

5 Steps to Understanding Product Costing-

Part 1 Cost Center Planning

Product Costing, part of the Controlling module, is *used to value the internal cost of materials and production for profitability and management accounting*. Product Costing is a niche skills and while highly integrated with other modules, many people avoid it due to the complexity. This 5 part blog will seek to simplify Product Costing.

The first step in understanding the basics of product costing is **Cost Center Planning**. The goal of cost center planning is to *plan total dollars and quantities in each Cost Center in a Plant*.

Prerequisites:

- Organizational Structure is configured:
 - Company Codes
 - Plants
- Master data is created
 - Profit Centers
 - Cost Centers
 - Primary and Secondary Cost Elements
 - Activity Types

Overview:

Cost Center dollars are planned by Activity Type and Cost Element in *Transaction KP06*. You can plan all costs in production cost centers where they will end up through allocations, or you can plan costs where they are incurred and use plan assessments and distributions to allocate.

Cost Center activity quantities are planned in by Activity Type in *Transaction KP26*. You can also manually enter an activity rate based on last year's actual values. It is a best practice to plan activity quantities based on practical installed capacity which accounts for downtime. If you plan at full capacity, plan activity rates will be underestimated.

Relatable Example:

Let's say we are using Product Costing to value our inventory in a cookie baking shop. This will help us value our cookies (finished good), frosting (semi-finished good), and baking items like eggs, milk, and sugar (raw materials).

In order to calculate costs, we need to come up with rates for each activity, such as mixing baking items, oven baking, and cookie cooling. Since a rate is a dollar per unit, we can either come up with a rate based on previous year's actual rates, or enter our total costs and total units.

Further information:

- You can customize layouts and user profiles to your needs.
- You can activate integrated Excel planning to see a spreadsheet instead of a fixed format.
- You can also configure the system to upload Excel files instead of typing in values.

In the next blog, I will explain how activity rates are calculated based on the plan Cost Center dollars and quantities. If rates are manually entered, activity rates do not need to be calculated, but there is a valuable report to review them prior to proceeding.

Product Costing, part of the Controlling module, is *used to value the internal cost of materials and production for profitability and management accounting*. Product Costing is a niche skills and while highly integrated with other modules, many people avoid it due to the complexity. This 5 part blog will seek to simplify Product Costing.

Now that you understand Cost Center Planning, the next step in understanding the basics of product costing is **Activity Rate Calculation**. The goal of Activity Rate Calculation is *to calculate the plan activity rates for each activity in each Cost Center in a Plant*.

Prerequisites:

- Cost Center Plans are entered:
 - Plan Costs in KP06
 - Plan Activity units in KP26

Overview:

Now that our *Cost Center dollars* and *activity quantities* are planned, we need to calculate Activity Type Rates. Activity Type Rates are used to value internal activities to produce products.

If you manually entered activity rates based on last year's actual values instead of planning total dollars and units. You can skip most of this blog, and simply review activity rates in Transaction KSBT. Note that you can use a mixed approach and plan rates for some activities/cost centers and calculate rates for others.

If you planned all costs in production cost centers where they will be allocated, you can skip the next step of plan allocations.

If you planned costs where they are incurred in overhead cost centers, you will need to use *plan assessments and/or distributions* to allocate costs. The specific details on Assessments and Distributions could be an entire blog in itself. The main difference between assessments and distributions is that distributions maintain the identity (primary cost element) of the cost. Assessments use Secondary Cost Elements which act as cost carriers to move costs, and therefore lose the identity (primary cost element) of the cost. You can choose to use Assessments or Distributions only, or use a mixed process. Plan Assessments and Distributions are created in Transactions KSU7 and KSV7 and executed in Transactions KSUB and KSVB.

After costs are allocated, it is important to review the Cost Center Actual/Plan/Variance report, Transaction S_ALR_87013611. Ensure that allocations credited sending cost centers and debited receiver cost centers.

Next, execute plan cost center splitting which splits costs when you have more than one activity type in a cost center and you want to split the costs between two activities based on activity qty or some other basis. This is a great place to use Cost Center groups to easily select desired cost centers since you cannot enter a range. Cost splitting uses Transaction KSS4.

Finally, Activity Type Rates are calculated using Transaction KSPI. If rates are undesirable, you can revise your cost center plans and recalculate rates. Rates are not final until you use them to calculate and release product costs. This is an iterative process, and it is expected that you will make several attempts at desirable rates.

After calculating Activity Type Rates, you can review rates in Transaction KSBT.

Relatable Example:

Let's say we are using Product Costing to value our inventory in a cookie baking shop. This will help us value our cookies (finished good), frosting (semi-finished good), and baking items like eggs, milk, and sugar (raw materials).

In order to calculate costs, we need to come up with rates for each activity, such as mixing baking items, oven baking, and cookie cooling. We planned overhead costs like our building rent, electricity, and baker wages at an overhead cost center. We need to allocate those costs to our production cost center in order to include those costs in our product cost.

Prior to calculating costs, let's assume there are some overhead costs in a cost center that should be split into multiple activities. Once we split these costs, then we calculate rates for activities. Now we have a dollar per unit for activities like indirect labor, direct labor, setup, and overhead to use in product costing.

Further information:

- You can use Cost Center Groups and Cost Element Groups to simplify selecting Cost Centers and Cost Elements in KSBT and KSPI and in other Cost Center/Cost Element Reports.
- You may find that your rates are not appearing for certain months, or that they are averaged over 12 months. Make sure you review the 'Period Overview' screen in Cost Center planning Transactions KP06 and KP26. This screen shows costs and units by each month.
- You can reverse Assessments and Distributions if results are undesirable.
- In theory, your plan Assessments and Distributions should match your actual Assessments and Distributions.

In the next blog, I will explain how production data like BOM's (Bills of Material), Routings/Master Recipes and Work Centers integrate with Product Costing.

Product Costing, part of the Controlling module, is *used to value the internal cost of materials and production for profitability and management accounting*. Product Costing is a niche skills and while highly integrated with other modules, many people avoid it due to the complexity. This 5 part blog will seek to simplify Product Costing.

The third step in understanding the basics of product costing is **Quantity Structure**. Quantity Structure enables you to *calculate the cogs of goods manufactured and cost of goods sold* for products based on the *BOM* and *Routing* (PP) or *Master Recipe* (PP-PI).

Prerequisites:

- Master data is created
 - Material Masters (including MRP, Accounting, Costing views)
 - Bill of Materials
 - Work Centers (with Cost Centers and Activity Types)
 - Routings (Production Planning) OR
 - Master Recipes (Production Planning- Process Industries)
 - Production Versions (optional)
 - Product Cost Collectors (PP-REM – Repetitive Manufacturing)

Overview:

Quantity Structure is an important concept in Product Costing because it is a key integration point between the Finance and Logistics modules in SAP. There are several components of Quantity Structure.

A material master is created for each product with a unique fit/form/function in a plant. The material master contains many views including Material Resource Planning (MRP) views, Accounting views, and Costing views. Two costing-relevant fields on the MRP 2 view are procurement type and special procurement key. The *procurement type* field indicates if a material is produced internally, purchased or both. The *special procurement key* further designates if a material is subcontracted, a phantom, purchased from another plant, etc. It is important that these two fields are correct when costing a material.

For each internally produced material, a *bill of materials* (BOM) is created. A BOM contains the component materials and quantities required to produce a finished or semi-finished good. The material cost of a product is calculated using the standard or moving average price of the BOM components depending on the price control (S for standard, V for moving average).

A work center (PP) or *resource* (PP-PI) identifies a machine or work area where a production process is performed. Each work center or resource utilizes a *standard value key* which is a unique set of *activities* related to a work center. I previously discussed *activity types* in part 1 of this blog series.

In addition to a BOM, a *routing or master recipe* is created to indicate the processes required to produce a material. In Production Planning (PP) manufacturing, a routing is made up of a series of operations that include work centers and activity quantities which define a production process. In Production Planning- Process Industries (PP-PI), a master recipe is used for batch-oriented process manufacturing. A master recipe contains the processes required for producing a material including the resources (instead of work centers) required for production.

Repetitive manufacturing utilizes *rate routings* and *product cost collectors*. *Product cost collectors* are created for each production version (see below) and capture costs per period rather than per order.

If there are multiple ways to produce a material including different material combinations or activities, production versions can be used. Production versions indicate a combination of a BOM and routing or master recipe required to produce a material. The first production version should be the most frequent or realistic.

Relatable Example:

Let's say we are using Product Costing to value our inventory in a cookie baking shop. This will help us value our cookies (finished good), frosting (semi-finished good), and baking items like eggs, milk, and sugar (raw materials).

In order to calculate costs, we need a list of ingredients (Bill of Material) and a recipe of steps to follow (Routing or Master Recipe). There may be several ways that we can bake the same cookie by substituting ingredients or baking in different ovens, so we can have several versions of our ingredients and recipe (Production Version). In order to accurately calculate costs of producing our cookies, we need to define the places where baking activities occur (work centers or resources).

For example, we may use a refrigerator, mixing station, oven, cooling station, and packaging station. Each would be considered a work center, and we assign different activities like labor and overhead to each work center. The work centers and amount of each activity are indicated in our recipe (Routing or Master Recipe) as operations.

Using the costs for each ingredient (Material Master) in our ingredient list (BOM) and the rates for activities in our recipe (Routing or Master Recipe), we can calculate the cost of producing a cookie.

Further information:

- Material Master MRP settings are crucial in product costing with quantity structure.
- You must re-calculate and release costs to reflect changes in production data like BOMs, Routings or Master Recipes, Production Versions.

In my next blog, I will connect the concepts of cost center planning, activity rate calculation and quantity structure to the costing process. This blog will include executing a costing run, costing an individual material, and marking and releasing costs.

5 Steps to Understanding Product Costing- Part 4 Costing Run

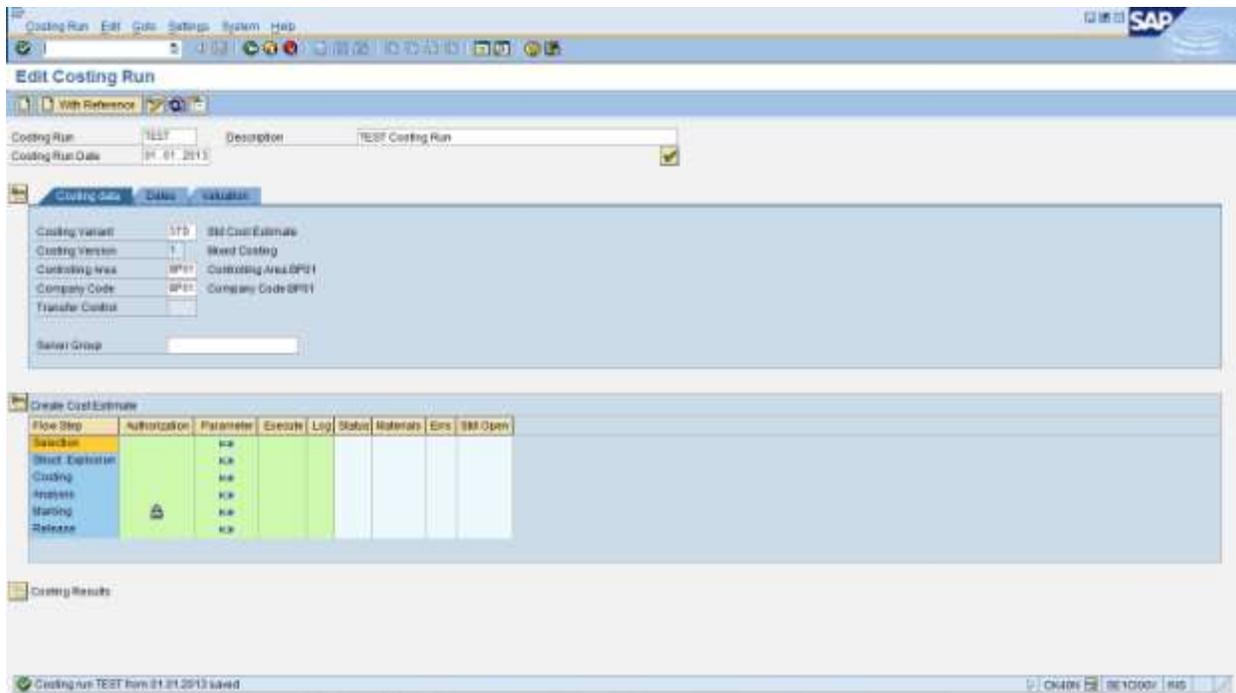
Product Costing, part of the Controlling module, is *used to value the internal cost of materials and production for profitability and management accounting*. Product Costing is a niche skill. Due to costing's high integration with other modules, many people avoid it due to the complexity. This 5 part blog will seek to simplify Product Costing.

The fourth step in understanding the basics of product costing is **the costing run**. Costing runs are used to cost mass amounts of materials in a single company code. The costing run allows you to *select certain materials, explode their quantity structure, cost, analyze, and mark and release*. **Prerequisites:**

- Material Masters (including MRP, Accounting, & Costing views)
- Quantity Structure (Bill of Materials, Routing or Master Recipe, Production Versions are optional)
- Purchase Info Records and Condition Types (If desired for costing)
- Configuration (Cost Component Structure, Costing Variant, Valuation Variant, Costing Sheet if required)
- CO Master Data (Primary and Secondary Cost Elements, Activity Types, Mixed Costing Ratios & Alternatives if required, Additive Costs if required)

Overview:

During the annual or monthly costing process, materials are costed in a costing run. Transaction CK40N is used to execute costing runs, analyze results, and mark and release costs. The costing run must be created using a costing variant (read more in configuration section), costing version, controlling area, company code, and transfer control. Therefore, a costing run can only be created for one company code at a time. The costing run is also created for a particular date range.



The costing run contains six steps: *Selection*, *Structure Explosion*, *Costing*, *Analysis*, *Marking*, and *Release*. Each step requires you to enter parameters, save, and then execute. The *selection* parameters are entered which indicates which materials should be costed. In the *structure explosion* step, the selected materials are exploded to pick up component materials from BOM's.

As discussed in the previous blog on Quantity Structure, a *bill of materials* (BOM) is created for each internally produced material. In the costing step, finished good materials selected from the previous step are costed based on their BOM and routing or master recipe. A *routing or master recipe* is also created to indicate the processes required for a material. Component materials are also costed based on costing configuration.

You can *analyze* the costing results using the available reports in the analysis parameters. In the *marking* step, you open the lock to authorize marking for a company code, costing variant, and period. Once marked, costs appear as planned standard cost estimates in the material master. After executing marking, you *release* the costing results. Once released, costs are valid for the given date range and appear as current standard cost estimates in the material master.

After executing each step, it is important to review the error log and resolve errors. Once resolving errors in a given step, you must re-execute each step from the beginning to see the effect. If results do not update after executing, you can press the refresh button. You have the option to execute any step in background when processing a large number of materials or if you prefer to execute a step at a given date and time.

Configuration:

Configuration of costing and valuation variants and cost component structure are required to set the strategy for costing materials. The *costing variant* holds the criteria for costing. Costing variants contain a costing type, which determines the object to be created, and valuation variant. *Valuation variants* contain parameters for valuation of a cost estimate. In a valuation variant, you can specify the strategy sequence for how costs are selected. For produced materials, the component's standard cost, moving average price, purchase info record price, or planned prices may be selected. You can also choose a particular plan/actual version and average the plan activity rates for the year or take the current activity rates. The *cost component structure* is used to indicate which costs should be included, whether to include the variable or total costs, and group costs in logical groupings called cost components.

Relatable Example:

Let's say we are using Product Costing to value our inventory in a cookie baking shop. This will help us value our cookies (finished good), frosting (semi-finished good), and baking items like eggs, milk, and sugar (raw materials).

Using the costs for each ingredient (Material Master) in our ingredient list (BOM) and the rates for activities in our recipe (Routing or Master Recipe), we can calculate the cost of producing a cookie. In costing our cookies, we will cost the ingredients. Once we are satisfied with our standard cost, we can choose to value our inventory at that cost (release).

Further information:

- Product Cost Collectors, used in repetitive manufacturing, must be costed in a separate transaction (Individual- KKF6N or Mass- KKF6M).
- You must re-calculate and release costs to reflect changes in production data like BOMs, Routings or Master Recipes, Production Versions.
- Note that only the first production version will be used in costing.

In the final blog of this series, I will explain how actual costs are calculated and plan to actual variance analysis.

Product Costing, part of the Controlling module, is *used to value the internal cost of materials and production for profitability and management accounting*. Product Costing is a niche skill. Due to costing's high integration with other modules, many people avoid it due to the complexity. This 5 part blog will seek to simplify Product Costing.

The fifth and final step in understanding the basics of product costing is **actual costs**. Actual costs are determined through purchase prices, actual expenses, and confirmed production quantities. Actual costs are compared to standard costs through variance analysis to make management decisions and determine profitability.

Prerequisites:

- Material Masters (including MRP, Accounting, & Costing views)
- Quantity Structure (Bill of Materials, Routing or Master Recipe, Production Versions are optional)
- Configuration (WIP, Variance, and Settlement)
- CO Master Data (Primary and Secondary Cost Elements, Activity Types, Actual Assessment/Distribution Cycles, Actual Statistical Key Figures if required)

Overview:

Throughout a given period, actual expenses are recorded in SAP as purchases are made, payroll is processed, bills are paid, and production occurs. At month-end, *Work in Process*, *Variance*, and *Settlement* are calculated. The variance between actual costs and standard costs can result in changes to product costing for the next period or year. Costs are settled and the posting period is closed at the end of the month end process to avoid material movement or accounting postings in the previous period.

In product cost by order, actual production yield, scrap, and activity quantities are entered in a production confirmation. The production costs are collected on the production orders for review and settlement. *In product cost by period*, product cost collectors are used to calculate WIP, variances, and settlement instead of the planned orders.

Prior to calculating variances and settling orders, orders must run through WIP calculation to determine what part (if any) of an order is not complete. You can calculate work in process at target costs for Product cost collectors, Production orders, and Process orders. Only orders that have a valid results analysis key and are not in status DFLF (Deletion flag) or DLT (Deleted) are included in WIP calculation.

In *Product Cost by Period* (repetitive manufacturing), the quantities confirmed (other than scrap) for manufacturing orders or production versions are valued at target cost based on the valuation variant for WIP and scrap. *In Product Cost by Order* (discrete manufacturing), WIP is the difference between the debit and credit of an order that has not been fully delivered.

SAP offers variance analysis on the input (consumption, overhead allocation, actual expenses) side and output (production quantity or valuation) side.

Input Variances	Output Variances
-----------------	------------------

Input Price Variance:

Caused by differences between plan and actual material and activity prices. Only calculated if material origin is selected on material master.

Resource-Usage Variance:

Caused by the use of different materials and activities than were planned in BOMs and Routings/Master Recipes.

Mixed Price Variance:

Caused when the system determines a different mixed cost than the released cost estimate. Must be selected in the variance variant to see.

Output Price Variance:

- If standard price changed between delivery to stock and when variances are calculated
- If price control V materials are not delivered to stock

- at standard price
- If price used to value inventory is not a mixed price

Material Quantity Variance:

Caused by different material and quantities than were planned in BOMs.

Lot Size Variance:

Differences between the planned and actual costs that don't vary with lot size.

Remaining Input Variance:

This occurs when costs are entered without a quantity or when OH rates are changed.

Remaining Variance:

Differences between target and allocated actual costs that cannot be assigned to any other category. Also used when no variance categories defined in variance variant.

Scrap Variance:

Caused by differences between operation scrap in routing and actual scrap confirmed.

Finally, we must settle our orders or product cost collectors. Product Cost Collectors and orders are debited with actual costs during production. The actual costs posted to an order can be more or less than the value with which an order was credited when the goods receipt was posted. When you settle, the difference between the debit and credit of the order is transferred to Financial Accounting (FI).

Relatable Example:

Let's say we are using Product Costing to value our inventory in a cookie baking shop. This will help us value our cookies (finished good), frosting (semi-finished good), and baking items like eggs, milk, and sugar (raw materials).

At month-end, we determine what batches of cookies are still in progress (WIP), review our actual expenses and compare to our planned expenses (variances), and close our books for the month (settlement). The cookies still in the oven are considered WIP (order status not complete). We notice several types of cost variances due to higher milk costs (unfavorable input price variance), less frosting waste (favorable scrap variance), and a cost difference because we planned to purchase a higher percent of eggs from a lower cost farmer (unfavorable mixed price variance). After analyzing these variances, we make a few changes to our inventory costs of eggs and look for ways to save on milk costs. We close our books for the month and record our profit and loss to the Income Statement.