust basic dates*.

If you use all the standard system settings, you do not need to make any additional settings in Customizing.

## Sample Scenario: Strategy 82

### Stage 1: Demand Management

This stage does not apply to this strategy.

### Stage 2: Procurement Before Sales

This stage does not apply to this strategy in the sense that there is no production without a sales order. If sales orders exist in the system in advance, production is performed before the required delivery date.

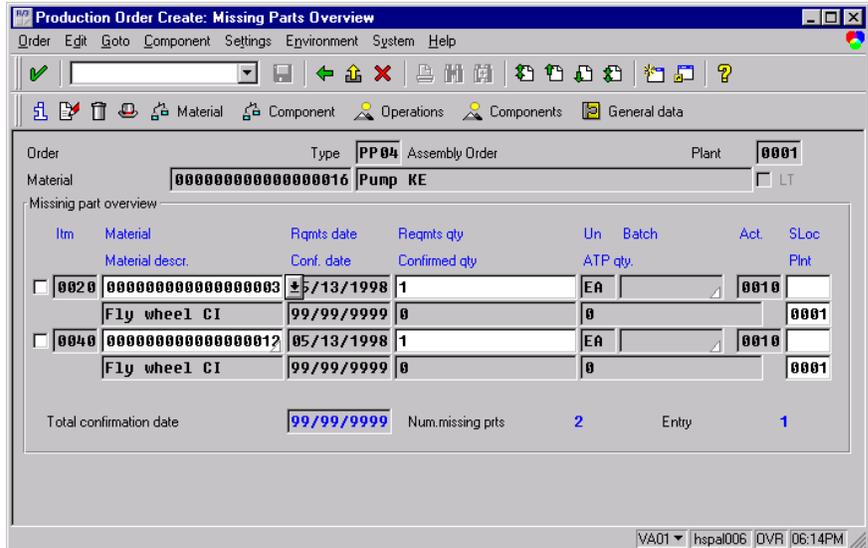
### Stage 3+4: Sales Order and Creation of a Production Order

Once a sales order is created (by choosing *Logistics* → *Sales/Distribution* → *Sales, Order* → *Create*), the following happens:

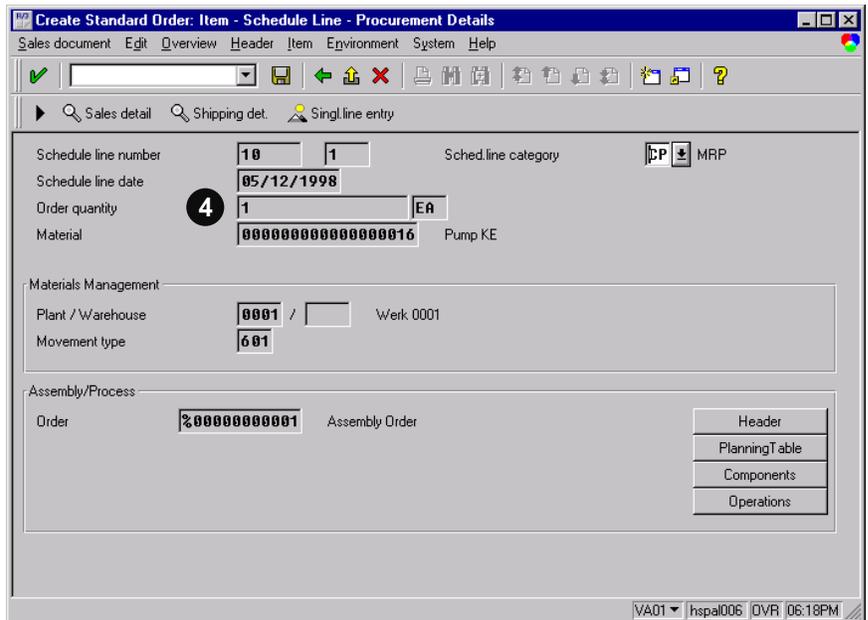
1. The system finds the requirements type *KMSE* (under *Overview* → *Procurement* in the sales order menu) because the strategy group has been set to *81*.
2. The system checks each component's availability individually (unless you enter an *availability check* that says *no check*, which makes sense for unimportant parts, for example, for nuts and bolts). The accessibility of the least available component determines the overall confirmation date.

The checking rule is determined by both the *Availability check* field in each single component's material master and the setting for the *checking group* of the PP-customizing.

When you are on the screen to the right, you can go back to the sales order screens by clicking *Back* until you reach the ATP check screen.



3. Because strategy 82 is set to assembly type *Static*, it is possible to display the planned order directly within the sales order using *Items* → *Schedule lines* → *Quantities/Dates, edit* → *Procurement Details*. At this point, you can change anything in the production order.
4. In this scenario, enter 1 piece for *Order quantity* with a required delivery date of today.



5. Once the sales order has been entered, the stock/requirements list appears as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	Cstock	000333/0010		0
<today>	Order	000333/0010/001	1-	1-
<t+rlt>	PrdOrd	1000120/PP04	1	0

t + rlt = today + replenishment lead time

Note the following about the stock/requirements list:

- Cstock lines divide the total stock into independent customer sections
- The system created a production order without running MRP

When you try to change the production order the following warning appears: *Assembly order - changes have effect on sales order.*

6. This production order is the starting point for production. You must release the production order before assembly can take place.
7. After goods receipt for the order, the stock/requirements list is as follows:

Date	MRP Element		Received/ Required Quantity	Available Quantity
<today>	Stock			0
<today>	Cstock	000333/0010		1
<today>	Order	000333/0010/001	1 -	0

### Stage 5: Goods Issue for Delivery

After goods issue for the delivery (*Logistics → Sales and distribution → Shipping → Delivery → Create*), the stock/requirements list is reset to empty.

## Assembly Processing with Planned Orders (81)

Assembly processing with planned orders is particularly useful, if production control is managed using:

- Production orders

However, you do not want to create the production order along with the sales order. You can use the planned order for adjusting planning and then convert it into a production order at a later date.

- Repetitive Manufacturing

The planned order is then the run schedule quantity, which you can plan using the planning and control tools provided by Repetitive Manufacturing. With this procedure, the goods receipt for the material can be posted with reference to the sales order number. Thus, the costs can also be directly assigned to the sales order, even in Repetitive Manufacturing.

The following sections provide a description of several criteria, as well as an example scenario for assembly processing with Repetitive Manufacturing.

## Special Settings for Planned Orders

All the settings you require in customizing for assembly processing with planned orders are already predefined by SAP. These settings include, for example, the strategy group and the requirements class. The settings in the system standard allow the planned order to be converted into a production order, and in Repetitive Manufacturing it can be used as a run schedule quantity.

### Strategy Group

Strategy group 81, assembly processing with planned orders, is predefined for planned orders. In this strategy, the dynamic procedure (that is, the loose link between the planned order and sales order) is preset as the assembly type.

### Requirements Type and Requirements Class

Strategy group 81 refers to both the following requirements type and requirements class in the standard system:

- Requirements type *KMSE*
- Requirements class *200*

## Assembly Processing with Repetitive Manufacturing

It makes sense to use assembly processing with Repetitive Manufacturing if you can apply several of the following situations:

- If production of the finished product is carried out in clear and simple steps
- If the assembly is produced in a constant flow over the production lines
- If simple routings are used, or if assembly can be carried out without routings
- If the components can be staged anonymously at the production lines

The components are procured, for example with Kanban, using consumption-based planning, or with the planning strategy *subassembly planning*

- If you want to reduce the effort required for production control and backflushing

Assembly processing with Repetitive Manufacturing is described in the following scenario:

- The production process is kept as simple as possible. There are only a limited number of production levels involved in producing the product. The number of components is relatively low, however, and it is fully possible to produce a large number of finished products due to configuration options.
- The components required for final assembly are selected through the configuration in the sales order and are staged at the production line anonymously. You can use the assembly order to carry out an availability check for the selected components. Components that are always readily available are excluded from the availability check by setting the appropriate indicator in the material master record.
- The finished product is assembled without a routing and the operations are similar. The planning table in Repetitive Manufacturing provides the planner with an overview of the production rates. At this point, the planner can also check capacities for the production lines and distribute the ordered quantities to the production lines with available capacity.

- When production is complete, the goods receipt for the finished product is posted with reference to the sales order number –(a special function exists in Repetitive Manufacturing for this step). After the goods receipt posts, the goods are withdrawn for the specific sales order and the assembly order is deleted.

For the scenario described above, you can also work without using the planning functions of Repetitive Manufacturing. In this case, capacity planning is not carried out from the planning table in Repetitive Manufacturing, but instead, using the capacity leveling functions in capacity planning. However, you can still use the backflushing functions in Repetitive Manufacturing.

## Special Settings for Repetitive Manufacturing

For assembly processing with Repetitive Manufacturing, the same strategy group and requirements type/class are used as described in the previous section *Special Settings for Planned Orders*.

If you use the planning table in Repetitive Manufacturing, you have more settings to make.

### Repetitive Manufacturing for Make-to-Order Production With or Without the Planning Table

The special settings for Repetitive Manufacturing depend on whether you:

- Want to use the planning table in Repetitive Manufacturing to assign the production quantities to production lines or to carry out capacity planning, for example
- Do not want to use the planning table to plan the run schedule quantities, and instead, for example, you want to use:
  - The current stock/requirements list from MRP to gain an overview of the run schedule quantities
  - The capacity leveling functions from the stock/requirements list or from capacity planning to adjust the master plan.

### Repetitive Manufacturing for Make-to-Order Production with Planning Table

If you want to use the planning table, you must maintain the following data:

- In the material master record, you must:
  - Allow Repetitive Manufacturing for the material. To do so, you must enter a Repetitive Manufacturing profile. Various control parameters are contained in this profile, for example, for the movement types in backflushing and for posting costs.  
We recommend you use a profile for which a cost collector has to be created manually, as a cost collector is not required for make-to-order production.  
The Repetitive Manufacturing profile also determines whether the costs are posted with or without activities (machine costs, labor costs, and so on) when backflushing. If you decide to post with activities, they are automatically posted with the final backflush.
  - Create a production version containing the data relevant for production –(alternative BOM, group, group counter, production line, and so on). If you work without routings, you must enter at least the BOM and the production line in the production version.

### Repetitive Manufacturing for Make-to-Order Without the Planning Table

If you choose not to work with the planning table, you must include the appropriate settings in the material master record.

You must enter a Repetitive Manufacturing profile. Various control parameters are contained in this profile (for example, for the movement types in backflushing and for posting costs). We recommend that you use a profile for which a cost collector has to be created manually, as a cost collector is not required for make-to-order production. The Repetitive Manufacturing profile also determines whether the costs are posted with or without activities (machine costs, labor costs, and so on) during backflush. If you decide to post with activities, they are automatically posted with the final backflush.

Note that the special goods receipt posting with reference to the sales order is available whether you work with or without the planning table.

## Sample Scenario: Strategy 81

### Stage 1: Demand Management

This stage does not apply to this strategy.

### Stage 2: Procurement Before Sales

This stage does not apply to this strategy, because there is no production without a sales order. If sales orders exist in the system in advance, production is performed before the required delivery date.

### Stage 3+4: Sales Order and Creation of Planned Order

After a sales order is created (*Logistics* → *Sales/Distribution* → *Sales, Order* → *Create*), the following activities occur:

1. The system checks each component's availability individually (unless you enter an *availability check* that says *no check*, which makes sense, for example, for nuts and bolts). The accessibility of the least available component determines the overall confirmation date.

The checking rule is determined by both the *Availability check* field in each single component's material master and the setting for the *checking group* of the PP-customizing.

2. The system finds the requirements type *KMSE* (under the *Overview* → *Procurement* in the sales order menu) because the strategy group has been set to *81*.

3. Because strategy *81* is **not** set to assembly type *static*, it is impossible to display the planned order directly within the sales order using the *Items* → *Schedule lines* → *quantities/Dates, edit* → *Procurement Details*.

However it is possible to display it by choosing *Edit* → *Item Availability*, and double-click on the planned order. Note the field *Assembly type*.

The screenshot shows the 'Availability check: Overview' window. It displays the following summary information:

- No. of components checked: 4
- Missing parts: 2
- Overall confirmation date could not be determined

The main table lists the materials and their requirements:

Material	Plnt	SLoc	Reqmts quantity	Requirements	Confirmed quantity	Da
0000000000000002	0001		1 EA	05/12/1998	0 EA	05
0000000000000003	0001		1 EA	05/12/1998	0 EA	99
0000000000000011	0001		1 EA	05/12/1998	0 EA	05
0000000000000012	0001		1 EA	05/12/1998	0 EA	99

4. In this scenario, an order with a quantity of 1 piece is now entered with a required delivery date of today.
5. Once the sales order has been entered, the stock/requirements list appears as follows:

Date	MRP Element		Received/Required Quantity	Available Quantity
<today>	Stock			0
<today>	Cstock	000333/0010		0
<today>	Order	000333/0010/001	1-	1 -
<t+rlt>	PIOrd.	0004711/Ord.*	1	0

t + rlt = today + replenishment lead time

Note the following about the stock/requirements list:

- Cstock lines divide the total stock into independent customer sections
  - The system creates a firmed planned order without running MRP
6. This planned order is the starting point for production. Various possibilities exist for handling the production process in the R/3 System. As mentioned above, the following possibilities exist:
    - Convert the planned order into a production order to release the production order and a goods receipt of the yield quantity
    - Process the planned order using repetitive manufacturing
  7. After goods receipt for the order, the stock/requirements list is as follows:

Date	MRP Element		Received/Required Quantity	Available Quantity
<today>	Stock			0
<today>	Cstock	000333/0010		1
<today>	Order	000333/0010/001	1 -	0

### Stage 5: Goods Issue for Delivery

After goods issue for the delivery (*Logistics* → *Sales and distribution* → *Shipping* → *Delivery* → *Create*), the stock/requirements list is reset to empty.

## Assembly Processing with Characteristics Planning (89)

This planning strategy is described in chapter 5, the section *Assembly Processing with Variant Configuration (89)*.

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# R/3 System MRP Strategies Made Easy—Evaluation Form

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We're interested in getting your feedback on the *R/3 System MRP Strategies Made Easy*.

Please fill out and return this questionnaire to us as soon as possible.

**Please Mail or fax the completed evaluation to:**

SAP Labs, Inc.  
R/3 Simplification Group  
3475 Deer Creek Road  
Palo Alto, CA 94404-2127

Phone (650) 849-4000

Fax (650) 849-4003

---

## Basic Information

Name:

Title:

Company:

Phone number:

Email address:

Customer Name:

---

## General Impressions

On a scale of 1–10 (10 being most satisfactory), please rate the items listed below by circling a number:

Relevance of Topics	1	2	3	4	5	6	7	8	9	10
Ease of Use	1	2	3	4	5	6	7	8	9	10
Overall Quality	1	2	3	4	5	6	7	8	9	10
Organization	1	2	3	4	5	6	7	8	9	10
Accuracy of Information	1	2	3	4	5	6	7	8	9	10
Overall Usefulness	1	2	3	4	5	6	7	8	9	10

## Questions

1. Which tool are you reviewing?

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2. Please rate how useful you found this tool (1 being least useful; 10 being most useful)?

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3. Would you use this tool again or recommend it to someone else?

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4. Approximately how many person-days did you save by using this tool?

Consultant person-days:

Customer person-days:

5. What dollar amount would you estimate you saved by using this tool (include saved consulting days into this US dollar amount)?

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6. By how many project days were you able to cut your implementation time in this area?

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7. Please describe, in detail, how you used this tool:

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8. What did you like about this tool (consider ease-of-use, practicality, and whether the tool is professional)?

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9. What did you **not** like about this tool? How would you like to see this changed? (Please describe bugs, additional functionality, and any impracticalities.)

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Questions

10. Please provide other comments, general ideas about the future of this tool.

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