

Standard Value Calculation with CAPP (PP-BD-CAP)



HELP.PPBDCAP

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Icons

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Standard Value Calculation with CAPP (PP-BD-CAP)

Standard Value Calculation with CAPP (PP-BD-CAP)

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Introduction

Introduction

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CAPP Standard Values Calculation in the SAP System

The calculation of standard values with CAPP belongs, like the material master, BOMs and routings, to the master data in the Production Planning System (PP).

The PP system has interfaces to:

- Materials Management (MM)
- Controlling (CO)
- Personnel Planning and Development (PD)

All modules are real-time applications. This means that all quantities and values are saved directly and the same current data is available to all users of the system.

Integration of CAPP Standard Values Calculation in Production Planning and Control

CAPP belongs to the **master data** of Production Planning (PP) as do material masters, bills of material, routings and work centers.

Routing

The calculation of standard values with CAPP (CAPP = computer aided process planning) provides machine support for work scheduling to determine standard values in the routing. The standard values are calculated using methods or processes that are available at the work center where the operation is carried out.

Standard Values

In the SAP system, standard values are used in formulas for

- scheduling,
- capacity planning, and
- costing.

Scheduling

In scheduling, the **standard values** and quantities in an operation in a routing are used to determine the dates for executing the operations.

Capacity Planning

In capacity planning the **standard values** and quantities in an operation are used to determine the capacity requirements for executing operations. These requirements are compared to the available capacity defined in the work center.

Costing

Costing calculates the costs incurred when a material is produced in-house. Costing provides the basic information for:

- pricing and pricing policy
- evaluation
- cost control
- profitability analysis

An operation in a routing is linked to cost accounting by the cost centers and the activity types maintained at the work center. If the work center is used for an operation, then you can enter standard values for the activity types stored in the work center.

In product costing the valuation of internal activities is carried out based on the rates which were planned for the activity types. The activity types determine how the **standard values** are evaluated.

Introduction to CAPP Standard Values Calculation

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Overview

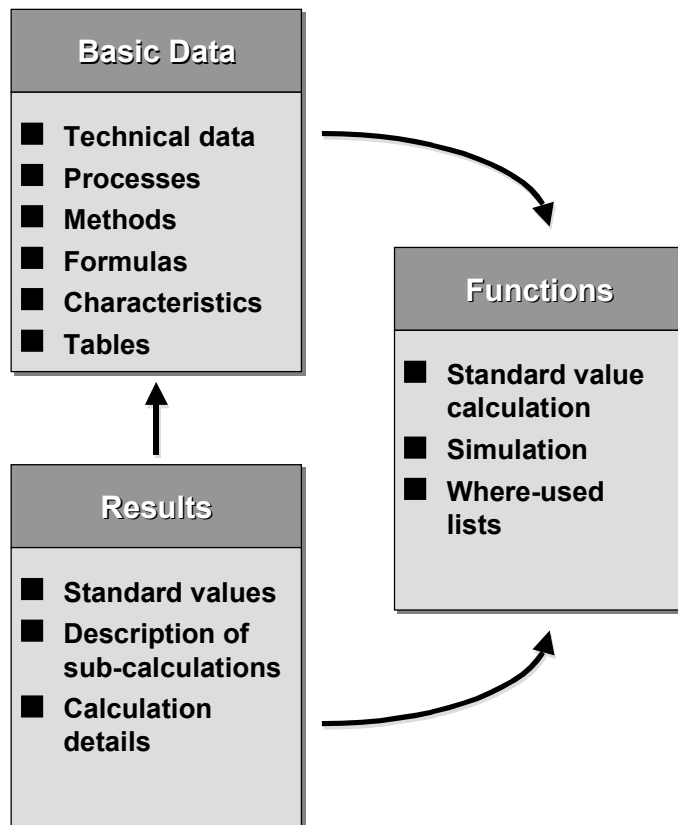
Standard values are used in scheduling, capacity planning and costing to determine dates, capacity requirements and costs (see also [Integration of CAPP Standard Values Calculation in Production Planning and Control \[Page 10\]](#)). They generally have the dimension “time”. However, in the PP system you can calculate standard values not only with the dimension “time” but also with any dimension in the SI system. This can be useful, for example, for calculating the necessary volume of an annealing furnace.

Standard values can be determined in several ways:

- the conventional procedure for determining times (for example, time studies, estimating, polling)
- sampling and statistical procedures for determining times (for example, period time sheets) and
- calculation methods (for example, MTM, WF and planned times)

In contrast to the procedures listed above, CAPP is a **mathematical procedure** using formulas and methods.

The following graphic displays the basic data, which CAPP uses in calculating standard values. The calculation details can also be generated.

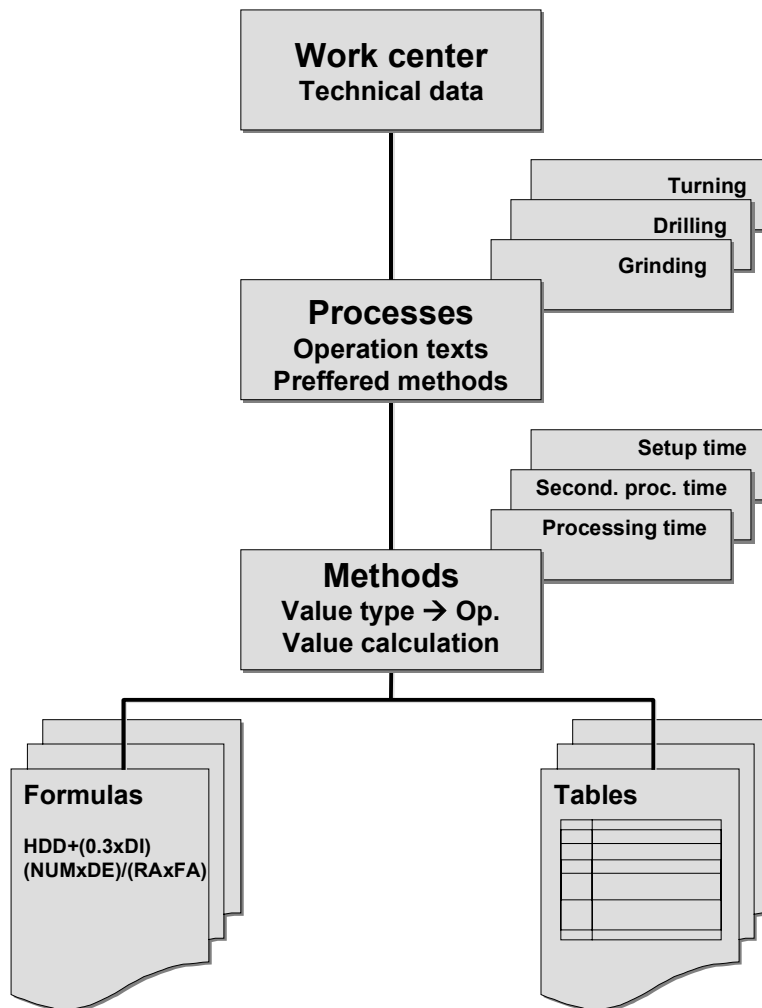


Overview

You can trigger the calculation of one or more standard values for an operation when you are within the create or change transaction for routings or when you are creating a production order. During this calculation both the **technical data** and one or more **processes** at the work center where the operation is executed are taken into account.

Standard values are calculated using **methods** that are allocated to the process(es). The method is used to specify the standard value to be calculated. When calculating methods the system accesses **formulas** that can in turn access other formulas and/or tables.

The following graphic displays the structure of the standard values calculation; it shows the CAPP elements and their hierarchical arrangement.



CAPP Elements

Before you can calculate standard values you must maintain the CAPP elements. They define how standard values are to be calculated and under what conditions. The following CAPP elements exist in the SAP system:

- formulas
- methods
- processes

You can find more details in:

[Basics of CAPP Elements \[Page 16\]](#)

[Formulas \[Page 18\]](#)

[Methods \[Page 19\]](#)

[Processes \[Page 24\]](#)

Basics of CAPP Elements

Basics of CAPP Elements

Characteristics and **tables** serve as the basis for calculating standard values with CAPP. They are used in CAPP elements.

Characteristics

A characteristic describes any detail or feature of an object, such as the length of a screw or the color of a casing. Characteristics are used in formulas for calculating standard values. They are also used in classification.

You can maintain the characteristics for formulas either directly in characteristic maintenance or when creating a formula by branching to characteristic maintenance.

To reduce the amount of data you need to enter to calculate standard values, you can specify one or more default values for characteristics in characteristic maintenance.

For additional information about characteristics, refer to the *CA - Characteristics* guide.

Tables

You can also save data in tables. You can use this information for calculating standard values. Tables consist of **key fields** (for example, plant and work center) and one or more values in the **function section** of the table, which refer to the key fields.

Tables are created using the ABAP/4 Dictionary. You can define the table structure using data elements and domains. For example, you can determine how many values can be entered in the function section of a table. You can find information on creating tables in the guide *BC - ABAP/4 Dictionary*.

You can use the following table types for standard values calculations:

- **General tables:** In a general table, function fields are assigned to any table key. You can use **search rules** to define how a value is to be taken from the table.
- **Tables for work centers:** In tables for work centers, function fields are assigned to a table key consisting of work center and plant. You can use **search rules** to define how a value is to be taken from the table.
- **Matrix tables:** In matrix tables, a series of individual values is assigned to a table key. These values must be sorted in ascending order. Matrix tables are suitable for specifying feed sequences or speed sequences. You can use **conversion rules** to specify how a value is to be selected from the sequence for the standard values calculation.



All the fields in the function section of a matrix table must have the same domain.

You can find information on search rules and conversion rules in [Rules \[Page 22\]](#).

- **Database tables:** A database table contains information from a discrete area. This information is stored in table-form. In CAPP you can take data from database tables for the following master data or objects for determining characteristics.
 - Material master
 - BOM
 - Task list header

- Operation
- Material component allocation

You can find further information on search rules and conversion rules in the section Rules.

Routing		
Key		Function
Basic material	Diameter	Cutting speed
ST37	15	30
ST37	17.5	31
ST37	19	32

Tables for work centers		
Key		Function
Work center	Plant	Setup time (minutes)
4711	0001	5.00
4712	0001	5.20

Matrix tables		
Key		Function
Work center	Plant	Speeds
4711	0001	100 200 300 400 500 600
		700 800 900 1.000
4712	0001	100 1.000

In CAPP you can specify the name of a field in a table from which the value of a characteristic in a formula is to be determined.



You can only specify fields in the function section of the table as the characteristic origin. Key fields in a table cannot be specified as the characteristic origin.

All the characteristics from the formula and the key fields are listed in method maintenance. You can enter a rule in method maintenance for each of the characteristics generated for the key fields.

Formulas

Formulas

A CAPP formula is the mathematical description of a calculation for determining standard values with CAPP. You can use CAPP formulas to calculate both final as well as intermediate results. You can save formulas in the system in any form.

Formulas consist of **characteristics** that are linked to one another by means of mathematical operands and functions. You can find further information on operands and functions available to you when you create a formula in the section [Entering a Formula String \[Page 34\]](#)

Methods

Methods group formulas and tables together into a logical processing sequence. A method calculates a standard value in an operation for certain processes (for example, straight turning). The method specifies **which** standard value is to be calculated. A method can have a complex hierarchical structure since the characteristics in the basic formula of the method can have other formulas and/or tables as their origin.

You can find more details in:

[Characteristic Origin \[Page 20\]](#)

[Value Types \[Page 21\]](#)

[Rules \[Page 22\]](#)

Characteristic Origin

Characteristic Origin

You generally specify the origin of a characteristic in method maintenance. You can assign an origin and the relevant rule to a characteristic in the method. The following origins are possible:

- manual entry
- formula
- table

Value Types

You define a **value type** for the method result. The value type uses the parameter ID assignment to determine:

- the dimension of the method result,
- into which standard value in the routing the result calculated is to be transferred.

So that the system can copy the calculated value into a standard value in the routing, the standard value must be defined using the standard value key in the work center (see [Work Center \[Page 26\]](#) and [Routing \[Page 27\]](#)). The standard value is a parameter identified by the parameter ID.

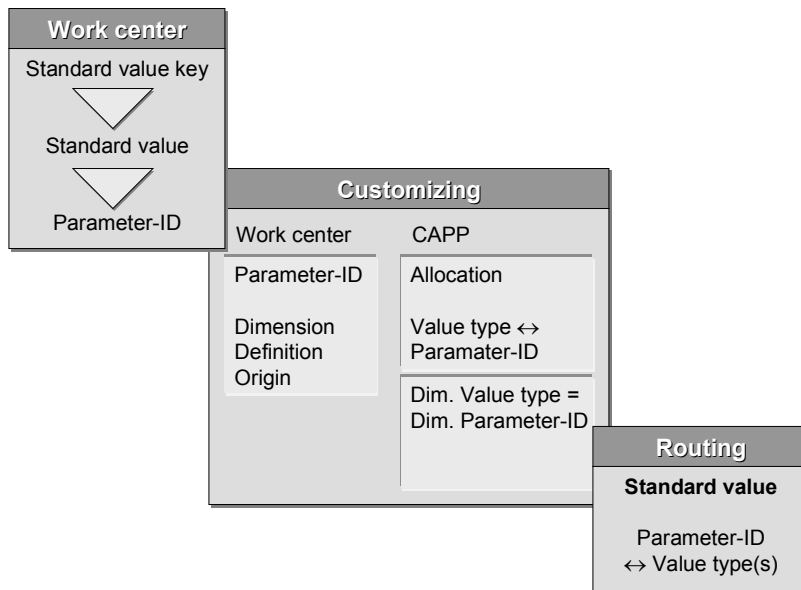
In work center Customizing a dimension is assigned to the parameter ID. In CAPP Customizing you can assign the value type to a parameter ID, that means to the standard value into which the method result is to be copied.



In the method, the value type and the unit of the method result are defined. The assigned parameter ID and the method result must have the same dimension.

Using CAPP Customizing you can assign parameter IDs with the following origin to a value type:

- standard value
- general operation value if it concerns the break time, the maximum wait time, the minimum wait time or the normal queue time.
- user field from the operation



Rules

Rules

Rules are defined to deal with exceptional cases so as to achieve realistic standard values. For example, you need rules if the turning speed calculated in a sub-calculation in the method cannot be adhered to because of the machine-specific speed sequence. In this case, it must be determined whether the next largest or next smallest value should be used for further calculations.

You can maintain the following rules for determining values.:

- Validation rule
- Search rule
- Conversion rule

Validation rule

The validation rule checks whether a specific value range is adhered to with respect to a characteristic.



If the drill depth must not exceed 50 mm, then the value of the characteristic must be ≤ 50 mm.

Search rule

A search rule determines how a general table or a table for a work center is to be read. This rule refers to the **key fields in the table**.

For every characteristic that was generated for the key fields in the table, you can enter a search rule in the method.

The following **processing indicators** are valid when accessing tables to select the generated characteristics:

- \geq or "GE" the next largest value is selected
- \leq or "LE" the next smallest value is selected
- = or "EQ" only the exact value is selected



If the cutting speed depends on the key fields "basic material", "cutting depth" and "feed" and if the cutting depth entered or calculated does not appear in the table, then you must use the search rule to specify whether the system is to take the next largest or next smallest value.

For example, if the key fields "work center", "plant" or "material" are involved or if you have not maintained a search rule for another key field, then the system automatically searches for the exact value. If no value is found on a later calculation then this is noted in the log.

Conversion rule

A conversion rule indicates which value is to be taken from a table. This rule refers to the **function section of matrix tables**. For example, if the calculated turning speed does not exist in

a speed sequence then you must specify whether the next smallest or the next largest speed is to be used for the rest of the calculation.

Database rule

A database rule relates to database tables. By accessing database tables you can use fields from master data to determine characteristics. The database rule determines whether the data used to calculate the characteristic is taken from the database table of the material to be planned (end product) or whether it is taken from the database table of the material component required.

The database rule is required for the origins **Material master** and **BOM**. The system sets it automatically depending on the menu entry selected.

Processes

Processes

A process describes a manufacturing technique such as drilling, turning or assembly. A process groups together all the methods and the corresponding value types that can be used to calculate standard values for a production technique.

In one process you can:

- evaluate several different methods and so several different standard values or
- evaluate a method several times, add the results and transfer them to a standard value or
- evaluate several different methods, add the results and transfer them to a standard value



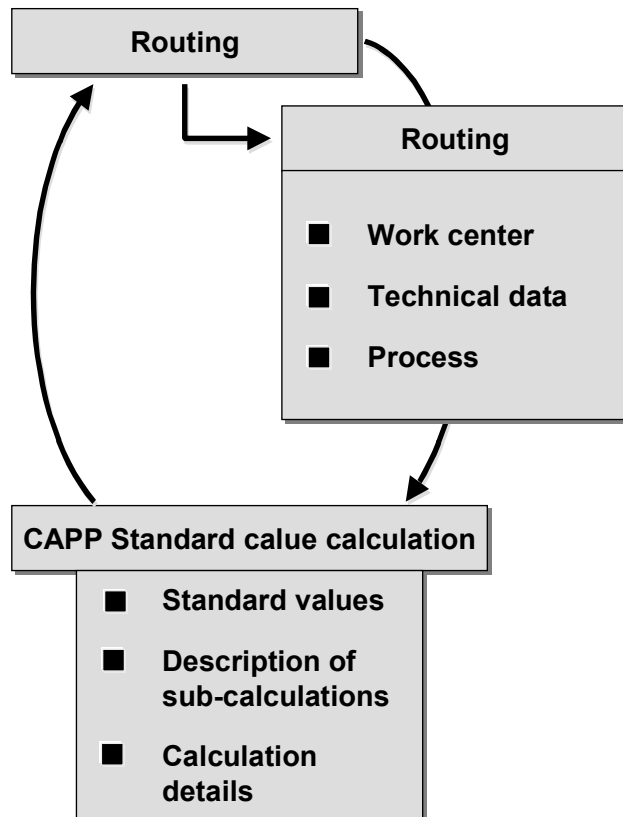
You can assign the methods “drilling”, “reaming”, “countersinking”, “threadcutting” and “setup” to the process drilling and so determine several different standard values.

The value type for the method determines which results are added together.

Processes are assigned to the work center where the technique can be used. If you want to carry out a standard values calculation from within the routing, then you must allocate at least one process to the work center for the operation.

Interface to Other Master Data

CAPP uses the master data **work centers** and **routings**. When the standard values calculation is triggered, work center data is provided for the operation that is to be carried out. This data is used to calculate the standard values. The result of the calculation is transferred from the standard value calculation to a standard value for the operation in the routing.



You can find more details in:

[Work Center \[Page 26\]](#)

[Routing \[Page 27\]](#)

Work Center

Work Center

A work center is generally either an individual machine or a group of machines, however, a person or a group of people can also constitute a work center. An operation is carried out there.

If you want to carry out a standard values calculation, you must specify the work center where the operation is going to be processed. You specify the work center for which the standard values are to be calculated in the operation in the routing. **Technical data** describing the work center from the point of view of the standard values calculation must be assigned to this work center. Machine data and rounding and additional value keys are examples of technical data. In the technical data you also enter the processes that are assigned to the work center.



If a standard values calculation is to be carried out using a work center then at least one process must be assigned to this work center which can be used to carry out the calculation.

You use the standard value key in the work center to specify which standard values can be used in scheduling, capacity planning and costing. You can maintain these standard values in the routing or you can carry out a standard values calculation for them.



If you have not entered a standard value key in the work center (for example, for a statistical work center) then a standard values calculation cannot be carried out.

You can find more detailed information on work centers in the guide *PP - Work Centers*.

Routing

A routing and its objects contain all the information required to describe a production process. The most important routing objects are operations, sub-operations, sequences of operations, material components, PRTs and inspection characteristics.

For additional information about routings, refer to the *PP - Routings* guide.

You can maintain the standard values in the operation and the sub-operation of the routing. The standard values were defined in the work center using the standard value keys. For each of the standard values you can also carry out a standard values calculation using CAPP. You can manually select processes and methods from the routing or else let the system do it automatically.

The system transfers a calculated standard value in the routing into the standard value field that was defined in Customizing using the **value type** (see [Value Types \[Page 21\]](#)). You must take into account which maintenance rule is given in the work center (that is, whether you can, may or must maintain the standard value). You can overwrite the calculated value.

You can find more details in [Sub-calculations \[Page 28\]](#).

Sub-calculations

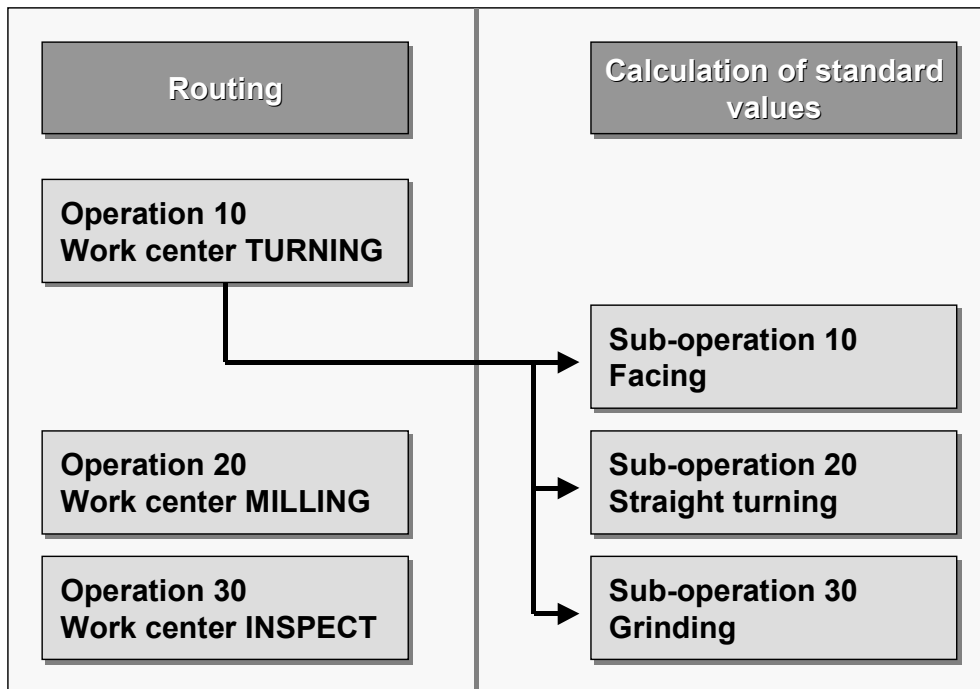
Sub-calculations

In the operation or sub-operation of a routing the standard values calculation can take place in several individual steps: the **sub-calculations**. For example, that may be necessary if a standard value is made up of several time segments (such as, setup time, primary processing time and secondary processing time).

Every sub-calculation is the result of a method calculation. If several sub-calculations exist, this may be because one and the same method has been calculated several times or because several different methods have been calculated. If only one method is evaluated in a standard values calculation, then the system only creates one sub-calculation.



If the same value type was calculated in several sub-calculations, then the calculated values of these sub-calculations are added and transferred to the relevant standard value field.



Working with CAPP

Individual **menus** were developed for each area that you can process using the R/3 System. You can select all the entries and evaluations required from the menu. You can also select particular functions using **function keys**.

CAPP Menu

To get to the initial menu for maintaining CAPP elements, select *Logistics* → *Production* → *Master data* → *CAPP standard values*.

The initial screen for CAPP has the following menu options:

- **Formula:** This menu option enables you to maintain formulas that can be used to calculate standard values. You can select whether you want to create, change or display a formula. From this menu option you are led in the following menus to further functions, for example, to characteristic maintenance.
- **Method:** This menu option enables you to maintain methods which can be used to calculate standard values. You can select whether to create, change or display a method.
- **Process:** This menu option enables you to maintain processes which can be used to calculate standard values. You can select whether to create, change or display a process.
- **Utilities:** This menu option enables you to simulate the standard values calculation and display the single-level usage of CAPP elements and characteristics.
- **Environment:** This menu option enables you to maintain work centers. You can choose whether to create, change or display a work center.

You also find non-application-specific menu options that are on every screen:

- **System:** This menu option enables you to create or delete sessions, maintain user defaults and process print orders.
- **Help:** This menu option enables you to look for documentation relating to specific terms or display the documentation for various applications.

Maintaining CAPP Elements

[Creating CAPP Elements \[Page 31\]](#)

[Creating Formulas \[Page 32\]](#)

[Creating Methods \[Page 37\]](#)

[Creating Processes \[Page 53\]](#)

[Changing CAPP Elements \[Page 58\]](#)

[Maintaining Technical Data in the Work Center \[Page 59\]](#)

Creating CAPP Elements

A small number of people should maintain the CAPP elements centrally. These centrally maintained elements can be used by any number of people.

The status of a CAPP element determines the extent to which a formula, method or process may be used for calculating standard values. If a CAPP element has the status "inactive", then it is marked for deletion and can no longer be used in other CAPP elements and for calculating standard values. If you still want to use it you must change the status.

You can find more details in:

[Creating Formulas \[Page 32\]](#)

[Creating Methods \[Page 37\]](#)

[Creating Processes \[Page 53\]](#)

Creating Formulas

Creating Formulas

Proceed as follows to create a formula:

1. From the main R/3 menu choose the menu options *Logistics* → *Production* → *Master data* → *CAPP standard values* and then *Formula* → *Create*.
2. Enter an alphanumeric key to identify your formula. You can specify a formula which has already been created and copy it to create another formula.
3. Press ENTER.
You reach the screen *Basic Data* where you can maintain the basic data for the formula and on which the following administrative data is displayed:
 - the date the formula was created
 - who created the formula
 - if the formula was changed, the date it was changed and the person who changed it
4. You must maintain the short text for the formula on the screen *Basic Data* and enter the following data:
 - *Sort string*: You can use the sort string to sort and search for CAPP elements. It is used in the matchcode, for example.
 - *CAPP planner*: Enter the person or group of people responsible for maintaining the CAPP elements and the technical data.
 - *Status*: The status specifies whether a CAPP element is created, active or inactive. A formula can only be used in a higher-level CAPP element (for example, in a method) if it has the status "created" or "active".

Inactive CAPP elements are marked for deletion. They will be deleted in a reorganization run. However, it is possible to activate an inactive CAPP element by changing its status, with the result that it can be used again.

You can find more details in:

[Entering a Formula String \[Page 34\]](#)

[Creating a Long Text for a Formula \[Page 33\]](#)

[Deleting Formulas \[Page 36\]](#)

Creating a Long Text for a Formula

Proceed as follows to enter a long text for a formula:

1. Select the menu options *Edit* → *Long text*.
You reach the SAP editor.
2. Enter the desired text.
3. Save the entered text by selecting the menu options *Text* → *Save*.

Entering a Formula String

Entering a Formula String

Proceed as follows to enter the formula string:

1. Select the menu options *Goto* → *Formula* or the relevant function key on the screen *Basic Data*.
You reach the screen *Formula*.
2. Enter the formula.
Three lines are available for the entry. The operators and functions you can use for the calculation are listed in the following table.
3. Press ENTER.
The system lists the characteristics you specified in the formula with the units of measurement, if necessary.

Possible Operators, Functions and Operands in Formulas

Operator	Meaning	Example
+	Add	A + B
-	Subtract	A - B
*	Multiply	A * B
/	Divide	A/B
**	Raise to the power of	A**B
=	Equals	
><, <>	Is not equal to	
<	Is less than	
>	Is greater than	
<=, =<	Is less than or equal to	
>0, =>	Is greater than or equal to	
AND	Logical AND	
OR	Logical OR	
NOT	Logical negation	

Function	Meaning	Example
ABS	Absolute amount	ABS(3-5) → 2
SIN	Sine	SIN(A)
COS	Cosine	COS(A)
TAN	Tangent	TAN(A)

Entering a Formula String

LOG	Natural logarithm.	LOG(A)
EXP	Power to base e	EXP(A)
SQRT	Square root	SQRT(A)
ROUND	Round up	ROUND(3.5) → 4
INT	Round down	INT(3.5) → 3
TRUNC	Without places behind the decimal point	TRUNC(3.5) → 3
MOD	Modulo, remainder after division	7 MOD 3 → 1
DIV	Integer division	A DIV B

Operand	Meaning
TRUE	Logically true
FALSE	Logically false

Entering a Characteristic Origin

You can enter the origin of individual characteristics both in formula maintenance on the screen *Formula* and in method maintenance on the screen *Maintain Charact. Structure*. However, entering the characteristic origin in the method has the advantage that you can maintain the corresponding rule at the same time.

You maintain the origin of individual characteristics in formula maintenance in exactly the same way as in method maintenance. Place the cursor on the characteristic line, for which you want to maintain the origin and proceed as described in [Maintaining Characteristic Origins \[Page 42\]](#).

Deleting Formulas

Deleting Formulas

You can delete a formula as follows:

1. When changing a formula: select the menu options *Formula* → *Delete* on the initial screen or on the screen *Basic data*.

The formula is physically deleted from the database.



You cannot delete the formula if it is being used.

2. Using the formula status:

Set the status of the formula to “inactive”. The formula can no longer be used. It will be deleted in the next reorganization run.

Creating Methods

In the method you enter the **value type** to be calculated and the **unit** in which the method result is to be calculated.

Proceed as follows to create a method:

1. In the main R/3 menu choose *Logistics* → *Production* → *Master data* → *CAPP standard values* and then *Method* → *Create*.
2. Enter the key for the method that you want to create. Then specify the CAPP element from which you want to copy the basic formula, that is, the upper-most element of your method. If you enter a formula this formula is used as the basic formula. If you enter a method the basic formula of this method is copied into the new method.
3. Press ENTER.

You reach the screen *Basic Data* where you can maintain the basic data for the method and where the following administrative data is displayed.

- the date the method was created
- who created the method
- if the method was changed, the date it was changed and the person who changed it

You can find more details in:

[Maintaining Basic Data \[Page 38\]](#)

[Displaying and Maintaining the Characteristic Structure \[Page 40\]](#)

[Maintaining Default Values for Characteristics \[Page 41\]](#)

[Maintaining Validation Rules \[Page 47\]](#)

[Maintaining Search Rules \[Page 48\]](#)

[Maintaining Conversion Rules \[Page 49\]](#)

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[Creating a Long Text for a Method \[Page 51\]](#)

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Maintaining Basic Data

Maintaining Basic Data

The data that is proposed on the screen *Basic Data* depends on your entry on the initial screen and you can change this data.

If you have entered a **formula as a reference**, the following data is proposed on the screen *Basic data*:

- the short text for the formula
- the *Sort string*
- *CAPP Planner*

If you have entered a **method as a reference**, the following data from the method is proposed apart from the data mentioned above:

- *Value type*: Key used to specify the standard value in the routing into which the method result is to be transferred. In Customizing, you specify the standard value a value type corresponds to. By assigning the same value type to several methods (in the application) you specify that several results should be transferred to the same standard value. In this case, the intermediate results of the individual methods are added together.

A standard value is a parameter that is identified by the parameter ID. In Customizing, only parameter IDs with the following origin can be assigned to a value type:

- standard value



You cannot calculate value types for standard values if it was specified in the work center that they must not or should not be entered.

- General operation value if it relates to the break time, the maximum wait time, the minimum wait time or the normal queue time.
- User field from the operation



If you want to calculate one of the possible general operation values or a user field using a standard values calculation, you should first enter the desired unit on the operation detail screen.

- *Unit of the value type*: specify the unit in which the method result is to be calculated
The method result and the parameter ID must have the same **dimension**. If they have different **units**, then the result is displayed in the unit of the parameter ID.
- *Base quantity*: Specify the quantity for which the value calculated with this method applies.



If the base quantity of the operation deviates from that of the method, then the method result calculated is converted to the base quantity of the operation during a standard value calculation.

- *Unit of the base quantity*: enter the unit of the base quantity to which the method refers.

Maintaining Basic Data

You can change this data. However, you cannot change the basic formula.



In superior CAPP elements (for a method that means in a process) you can only use the CAPP elements that have the status “creating” or “active”.

Displaying and Maintaining the Characteristic Structure

Displaying and Maintaining the Characteristic Structure

Proceed as follows to display the characteristic structure of the method:

1. Select the menu options *Goto* → *Charact. structure* or the relevant pushbutton on the screen *Basic Data*.

You reach the screen *Maintain Charact. Structure*.

The system displays the hierarchical structure of the method by specifying the individual characteristics in the method and their level in the hierarchy. The level number increases when a formula or a table is referred to. If a formula is referred to, the characteristics in the formula are displayed. If a table is referred to, the key fields in the table are displayed.



Even if a characteristic in the structure occurs several times it is only displayed once.

2. If you want to display the hierarchical structure in a graphic, select the menu entries *Goto* → *Graphic display..* or the relevant pushbutton.

Maintaining Default Values for Characteristics

To reduce the number of entries required to calculate standard values, you can predefine default values for characteristics. These values are proposed during characteristic value assignment but you can change them. If you want to carry out an automatic simulation or standard values calculation then the system accesses these values.

Default values that you define in method maintenance are method-specific. Default values that you define from within formula maintenance or in characteristic maintenance are valid **generally**.

Proceed as follows to maintain a default value for a characteristic:

- If you want to maintain a default value for a characteristic from within formula maintenance, select the menu options *Environment* → *Characteristic* → *Create* or *Change* on the screen *Formula*. You reach the initial screen for characteristic maintenance.
- If you want to maintain a default value for a characteristic from within method maintenance, position the cursor on the corresponding line and select the menu options *Edit* → *Default value* on the screen *Maintain Charact. Structure*. You reach the screen *Overwrite Characteristic: Allowed Values*.
- If you want to maintain a default value for a characteristic within characteristic maintenance, position the cursor on the corresponding line and select *Logistics* → *Central functions* → *Classification* and then *Characteristic* → *Create* or *Change*. You reach the initial screen for characteristic maintenance.

You should consider the following when you specify default values for a characteristic:

- On the screen *Allowed Values*, you can specify one or more allowed values for a characteristic.
- If you have specified allowed values for a characteristic, you can only enter different values for characteristics during the simulation or standard values calculation if you have set the indicator *Additional values* on the screen *Allowed Values*.
- You can mark one of the allowed values as a default value on the screen *Allowed values* by setting the indicator *D* (default) for that value.
- If several default values are to be valid for a characteristic, then you must set the indicator *Multiple Values* on the screen *Basic Data* in characteristic maintenance.

You can find more information on characteristic maintenance in the guide *Characteristics*.

Maintaining Characteristic Origins

Maintaining Characteristic Origins

If you want to specify the origin of a characteristic, go to the screen *Maintain Charact. Structure* in method maintenance and place the cursor on the relevant characteristic line. The rest of the procedure depends on the origin that you want to maintain. You have the following options for the origin:

- Manual entry (see [Entering Characteristics Manually \[Page 43\]](#))
- Formula (see [Determining Characteristics using a Formula \[Page 44\]](#))
- Table (see [Determining Characteristics using a Table Field \[Page 45\]](#))

Entering Characteristics Manually

If you do not enter an origin for a characteristic, you can enter a value for this characteristic when carrying out a simulation or a standard values calculation.

Determining Characteristics using a Formula**Determining Characteristics using a Formula**

If the value of the characteristic is to be determined by a formula, proceed as follows:

1. Select the menu options *Edit* → *Origin* → *Formula* on the screen *Maintain Charact. Structure*, or press the relevant function key.

You reach the dialog box *Characteristic Origin: Formula*.

2. Enter the formula used to calculate the characteristic value and press ENTER.

Determining Characteristics using a Table Field

The value of a characteristic can be determined using a table field. The following types of table can be used.

- Normal tables
- Table for a work center
- Database tables

Normal tables/tables for work centers

If you want to enter a normal table or a table at a work center as an origin and specify a table field, proceed as follows:

1. Select the menu options *Edit* → *Origin* → *Table*, or press the relevant function key.
You reach the dialog box *Characteristic Origin: Table Selection*.
2. Enter the name of the table used to calculate the characteristic value and press ENTER.
You reach the dialog box *Maintain field allocation*. The fields of the table which you already specified are displayed on this dialog box. The system also indicates whether the field is from the key field section or the function field section of the table.



If you first want to display possible tables, press the pushbutton *Table selection*. Tables are displayed that were first used in the standard values calculation.

3. On the dialog box *Maintain field allocation* place the cursor on a table field from the function section of the table, whose value is to be transferred to the characteristic. Press the pushbutton *Select*.



If you have entered a table as origin, but not maintained any field allocation, or if you wish to change a field allocation, select the menu entries on the screen *Maintain Charact. Structure*.

Database tables

You can use database tables to access fields from master data to determine the characteristic. You can access the database tables of the following objects.

- Material master
- BOM
- Task list header
- Operation

You can also access the database table for the material-specific detail data for the operation.

If you want to define one of these origins, proceed as follows:

Select the menu entries *Edit* → *Origin* → *BOM* or *Material master* or *Data f tsk.lst.head*. or the detail data for the operation.

Determining Characteristics using a Table Field

The system checks whether the characteristic has been assigned to a field in the database table that belongs to the origin. If the assignment already exists then the field is automatically taken over. If there is no assignment then you reach the dialog box *Maintain field assignment* on which the field of the corresponding database table are displayed, and you can select the desired field. The rest of the procedure corresponds to that where the origin is a normal table/table for a work center.



The system automatically assigns the database rule for the origins “BOM” and “Material master” depending on the menu entry chosen.

Possible entries for the origin “table”

You can use the following possible entries on the screens *Maintain Charact. Structure* and *Display Charact. Structure* specifically for the origin “Table”:

- If the cursor is placed on *Object* and you have entered a table, then the short text of the table entered is displayed.
- If the cursor is placed on *Field* and you have entered a table name and a field name, then the fields in the table are listed.
- If the cursor is placed on *Field* and you have entered a table name but no field name, then the fields in the table are listed.

Maintaining Validation Rules

Proceed as follows to enter a validation rule for a characteristic in method maintenance:

1. Place the cursor on the characteristic line on the screen *Maintain Charact. Structure* and select the menu options *Edit* → *Rules* → *Validation rule*.
You reach the dialog box *Maintain Validation Rule*.
2. Enter the relational operators and the corresponding values and press ENTER.
The validation rule is allocated to the characteristic.
3. If you want to delete the existing validation rules, press the function key Delete rule in the dialog box *Maintain Validation Rule*.

Maintaining Search Rules

Maintaining Search Rules

Proceed as follows to enter a search rule for a characteristic in method maintenance:

1. On the screen *Maintain Charact. Structure* place the cursor on the line of a characteristic for which the origin "Table" is maintained. Select the menu options *Edit* → *Rules* → *Search rule*.

You reach the dialog box *Maintain Key Fields*. The key fields are listed here for the table.

2. Enter the relational operators for the key fields, and press ENTER. If you have not entered a relational operator for one of the key fields, then the system sets it to "EQ".

The search rule is assigned to the characteristic.



If, during a later calculation the system does not find a value that corresponds to the criteria, then it assigns the value zero to numerical fields insofar as this is mathematically possible. For non-numerical fields the initial value is used for further calculations.

3. To delete existing search rules, press Delete rule in the dialog box *Maintain Key Fields*.

Maintaining Conversion Rules

If you want to determine the characteristic value from a matrix table, enter a conversion rule together with the name of the matrix table. Proceed as follows:

1. Place the cursor on the relevant line on the screen *Maintain Charact. Structure* and select the menu options *Edit* → *Rules* → *Conversion rule*.

You reach the dialog box *Maintain Conversion Rule*.

2. Enter a matrix table and define the relational operator using the processing indicator. For the operator "LE" conversion is performed to the next smallest value.



If, during a later calculation, the system cannot find a value corresponding to the criteria then the system puts a message in the log.

3. Press ENTER.

The conversion rule is allocated to the characteristic.

4. If you want to delete existing conversion rules, choose Delete rule on the screen *Maintain Conversion Rules*.



In the case of search rules, an origin (in this case, the table) has to be maintained first. If you want to maintain validation rules or conversion rules for characteristics you need not have previously entered the characteristic origin.

Using Other Display Functions

Using Other Display Functions

This section describes the display functions that you can call up on the screens *Maintain Charact. Structure* or *Display Charact. Structure*.

Proceed as follows to display the contents of a table:

1. Select the menu options *Extras* → *Tables* → *Table content*.
You reach table maintenance.
2. Select the menu options *Table* → *Display or Table* → *Maintain* or the corresponding function key.
The system displays the content of the table.

Proceed as follows to display the structure of a table:

1. Select the menu options *Extras* → *Tables* → *Table structure...*
You reach the dialog box *Display Table Structure According to Data Dictionary*. You see the following data:
 - field names
 - whether a field is a key field
 - data format
 - field length
 - number of decimal places
 - characteristic description

Proceed as follows to display the permitted values for the characteristic:

Select the menu options *Environment* → *Display charact.*

You reach the screen *Print Characteristic Data*, on which all the data relevant for the characteristic (for example, the format and the allowed values) is displayed.

Proceed as follows to display the default values maintained for a characteristic:

Select the menu options *Extras* → *Displ. default value*.

You reach the screen *Display Overwritten Characteristic: Allowed Values*. The system lists the characteristics with the allowed values.

Proceed as follows to display a rule maintained for a characteristic:

Choose the menu options *Extras* → *Display rules*.

You reach a dialog box where you see the following data depending on the existing rule:

- Validation rule: processing indicator and values
- Search rule: key fields for the table and the relevant search rule
- Conversion rule: matrix table, its meaning and the processing indicator

Creating a Long Text for a Method

Proceed as follows to create a long text for a method:

1. On the screen *Basic Data* select the menu options *Edit* → *Documentation*.
You reach the SAP editor.
2. Enter the desired text.
3. Save the text entered by selecting the menu options *Text* → *Save*.

Deleting Methods

Deleting Methods

You can delete a method in the following ways:

- When changing a method: For example on the initial screen or the screen *Basic Data* select the menu options: *Method* → *Delete*.

The method is physically deleted from the database.



If the method is being used, then it cannot be deleted.

- Using the method status: Set the method status to “inactive”. The method can no longer be used. It will be deleted in a reorganization run.

Creating Processes

Proceed as follows to create a process:

1. In the main R/3 menu choose *Logistics* → *Production* → *Master data* → *CAPP Standard values* and then *Process* → *Create*.

You reach the screen *Initial Screen*.

2. Enter the name of the process that you want to create.

If you want to copy data from an existing process, you must enter it in the field *Copy from Process*. In this case the basic data and any allocated methods are transferred to the new process. You can change the data.

3. Press ENTER.

You reach the screen *Basic Data*, where you can maintain basic data for the process and on which the following administrative data is displayed:

- the date the process was created
- who created the process
- if the process was changed, the date it was changed and the person who changed it

You can find more details in:

[Maintaining Basic Data \[Page 54\]](#)

[Allocating Methods \[Page 55\]](#)

[Creating a Long Text for a Process \[Page 56\]](#)

[Deleting Processes \[Page 57\]](#)

Maintaining Basic Data

Maintaining Basic Data

You can enter a short text for the process on the *Basic Data* screen. You can also maintain a sort string, the CAPP planner, the status and catchwords. In a later release you can use the catchword entered to classify the processes.

If at least one method is allocated to the process and if a text has already been created for the process, then the indicator *Process text* is set. The name of the process, the short text and the characteristics of the allocated methods are displayed in a process text. You can create a process text in two ways:

- Select the menu options *Extras* → *Process text* or the function key *Process text*. You reach the SAP editor. Enter the desired text. Save the text you have entered by selecting the menu options *Text* → *Save*.
- If you want the system to create a process text select the menu options *Extras* → *Generate process txt*. The system creates the process text and you can change and add to it. To change the process text, select the menu options *Extras* → *Process text*.



The system can only generate a process text if at least one method is allocated to the process.

If the indicator *Process text* is set, then you can set the indicator *Text generation*. This has the effect that a process text is generated when a standard values calculation or a simulation takes place. In a standard values calculation the process text can be transferred into the operation text.

Allocating Methods

Proceed as follows to allocate methods to the process:

1. On the screen *Basic Data* select the menu options *Goto* → *Method allocation* or the corresponding pushbutton.
You reach the screen *Method Allocation*.
2. Enter the methods that are to be calculated using this process and press ENTER.
The system displays which value types are calculated using the allocated methods.
3. Indicate which methods the system is to take into account during an automatic standard values calculation or simulation (that is, a standard values calculation or simulation in the background) by setting the **standard indicator**.

Sorting Allocated Methods

You can sort methods that are allocated to a process on the screen *Method Allocation* according to two criteria:

- Alphabet: Select the menu options *Edit* → *Sort alphabetically*. The methods are sorted alphabetically.
- Standard indicator: Select the menu options *Edit* → *Sort. acc. to std. ind.* The methods, for which the standard indicator is set, are displayed first on the screen *Method Allocation*.

Creating a Long Text for a Process

Creating a Long Text for a Process

Proceed as follows to create a long text for a process:

1. Select the menu options *Edit* → *Long text* on the screen *Basic Data*.
You reach the SAP editor.
2. Enter the desired text.
3. Save the text you have entered by selecting the menu options *Text* → *Save*.

Deleting Processes

You can delete a process in one of the following ways:

- When changing a process: On the initial screen or on the *Basic Data* screen select the menu options *Process* → *Delete*.

The process is physically deleted from the database.



If the process is used, then it cannot be deleted.

- Using the process status: Set the process status to *inactive*. The process can no longer be used. The process is deleted in a reorganization run.

Changing CAPP Elements

Changing CAPP Elements

If you want to change the data relating to a CAPP element, select the same menu options as when you create the CAPP element. However, instead of the menu option *Create*, select the menu option *Change*.

If a CAPP element is already being used, then only limited changes can be made to it. You can only change the following fields on the screen *Basic Data*:

- Short text
- Status
- CAPP planner
- Sort string

Maintaining Technical Data in the Work Center

To carry out a standard value calculation with CAPP, you must maintain technical data in the work center. You can maintain the technical data when **creating** and when **changing** a work center.

You can find more detailed information on creating and changing work centers in the document *PP - Work Centers*.

Proceed as follows to maintain technical data for a work center:

1. In the main R/3 menu choose *Logistics* → *Production* → *Master data* → *CAPP standard values* and then *Environment* → *Change work center* or *Logistics* → *Production* → *Master data* → *Work centers* and then *Work center* → *Change*.
You reach the initial screen of work center maintenance.
2. Enter the *Plant* and the key to the work center for which you want to maintain the technical data.
3. Select the menu options *Goto* → *Technical Data*.
You reach the screen *Technical Data* where the number of processes that have already been allocated is displayed.
4. Maintain the following technical data:
 - *Machine type*: The machine type is used to group together work centers with the same technical data (for example, lathes or drills).
 - *Sort string*: You can sort and search for CAPP elements using the sort string. For example, the sort string is used in the matchcode.
 - *CAPP planner group*: Enter the person or group of people responsible for maintaining the CAPP elements and technical data.
5. Enter the key for rounding and additional values. This key determines the way in which numbers are rounded and additional values are dealt with, for example, whether numbers are rounded up or down and whether rounding takes place before or after adding additional values.

Allocating Processes

Allocating Processes

Proceed as follows to allocate processes to the work center:

1. On the screen *Technical Data* select the menu options *Extras* → *Process allocation* or the appropriate function key.
You reach the screen *Process allocation*.
2. Enter the processes that you want to allocate to the work center.
If you want a process to be used in the automatic calculation of standard values or in an automatic simulation, set the standard indicator for this process.
3. Save your entries by selecting the menu options *Work center* → *Save*.

Calculating Standard Values with CAPP

[Simulating a Standard Values Calculation with CAPP \[Page 62\]](#)

[Calling up a Simulation \[Page 63\]](#)

[CAPP Calculation of Standard Values in Routings and Reference Operation Sets \[Page 73\]](#)

[Standard Values Calculation with CAPP on Order Creation \[Page 79\]](#)

[Link to Configuration \[Page 80\]](#)

Simulating a Standard Values Calculation with CAPP

Simulating a Standard Values Calculation with CAPP

Standard values are calculated with CAPP and transferred to the routing. You can use a simulation to test the formulas, methods and processes you have created without the system saving the data you entered or the calculated results. The simulation calculates the method result.

You can find more details in [Calling up a Simulation \[Page 63\]](#).

Calling up a Simulation

You can start a simulation as follows:

- From the main R/3 menu:
Choose *Logistics* → *Production* → *Master data* → *CAPP standard values* and then *Utilities* → *Simulation*.
- When changing or displaying a formula, a method or a process:
Choose the menu options *Environment* → *Simulation*.
- From within work center maintenance:
On the screen *Process Allocation* choose the menu options *Environment* → *Simulation*.

You reach the screen *Simulate Calculation of Standard Values: Initial Screen*. Enter the following data:

- The *Plant* and the *Work center*, for which you want to carry out a simulation. You must enter this data for a simulation. If no process is allocated to the work center, you must also enter a process on the initial screen.
 - The *Process* for which you wanted to carry out the simulation. If no methods are allocated to this process then you must also enter the method that is to be tested on the initial screen.
- If you have specified a process then that is the one the system uses, even if one or more processes are allocated to the work center.
- The *Method* you want to calculate using the simulation. If you have specified a process to which a method is allocated, then you need not specify a method.

If you have specified a method then that is the one the system always uses. This is also the case if:

- one or more methods are allocated to the work center using a process
- one or more methods are allocated to the specified process.



Any number of method calculations can be simulated. The work center and the method entered for the simulation need not be linked to one another.

Specify whether the simulation is to be **manual** or **automatic**. With an automatic simulation the calculations take place in the background.

You can find more details in:

[Checking CAPP Elements \[Page 64\]](#)

[Carrying out a Manual Simulation \[Page 65\]](#)

[Carrying out an Automatic Simulation \[Page 72\]](#)

Checking CAPP Elements

Checking CAPP Elements

You can check CAPP elements in a simulation. The system checks, for example, whether the method entered calculates a value type to which a standard value at the work center is allocated or whether the CAPP elements entered have already been released.

You check a CAPP element as follows:

On the initial simulation screen choose *Extras* → *Check CAPP elements*.

When you call up the standard values calculation from the routing the system checks CAPP elements automatically.

Carrying out a Manual Simulation

This is how you carry out a manual simulation:

1. Call up the simulation. In this connection read [Calling up a Simulation \[Page 63\]](#) When you have maintained the data on the initial screen, press ENTER.
2. Maintain the data and press ENTER.

Where do you get to after the initial screen?

If you	and	you reach the screen
have entered a work center but neither a process nor a method	several processes are allocated to the work center	<i>Process Selection</i>
have entered a process	several methods are allocated to the process	<i>Method Selection</i>
have entered a process or a method	only one method is allocated to the process	<i>Char. Val. Assigmt</i>

You can find more details in:

[Selecting Processes and Methods \[Page 66\]](#)

[Assigning Values to Characteristics \[Page 67\]](#)

[Displaying the Simulation Results \[Page 68\]](#)

[Displaying Sub-calculations \[Page 69\]](#)

[Recalculating Methods \[Page 71\]](#)

Selecting Processes and Methods

Selecting Processes and Methods

If you have maintained the data on the initial screen, then in a manual simulation the system passes through all the relevant screens

If you are on the screen *Process Selection*, proceed as follows:

1. Select the process(es) for which you want to carry out the simulation.
2. If you want to select all the processes for which the standard indicator is set, choose *Edit* → *Select* → *Select std. ind.*
3. Select *Goto* → *Next screen*

Depending on whether you have to select a method, you reach the screen *Method Selection* or *Char.Val. Assigmt.*

If you are on the screen *Method Selection*, proceed as follows:

1. Select the method or methods that you want to calculate in the simulation.
2. If you want to select all the methods for which the standard indicator is set, choose *Edit* → *Select* → *Select std. ind.* You can also enter how often values are to be assigned to the characteristics in the methods and how often the methods are to be calculated.
3. Select *Goto* → *Next screen*.

You reach the screen *Char.Val.Assigmt.*

You can find more details in [Assigning Values to Characteristics \[Page 67\]](#).

Assigning Values to Characteristics

The system displays the work center, the process, the method and the value type to be calculated on the screen *Char. Val. Assgmt.* You can maintain the values for the characteristics here that are needed for the method calculation.

The system displays default values for characteristics that you have maintained in the method or in characteristic maintenance and you can change these values, if necessary (see also [Maintaining Default Values for Characteristics \[Page 41\]](#)).

If there are one or more characteristics to which you have not assigned a value, then the system calculates using the value zero in the case of numerical fields if mathematically possible.

You can find more information on characteristic value assignment in the document *The Classification System*.

If you have assigned values to the characteristics, press the function key `Next` screen. You reach the screen *Method Result*.

You can find more details in [Displaying the Simulation Results \[Page 68\]](#).

Displaying the Simulation Results

Displaying the Simulation Results

The system displays the following data on the *Method Result* screen:

- work center
- sub-calculation
- process
- method
- method result
- characteristic values

You display the simulation results as follows:

Select the menu entries *Goto* → *Next screen* or the appropriate menu symbol.

What screen do you reach?

If	you reach the screen
at least one further method is calculated	<i>Char.Val.Assgmt.</i> Enter the values for the next method calculation.
no other methods are calculated	<i>Sub-calculations.</i>

Further navigation in the system depends on whether several methods are to be calculated one after the other or not:

- If at least one further method is to be calculated then you reach the screen *Char.Val.Assgmt.* Enter the values to calculate the next method.
- If no further method is to be calculated then you reach the screen *Sub-calculations.*

You can find more details in [Displaying Sub-calculations \[Page 69\]](#).

Displaying Sub-calculations

On the screen *Sub-calculations* you get an overview of the calculated methods and their results. The system displays the following data:

- Number of the sub-calculation
- The method, its description and the value type it is used to calculate
- The type of process text generation
- Method result calculated and its unit



The interval for numbering the sub-calculations is defined in Customizing for CAPP.

Displaying Generated Process Text

On the screen *Sub-calculations* the key *T* (text generation) is used to indicate whether a process text has been generated for a sub-calculation and if so how. The following options exist:

0. No text is saved in the process
1. The system generated the process text
2. The process text exists but no texts were replaced by text symbols
3. The process text exists but the indicator *Text generation* has not been set in the process

You display a process text as follows:

From the screen *Sub-calculations* choose *Edit* → *CAPP texts* and:

- *Text per sub-calc.*, if you want to display the process text for a sub-calculation
- *Text per operation*, if you want to display the process text for an operation in the routing or production order.



When the process text is displayed the texts for the individual sub-calculations are separated by text separators. These are maintained in Customizing for CAPP and given the indicator *IL*.

Types of Display of Method Results

On the screen *Sub-calculations* you can display the results of method calculations in various forms:

- **Totals per standard value:** the results of the calculations of several value types can be added to the same standard value. Choose *Extras* → *Totals per std.val.* on the screen *Sub-calculations*. You reach the dialog box *Totals per Standard Value*.

The system displays the standard values (defined using the standard value key in the work center), the sum with the unit belonging to it, the additional value and the rounded sum.

Displaying Sub-calculations

- **Totals per value type:** If you want to display the result of the calculation for the various value types, select the menu options *Extras* → *Totals per val. type*. You reach the screen *Totals per Value Type*.

You see the calculated value types and for every value type the sum with the unit that belongs to it.

You can find more details in [Recalculating Methods \[Page 71\]](#).

Recalculating Methods

You assign characteristic values again for a new calculation as follows:

On the screen Method result:

choose *Edit* → *New charact. values*.

you reach the screen *Char.Val.Assgmt.* and can enter new values for the characteristics.

On the screen *Sub-calculations*:

1. Choose the method that you want to recalculate
2. Choose *Edit* → *New charact. values*.

You reach the screen *Char. Val.Assgmt.* and can enter new values for the characteristics.

Carrying out an Automatic Simulation

Carrying out an Automatic Simulation

An automatic simulation takes place in the background. It corresponds to the procedure for a simulation with manual entry. The system only takes the following CAPP elements into account:

- **Processes** that are marked with the standard indicator in the work center. If there is no standard indicator next to any of the processes in the work center, then you must explicitly enter a process on the initial screen for simulations.
- **Methods** that are marked in a process with the standard indicator. If there is no standard indicator set against any of the methods, then you must explicitly enter a method on the initial screen for simulations.

CAPP Calculation of Standard Values in Routings and Reference Operation Sets

You can carry out a CAPP calculation of standard values when changing or creating a **routing** or a **reference operation set**. You can call it up from the following screens:

- from the operation overview
- from the operation detail screen
- from the object overview



To carry out a CAPP standard values calculation for an operation, at least one process must be allocated to the work center where the operation is carried out.

You can find more details on routing maintenance in the document *PP - Routings*.

You should take the following points into account:

- Messages that the system issues during the standard values calculation are collected up in a log. You can call up the log by selecting *Extras* → *Display log* on the screen *Method Result*.
- The standard values that were calculated using CAPP are displayed in the routing, usually on the operation detail screen in the section *Standard values*. However, you can also display them in user-specific fields or in the following general operation data.
 - Normal queue time
 - Break time
 - Minimum wait time
 - Maximum wait time

By assigning the parameter ID to a value type in Customizing for CAPP you use the parameter origin to specify the field in which a standard value calculated by the system is displayed.



If you want to carry out a standard values calculation to calculate one of the possible general operation values or a user field, first enter the desired unit on the operation detail screen.

- After the standard values calculation has been carried out, the system displays the year of the standard values calculation and indicates that the standard values were calculated using CAPP. This information appears in the routing, on the operation detail screen in the section *Standard values calculation*. The standard value determination type must be defined in Customizing for CAPP.
- The indicator *CAPP text created* in the section *CAPP* on the operation detail screen in the routing indicates whether a CAPP process text was created for the operation.

You can find more details in:

[Carrying out a Standard Values Calculation \[Page 75\]](#)

CAPP Calculation of Standard Values in Routings and Reference Operation Sets

[Standard Values Calculation with Automatic Selection \[Page 76\]](#)

[Standard Values Calculation with Manual Selection \[Page 77\]](#)

[Displaying Calculation Details \[Page 78\]](#)

Carrying out a Standard Values Calculation

Proceed as follows to carry out a standard values calculation in the routing:

1. Call up the operation overview.
2. Select the operation(s) for which you want to carry out a standard values calculation.

If CAPP data already exists for one of these operations, then the system displays a message. In this case you can only carry out a manual standard values calculation.



If you want to carry out a standard values calculation again for an operation for which standard values already exist, then the existing standard values for the operation are deleted. The new values are transferred into the routing according to their value type.

3. Choose *Extras* → *CAPP*, and specify whether the selection of processes and methods is to be manual or automatic.

You can find more details in:

[Standard Values Calculation with Automatic Selection \[Page 76\]](#)

[Standard Values Calculation with Manual Selection \[Page 77\]](#)

[Displaying Calculation Details \[Page 78\]](#)

Standard Values Calculation with Automatic Selection

Standard Values Calculation with Automatic Selection

If you want to carry out the standard values calculation **with automatic selection**, you should consider the following points:

- With automatic selection, the calculation takes place in the background. The system only branches to the screen *Char. Val. Assgmt.* if there are no values for one or more characteristics. Then you can assign values to the characteristics for the relevant method on the screen *Char. Val. Assgmt.*
- During an automatic calculation the system only uses those processes and methods which are marked with the standard indicator.
- If inconsistencies occur during the automatic calculation of standard values for an operation, then the system interrupts the process. Then you can continue the standard values calculation manually. If you have selected further operations for the standard values calculation, then you can continue the standard values calculation automatically for the next operation by selecting *Extras* → *Continue - aut. sel.*

Standard Values Calculation with Manual Selection

If several processes are allocated to the work center where the operation is carried out, then on manual selection you reach the screen *Process Selection*. Here, all the processes allocated to the work center are available. Select the desired process and press the pushbutton *Next* screen.

The selection of methods and the assignment of characteristic values takes place on the screens *Method Selection* and *Char. Val. Assgmt.* just as in a simulation. You can find more details in [Simulating a Standard Values Calculation with CAPP \[Page 62\]](#).

The system displays the result of the standard values calculation on the screen *Method Result* in CAPP. If you have carried out one or more calculations, the results of these calculations are displayed on the screen *Sub-calculations*.

Displaying Calculation Details

Displaying Calculation Details

If you want to display the results of one or more method calculations for one or more operations, proceed as follows:

1. Select the operation(s) for which you want to display the calculation details.
2. Choose *Extras* → *CAPP* → *Display*, for example, on the screens *Operation Overview* or *Operation Details*.

You reach the screen *Sub-calculations* which displays the individual method results for the first operation selected.

3. If you want to display the calculation details for the next operation selected, choose *Goto* → *More* → *Next operation* or the relevant function key.

Standard Values Calculation with CAPP on Order Creation

In the routing you can specify whether and how a CAPP standard values calculation is to be carried out on order creation. To do this maintain the following keys:

- *CAPP order*:

You find this key on the screen *Header Details* in the section *Control*. It specifies whether standard values are to be recalculated on order creation and for which order categories. You can choose between the order categories “production order” and “planned order” or a calculation for both order categories.



If you have used the key *CAPP order* to specify that a standard values calculation is to be carried out on order creation, then you must also maintain the key *CAPP prod. order* on the screen *Operation Details* for the individual operations for which standard values are to be calculated.

If there are already calculated standard values in the routing and

- if you have maintained the key *CAPP order*, then the existing data is recalculated on order creation and, if necessary, updated for the order. The data in the routing remains unaffected.
 - if you have not maintained the key *CAPP order*, then the data already calculated in the routing is transferred to the order.
- *CAPP prod. order*:

You find this key in the section *CAPP* on the screen *Operation Details*. It specifies whether the standard values calculation is to be carried out for the operation and whether it is to take place online or in the background. The key *CAPP prod. order* is, however, only taken into account if the key *CAPP order* is maintained on the screen *Header Detail*.



With planned orders the calculation always takes place in the background even if the key *CAPP prod. order* specifies an online calculation.

Link to Configuration

Link to Configuration

The CAPP standard values calculation is linked to the configuration. This means it is also possible to calculate CAPP values on order creation for configurable operations, that is, operations for which object dependencies are maintained.

The aim is to transfer the characteristic values that were entered for the selection of the operations to the standard values calculation. This reduces the work required to enter data since the characteristics that are required, for example, for calculating a setup time or a primary processing time in CAPP, already had a value assigned in the configuration.

The procedure is as follows:

1. Create a customer order for the configurable material. If there are several classes with the class type 300 (configurable material) for the material, then you reach a dialog box on which you can select the desired class.

You reach characteristic evaluation for the characteristics of all the classes with the class type 300 which are allocated to the material.
2. Evaluate the characteristics in the customer order for
 - the selection of the operation in the routing and the BOM items
 - the calculation of standard values with CAPP
3. Maintain the object dependencies in the routing for the configurable operations.
4. Maintain the key *CAPP order* in the routing on the screen *Header Detail*, if a standard values calculation is to be carried out when the production order is created.
5. Specify whether the standard values calculation is to be carried out online or in the background for the configurable operations. You do this with the key *CAPP Production order* on the operation detail screen.
6. Create the production order for the configurable material relating to a customer number and an item number.

The system searches for the operations on the basis of characteristic values.
7. If you have specified a standard values calculation online for one or more of the operations then you reach the appropriate screens.

The result of the CAPP standard values calculation is displayed for the appropriate operations on the operation detail screen.

Managing CAPP Data

[User Master Record \[Page 82\]](#)

[Where-used List \[Page 83\]](#)

User Master Record

User Master Record

A user can only access the SAP System if there is an appropriate user master record. A user master record defines the authorizations assigned to a user. Your system administrator is responsible for maintaining the user master record and assigning authorizations. You assign authorizations in Customizing.

Authorization Checks

A user's access to CAPP master data is affected by the **activity authorization**. The activities for CAPP elements are as follows: create, change, display and delete.

The authorization for carrying out a CAPP standard values calculation also depends on the **activity authorization**.



A user has authorization to create, change and display CAPP elements but does not have authorization to carry out a standard values calculation.

Where-used List

Where-used lists tell you which CAPP elements are used and where. The system generates **single-level** where-used lists, that is, lists which show the use of CAPP elements on the next higher level.

You can generate a single-level where-used list for the following components:

- characteristics
- formulas
- methods
- processes

You call up where-used lists as follows:

There are the following ways of calling up the where-used list:

- In the main R/3 menu choose *Logistics* → *Production* → *Master data* → *CAPP standard values* and then *Utilities* → *Sing-lev. where-used*
or
- call up the where-used list from CAPP element maintenance (for example, in change mode on the screen *Basic Data*). Choose *Environment* → *Where-used list*.

You reach the screen *Where-used lists for CAPP elements (single-level)*.

You can find more details in:

[Where-used List - Characteristic \[Page 84\]](#)

[Where-used List - Table \[Page 85\]](#)

[Where-used List - Formula \[Page 86\]](#)

[Where-used List - Method \[Page 87\]](#)

[Where-used List - Process \[Page 88\]](#)

[CAPP Elements With No Usage \[Page 89\]](#)

Where-used List - Characteristic

Where-used List - Characteristic

The where-used list for a characteristic shows you the formulas and methods in which the characteristic is used. On the screen *Where-used lists for CAPP elements (single-level)* enter the characteristic for which you want to display the usage and specify whether you want to display its usage in formulas and/or methods.

If you call up the where-used list from method maintenance, place the cursor on the line of the characteristic whose usage you want to see. In this case the system displays the name of the characteristic on the screen *Where-used lists for CAPP elements (single-level)*.

Where-used List - Table

The where-used list for a table shows you formulas and methods in which the table is used. On the screen *Where-used lists for CAPP elements (single-level)* enter the table whose usage you want to see and specify whether you want to see the usage of the table in formulas and/or in methods.

If you call up the where-used list from method maintenance, place the cursor on the characteristic line in which the table appears whose usage you want to see. The system transfers the name of the table onto the screen *Where-used lists for CAPP elements (single-level)*.

Where-used List - Formula

Where-used List - Formula

The where-used list for a formula shows you the other formulas or methods to which the formula is allocated. On the screen *Where-used lists for CAPP elements (single-level)*, state which formula's usage you want to see and whether you want to see the formula's usage in other formulas and/or methods.

Choose *Program* → *Execute*. The system displays a list of the formulas and methods in which the formula is used.

Where-used List - Method

The where-used list for a method shows you the processes to which the method is allocated. On the screen *Where-used lists for CAPP elements (single-level)* enter the name of the method.

If you call up the where-used list from method maintenance, you can position the cursor to specify whether the name of the method or that of one of the characteristics belonging to the method is displayed on the screen *Where-used lists for CAPP elements (single-level)*.

Choose *Program* → *Execute*. The system displays a list of processes in which the method is used.

Where-used List - Process

Where-used List - Process

The where-used list for a process shows you the work centers to which the process is allocated. On the screen *Where-used lists for CAPP elements (single-level)* specify the name of the process for which you want to generate a where-used list.

Choose *Program* → *Execute*. A list is displayed with the work centers at which the process is used.

CAPP Elements With No Usage

You can use the where-used list to display the formulas, methods and/or processes that, although existing in the system, are not used. That means that they are not allocated to any other CAPP element or work center. That has the advantage that you can get an overview of the unused CAPP elements before deleting them.

If you want to display CAPP elements which exist in the system but are not used, specify on the screen *Where-used lists for CAPP elements (single-level)* whether the system is to search for formulas and/or methods and/or processes.