

Configuration for Discrete Manufacturing

DISCRETE MANUFACTURING CONFIGURATION DURING SAP IMPLEMENTATION

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Configuration Basics of Discrete Manufacturing

DURING AN SAP ERP IMPLEMENTATION project, when it's established that discrete manufacturing will most closely serve the business needs of the company, the next logical step is to have sensitive discussions and several workshops to agree on the configuration objects of discrete manufacturing. Configuration of the specific production type (which in this case is discrete manufacturing) forms the basis on which the business process of the company will run. For example, how should the system behave when it comes across a material or capacity shortage during production order creation or release? How should it behave when the actual production exceeds the defined under-delivery or over-delivery of the material? What should the system do if it's unable to schedule production within the defined basic dates? For each of these (and many more) questions, you can set the controls on the degree of freedom or flexibility (or strictness) that you want the system to allow you to perform business functions. For example, you can configure the system to allow you to create a production order despite a component shortage, but to stop you from releasing it until the requisite components for production are available in stock.

In this chapter, we cover the configuration basics needed to set up the master data used in discrete

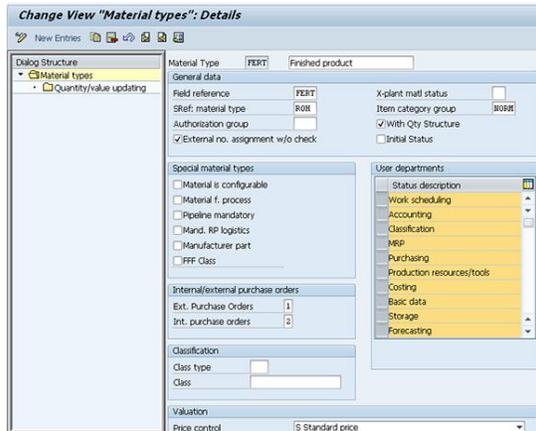
manufacturing. Next, we follow up a step-by-step process to create a new production order type PPI0, including assigning it a new number range. All of the subsequent configuration steps covered for this order type and in this chapter are sufficient to enable you to run end-to-end business process in SAP ERP. In Chapter 6, we cover the business process side of the configuration undertaken in this chapter.

If, as an SAP ERP system consultant or as a business owner, this is the first time you're configuring and implementing the Production Planning (PP) component, then we suggest that you follow the step-by-step approach that we use in this chapter. Because the PP component integrates with several other components such as Materials Management, Quality Management, and most importantly with Controlling-Production Costing (CO-PC), we suggest that you maintain close coordination all along by consulting the resources of these components.

1.1 Material Master

The configuration of the material master is primarily managed within the Materials Management (MM) component of the SAP ERP system. During an SAP ERP system implementation, the MM team coordinates with the client to discuss and agree on a larger number of MM-specific configuration objects, which also includes material types. A *material type* is a unique identification to distinguish materials in various business processes. Some examples of material types are raw materials, semi-finished goods, trading materials, packing materials, non-valuated materials, spare parts, and consumables. However, the importance and involvement of production planning can't be overemphasized

here, as the material requirements planning (MRP) and work scheduling views of the material master are very important to PP, both from a planning and execution perspective.



Apart from the option for quantity and value updates, you can also control the views that the system makes available to the end user during material master creation. For example, normally the purchasing view isn't available for finished goods because the company doesn't purchase finished goods. Similarly, for raw materials, the sales views aren't available because the company normally doesn't sell its raw materials.

To set up the attributes of material types, follow the configuration (Transaction SPRO) menu path LOGISTICS – GENERAL – MATERIAL MASTER – BASIC SETTINGS – MATERIAL TYPES – DEFINE ATTRIBUTES OF MATERIAL TYPES.

1.2 Bill of Materials (BOM)

Similar to the material master, a material's BOM is used extensively in various areas of the supply chain, including planning and costing. A BOM is a formally structured list of components that you need to use to produce a material. These components may be raw materials or packing

materials procured directly from vendors or subassemblies produced in-house.

The BOM has a large number of functions. You can have a BOM that is specific to engineering/design only, whereas you can have another BOM of the same material that you can use for costing purposes. You can have a production BOM and also a sales BOM. In a sales BOM, the system explodes the components and makes them an integral part of sales processing. For example, when a company sells a new car, it also includes the accessories such as a spare tire, the tire changing tool-kit, and the owner's manual, among other things. These accessories are, in fact, components in a sales BOM.

A material BOM is a central component in MRP. When the system runs the MRP on a material, it looks for its BOM to plan not just at the finished goods level but also at the components' and raw materials' levels. The material BOM is always single-level, and you can explode and display the cascade of BOMs as a multilevel structure. The system displays a single-level BOM by showing its immediate next component or assembly. It's in a multilevel BOM that the system reflects comprehensive details of all the assemblies, components, the associated quantities of assemblies and components, and their logical relationship to each other.

1.2.1 Define BOM Usages

A BOM usage controls the activities and functions that the system can perform in business processes. To create a new BOM usage, follow the (Transaction SPRO menu path PRODUCTION – BASIC DATA – GENERAL DATA – BOM USAGE – DEFINE BOM USAGES, or use transaction OS20.

Change View "BOM Usage - Item Statuses": Overview

New Entries

BOM ...	Prod.	Eng./des.	Spare	PM	Sales	CostRel	Usage text
1	+	.	.	-	-	.	Production
2	.	+	.	-	-	.	Engineering/design
3	.	.	.	-	-	.	Universal
4	-	-	-	+	-	.	Plant maintenance
5	.	.	.	-	+	.	Sales and distribution
6	.	.	.	-	.	+	Costing
7	.	-	-	-	-	.	Returnable Packaging
8	-	.	-	-	-	-	Stability Study

Here you'll find several standard BOM usages. You can create a new BO usage by choosing **NEW ENTIREES**, and selecting the control functions to allow or disallow the business processes in which the BOM usage is applicable.

1.2.2. Allowed Material Types in the BOM Header

You can control the material types that the system allows for creation of a material BOM. For example, you normally don't create a material BOM for spare parts or consumable material types. This control on material types for BOM creation also helps prevent the creation of unnecessary configuration for all of the material types that will have any BOM usage.

Change View "Material Types Allowed in BOM Header": Overview

New Entries

BOM Usage (1) 9 Entries found

BOM Usq	Mat type he...	Allowed
*	*	+
*	INTR	-
B	*	+
U	*	+

Restrictions

Usage	Usage text
*	All Usages (Masked)
1	Production
2	Engineering/design
3	Universal
4	Plant maintenance
5	Sales and distribution
6	Costing
7	Returnable Packaging
8	Stability Study

1.2.3 BOM Status

You can control the different applications of a material BOM from its status. For example, during new product development, a material has BOM status as *Engineering/design* or *Costing*, it isn't available in production order creation. You

can also set the status in which all functions are possible.

Change View "BOM Statuses": Overview

New Entries

BOM St	ExMs ID	MRPExplo	PlanOrd	Rel cstg	RelWtS...	Rel ords	Coll is	SalesOr
1		<input checked="" type="checkbox"/>						
2		<input type="checkbox"/>						
3		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4		<input type="checkbox"/>						
5		<input type="checkbox"/>						
6		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7		<input checked="" type="checkbox"/>						

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1.2.4 BOM with History Requirement

You can control whether changes made to the material BOM are with reference to a change number or Engineering Change Management (ECM). With a history requirement or change number, the system requires you to enter the change number before it allows you to makes the desired changes, which adds a level of security.

To create or set the BOM status, follow the configuration (Transaction SPRO) menu path **PRODUCTION – BASIC DATA – GENERAL DATA – DEFINE BOM STATUS**, or use Transaction OS23.

1.2.5 Item Category in BOM

The item category provides further divisions to the different BOM classes. While some item categories are relevant for production or for

planning, others are merely to provide information.

Following are some of the most important predefined item categories:

- **L: stock item** - Stock items contain components that you store in your warehouse and include as a part of Inventory Management.
- **N: nonstock item** - A nonstock item is a material that isn't available in stock but is procured directly for the given production order. A nonstock item has direct relation to the procurement process. There is also no need to have a material master (item code) for nonstock material. If you use nonstock material, you also have to fill in the procurement details, such as cost element, purchasing group, material group, and price.
- **R: variable-size item** - In this item category, you can use the formula and also define the variables' sizes to enable the system to perform calculations and suggest the component's quantity.
- **T: text item** - The text item has a descriptive character.
- **M: intra material** - This item category is commonly used in master recipes (process industry). Materials that are temporarily used in process engineering are recorded as components with this item category.

The material input parameter (MatInpt) indicates whether a material reference to the item exists. This isn't the case with document items or nonstock items. The inventory-management parameter (InvMg) allows you to set that you can only use those materials whose quantities are managed in inventory management.

To maintain a new item category or make changes to the existing ones, follow the configuration (Transaction SPRO) menu path Production _ Basic Data _ ItemData _ Define Material Types Allowed for BOM Header, or use Transaction OS24. Select or deselect the checkboxes to meet your business needs.

1.2.6 Variable Size Item Formulas

In the fabrication industry, it's common that component issuance to produce an assembly is often based on a formula. For example, to produce the fuel tank of a motorcycle, the warehouse issues the steel sheet based on the formula, which calculates the requirement. When you assign the variable-size item in the BOM of the material, and with item category R, the system enables you to enter the variable-size details in the relevant area of the BOM's item details area.

Change View "Variable-Size Item Formulas": Overview

New Entries

Formula	Formula	DimRes	Formula text
F1	$R0M1 * R0M2$	SURFAC	Area of a rectangle
F2	$R0M1 * R0M1 * PI$	SURFAC	Area of a circle
T11	$R0M1 + R0M2 + R0M3$	LENGTH	Perimeter of a triangle
U2	$2 * R0M1 + 2 * R0M2$	LENGTH	Perimeter of a rectangle
V1	$R0M1 * R0M2 * R0M3$	VOLUME	Volume of a rectangular parallepiped

Notes

Before you proceed to create a formula for a variable size item, you can also self-define a unique unit of measure to denote the formula via Transaction CUNI.

To create a variable size item formula, follow the SAP ERP system configuration (Transaction SPRO) menu path Production _ Basic Data _ Item Data _ Define Variable-Size Item Formula, or use Transaction OSI5.

1.2.7 BOM Explosion Types

You can control how the system takes a specific component's explosion into account in the Basic Data view of the BOM creation screen. You can control whether direct production, a phantom assembly or even Long-Term Planning (LTP) is deactivated. For example, if you don't want the system to plan a particular component in LTP, you can set its explosion type status in the Basic Data view of the material's component. If you don't find the desired configuration settings, then you can configure using the configuration (Transaction SPRO) menu path Production _ Basic Data _ Item Data _ Define Explosion Types.

1.2.8 BOM Selection (Order of Priority)

You can control how the system makes an automatic selection of a BOM to incorporate it; for example, in a planned order during an MRP run. For example, during the MRP run, if the system is unable to find a material's BOM for production, then you can define the next BOM selection priority as universal.

To configure the BOM selection and its order of selection priority, follow the configuration (Transaction SPRO) menu path Production _ Basic Data _ Bill of Material _ Alternative Determination _ Define Order of Priority for BOM Usages, or use Transaction OS31. Here you define the selection ID to combine all BOMs

with one unique ID. Then you define the selection priority of each BOM and finally assign the BOM usage, such as production or universal.

1.3 Work Center

A *work center* is a machine or a group of machines, a person or a group of persons, or a group of person(s) and machine(s) that adds value to the manufacturing process. During an SAP ERP system implementation, the production and the product costing teams discuss and mutually agree on the number of work centers that needs to be available. The decision is primarily focused on ensuring that the production department is able to schedule and plan work centers and machines capacities, whereas the product costing team ensures that the activities-wise and cost centers-wise reporting is available. For example, if Packaging as a work center entails significant cost that the product costing team needs to monitor its cost and activities, then it makes sense to create a work center and assign a separate cost center and associated activities to it. If it doesn't require monitoring, then the production line cost center is sufficient.



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