PP KANBAN

Release 4.6C

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Purpose

The KANBAN method for controlling production and material flow is based on the actual stock quantity in production. Material that is required on a regular basis is continually provided in small quantities in production. Replenishment or the production of a material is only triggered when a higher production level actually requires the material. This replenishment is triggered directly in production using previously maintained master data. The entries you have to make in the system have been reduced to a minimum, for example, the scanning of a bar code. All other actions in the system are carried out automatically in the background.

With KANBAN, the production process controls itself and manual posting is reduced as far as possible. The effect of this is a reduction in lead time and in stock.

In KANBAN, the signal for material replenishment can be triggered, for example, by the work center that requires the material (demand source) by sending a card to the work center that is responsible for manufacturing the material (supply source). This card describes which material is required, the quantity of the material required and where the material is to be delivered. The name KANBAN originally stems from these cards, which are called "kanban" in Japanese. When receiving the material, you can automatically post the goods receipt at the demand source by a further kanban signal by bar code, for example.

The following graphic illustrates the KANBAN process:

KANBAN

Implementation Considerations

If you want to make full use of the KANBAN technique, your production must fulfill a number of preconditions:

- The consumption of the kanban parts should be relatively constant within an interval which is longer than the replenishment lead time of a kanban. If large quantities of a material are required for a certain period, and then the material is not required at all for a certain period, a large number of kanbans are required to guarantee material availability. This means that relatively high inventory levels exist when the material is not required.

- The supply source has to be able to produce a large number of lots within a short interval. To this end, the setup times in production have to be reduced to a minimum and the reliability of production has to be increased. Waiting until several kanbans for one material have been sent to the supply source before starting production defeats the whole point of the KANBAN method of production.

KANBAN Versus MRP Material Requirements Planning

In conventional MRP procedures, production quantities and dates are calculated in accordance with actual customer/planned independent requirements and the required quantity and dates of the components are calculated by exploding the bill of material. The production quantities can be compiled for various requirements. The creation of lot sizes is based on the selected lot sizing procedure. In each production level, the lots are usually produced completely before being passed on for further processing. The dates calculated in MRP are the results of a detailed planning run for the current production level even if it is not known exactly when the material is required for the subsequent production level at the time of the planning run. The material is pushed through production on the basis of these dates (PUSH PRINCIPLE). This often leads to queue times before production can be started or until the material can be processed further. These queue times are planned as increased lead times or floats in planning and are rarely undercut. This results in high inventory and longer lead times in production.

In KANBAN techniques, no separate, higher-level planning is used to control the material flow through production. Instead, the work center further down the line (demand source) requests material from the preceding work center (supply source) only when it is required (PULL PRINCIPLE). For this purpose, a control cycle is created - with a fixed number of kanbans (cards) - between the supply source and the demand source. Each kanban represents a specific material quantity and usually represents a container (however, this need not be the case). When the material quantity of a kanban has been consumed, it is given the status EMPTY and is sent to the supply source. The kanban is the signal for the supply source to go ahead and produce the quantity of material recorded on the kanban. Once production is complete, the material is delivered to the demand source which confirms the receipt of the material by setting the status back to FULL. The lot size is determined by the kanbans and this quantity is produced by the supply source in one run. The total production quantity is calculated by the total number of kanbans sent to the supply source within a predefined period. Replenishment frequency is based on actual consumption. This means that if more material is required, the kanbans simply circulate between the supply source and the demand source more quickly. If less material is required, the kanbans circulate more slowly. If no material is required, then all the kanbans will remain at the demand source with the material, meaning that all of the components required to start producing the corresponding assembly are available. There is never more material in circulation than is defined by the number of kanbans in the control cycle and all of the production levels that are controlled using KANBAN techniques are always in a position to start production.

KANBAN Procedure

Purpose

The SAP System can use many procedures to implement KANBAN.

You may require different KANBAN processes depending on the structure of your company and on the way you need to implement KANBAN production control.

Features

In the SAP system, the following procedures are available:

- Classic KANBAN [Page 12]
- KANBAN with Quantity Signal [Page 17]
- One-Card KANBAN [Page 15]
- Event-Driven KANBAN [Page 13]

Classic KANBAN

Use

In the classic KANBAN production control method, the demand source, the supply source and the procedure to be used to replenish the material are defined in the control cycle as well as the number of kanbans that circulate between the supply source and the demand source and the quantity per kanban.

In this classic KANBAN procedure, the kanban signal always only triggers replenishment for the kanban quantity defined in the control cycle. Moreover, you cannot circulate more kanbans than are defined in the control cycle without changing the control cycle first.

Event-Driven KANBAN

Use

In event-driven KANBAN, material provision is not based on a predefined number of kanbans or a predefined kanban quantity. Instead, it is based on actual material consumption. The material is not continually provided and replenished at a supply area. It is only replenished when specifically requested. In this procedure, the advantages of the KANBAN module are used to make the material replenishment process even more simple.

Integration

In the event-driven KANBAN procedure, you can also use all the functions available in the KANBAN module.

Prerequisites

You must maintain separate control cycles for event-driven KANBAN.

Features

In this procedure, a kanban is only created when required. That is, kanban creation is triggered by a certain event. The system creates a kanban for every requested material quantity, which is subsequently deleted on replenishment.

The event-driven kanban is created using a separate function. The quantity to be replenished is defined directly in this function. In the control cycle, you can define the following restrictions for the definition of the kanban:

- You can enter a rounding quantity to round up the required quantity.

- You can enter a fixed kanban quantity. If the requested quantity is smaller than the fixed kanban quantity, the system replenishes the fixed quantity. If the required quantity is greater than the fixed quantity, several kanbans (for the fixed quantity) are replenished until the required quantity is covered. Here, if necessary, the required quantity is rounded up to a complete multiple of the fixed quantity.

- You can define a proposal value for the required quantity. This value is used by the system if no quantity has been specified in the function for creating the event-driven kanban.

> ⚠️
>
> For technical reasons, it is not possible to create several production orders for several kanbans all at once. The system does not allow such an entry.
>
> Change your entry or the business process so that only one kanban is created. For example, make several entries, each with smaller quantity.
>
> If this is not possible, change your replenishment strategy from production orders to planned orders/run schedule quantities.

Actions

1. Using a separate transaction, the kanban signal is triggered which creates one or several kanban(s). The quantity or the number of kanbans depends on the required quantity and the

Event-Driven KANBAN

specifications in the control cycle. A replenishment element is created for each kanban created depending on the strategy.

2. Replenishment is carried out.

3. The kanban is set to FULL and, if necessary, a goods receipt is posted.

4. When you set the kanban to EMPTY (for example, using either a bar code or the kanban board), the system deletes the kanban.

5. A new kanban or new kanbans with replenishment element is/are not created again until you retrigger the kanban signal using the function, *Event-driven kanban*.

One-Card KANBAN

Use

The purpose of this process, amongst other things, is to create a one-card KANBAN system with two kanbans in a control cycle. As a kanban is set to the status WAIT for certain periods in a control cycle, you can further reduce the inventory level at the demand source - especially during periods when the material is not required. In this procedure, replenishment is always triggered when the kanban that is currently being emptied is approximately half empty. The new kanban is then delivered before the current kanban is completely empty. This logic is illustrated in the following graphic:

1. Start with a full container

Kanban   **2. A new container is requested**

3. The new container is delivered

4. The first container is completely emptied

To be able to guarantee the replenishment of the kanban currently in use, two kanbans are active some of the time in the one-card system. Therefore, this logic requires the use of two kanbans in the system.

Integration

In the one-card KANBAN procedure, you can also use all the functions available in the KANBAN module.

Prerequisites

Before you can use this procedure, you must select one of the processes in the field, *Trigger replenishment* when maintaining the control cycle.

Features

- Triggering replenishment at status IN USE:

    After the first container is reported full, the system proceeds as follows: The second kanban is set to the status WAIT. If a new kanban is requested, the system sets the full kanban to the status IN USE. With this status change the kanban with status WAIT is automatically changed to status EMPTY and thus replenishment is triggered. When this new kanban is delivered, it receives the status FULL. As soon as the kanban from which material is still being withdrawn is set to EMPTY, the system automatically sets it to status WAIT and the process is repeated.

One-Card KANBAN

This procedure is illustrated in the following graphic:

- Triggering replenishment at status WAIT:

    After the first container is reported full, the system proceeds as follows: When a new kanban is requested, the full kanban is set to status EMPTY. With this status change the kanban with status WAIT is automatically changed to status EMPTY and thus replenishment is triggered. The kanban from which material is still being withdrawn receives the status WAIT. When the new kanban is delivered, it receives the status FULL and the process is repeated. As opposed to the logic with the status IN USE, you do not have to work with an additional status here. On the other hand, you have no possibility in the system of seeing whether a container is currently being emptied.

    This procedure is illustrated in the following graphic:

    1. Start with a full container

    2. A new container is requested

    3. The new container is delivered

    4. The first container is completely emptied

- Reaching or exceeding the trigger quantity:

    The procedure here is similar to the two procedures described above. However, the difference here is that the kanban is set to EMPTY when the remaining quantity in the kanban reaches or exceeds the trigger quantity. In this process, the parts are withdrawn with the quantity signal. In this case, you must maintain the trigger quantity as well as the logic in the control cycle. This process is particularly useful for parts that are not used on a regular basis. Therefore, you can procure parts with KANBAN without having to keep several containers in stock. However, a PDC system is required for this procedure.

KANBAN with Quantity Signal

Use

In the classic KANBAN procedure, after the kanban has been completely emptied, the employee in production uses the kanban signal to set the status of the kanban to EMPTY. At no point before the kanban is set to EMPTY is the system informed of the quantity still in the kanban.

Using the quantity signal, the employee in production does not trigger the kanban signal for replenishment manually by setting the kanban status to EMPTY. Instead, the employee in production or a PDC System enters the individual withdrawal quantities in the system directly. The system subtracts each of these withdrawal quantities from the actual kanban quantity and when the kanban quantity is zero, the system automatically sets the status of the kanban to EMPTY.

Integration

In KANBAN with quantity signal, you can also use all the functions available in the KANBAN module.

Prerequisites

For KANBAN with quantity signal, no further prerequisites are necessary.

Features

In KANBAN with quantity signal, a separate function is available for entering the withdrawal quantity.

The actual kanban quantity is reduced by the withdrawal quantity entered at each posting. The system recognizes when the actual kanban quantity is zero and automatically sets the kanban to EMPTY. The procedure in detail is as follows:

The first time a quantity is withdrawn from a kanban, the system sets the status to IN USE. Once the kanban is completely empty, the status is set to EMPTY and replenishment is triggered. If the withdrawal quantity exceeds the remaining quantity of this kanban, the system reduces the actual quantity of the next kanban, which is then set to IN USE.

The sequence of the kanbans from which you can withdraw material is determined as follows:

- First, the system empties kanbans with the status IN USE.

- Then the system selects the kanban that has been set to the status FULL the longest.

Therefore, in this procedure (as opposed to KANBAN without a quantity signal), the actual kanban quantity is of functional importance.

The system sets the kanban to FULL as normal with the kanban signal.

> ⚠️
>
> Only the actual quantity of the kanban is updated when you use the quantity signal - no stock postings are carried out. The system does not post the inventory data until the status has been changed to EMPTY.

KANBAN with Quantity Signal

For technical reasons, it is not possible to create several production orders for several kanbans all at once. The system does not allow such an entry.

Change your entry or the business process so that only one kanban is created. For example, make several entries, each with smaller quantity.

If this is not possible, change your replenishment strategy from production orders to planned orders/run schedule quantities.

KANBAN Replenishment: With or Without MRP

Use

In KANBAN production control, you have two options for organizing replenishment:

- Replenishment is only triggered by the kanban signal. Materials for which replenishment is only triggered by the kanban signal are not planned in the planning run. However, you can include these materials in long-term planning.

- The materials are planned in the planning run and corresponding procurement proposals are created. These procurement proposals do not directly trigger replenishment but provide a preview of future consumption. In this process, replenishment is also triggered by the kanban signal.

Integration

You can use both options for organizing replenishment in the classic KANBAN procedure and in the other KANBAN procedures.

Storage Location Assignment for KANBAN

In this topic, you are provided with detailed information on assigning storage locations for KANBAN.

In KANBAN, materials are stored on the short-term at supply areas on the shop floor. The supply area is used to provide material directly at the production line or at the work center. However, inventory is not managed at supply area level. In KANBAN, goods movements are also posted to the storage locations. For carrying out the goods movements, the supply areas are assigned to storage locations, when they are created in the KANBAN application. The goods receipt for KANBAN materials is always posted to the storage location, which is assigned to the supply area. Components are always backflushed in KANBAN. The determination of the storage location for the backflush is explained in Storage Location and Supply Area Determination with the BOM [Page 21] .

Before you create a control cycle, you must have created the material for the storage location, which is assigned to the supply area. This ensures that the system posts the stock movements to the correct storage location. The system also uses this information to determine whether KANBAN is carried out with or without MRP. It is not possible to create a control cycle with a material that has not been created for the storage location of the supply area.

> It is not usually necessary to create a material for storage locations as the system automatically creates the material master segment for the storage location the first time a goods movement is posted. In KANBAN, however, you must always create the materials for the storage locations as this is a prerequisite for creating control cycles.

In KANBAN without MRP, the storage location has an additional purpose. Here, you must ensure that the materials in the KANBAN storage locations are not included in the planning run. Therefore, these storage locations are excluded from the planning run in the material master record. Moreover, in the BOM explosion, the planning run has to recognize the storage location for which the dependent requirements are provided so that no procurement proposals are created for the storage locations excluded from the planning run.
You must assign an issue storage location to KANBAN components so that the system can enter the storage location for the dependent requirements.

Storage Location and Supply Area Determination in BOM Explosion

In the BOM explosion, the system tries to find a storage location in the BOM item (component). If no issue storage location has been defined, the system reads the MRP group of the assembly or of the finished product and thus determines the strategy it is to use for storage location (or supply area) determination. If you have not defined an MRP group with a strategy for storage location/supply area determination, the system finally checks to see whether an issue location has been maintained in the material master record.

The same procedure is used to determine the supply area.

Strategies for storage location/supply area determination

The following strategies for withdrawing components are available for determining the storage location/supply area:

*   If you set indicator 1 *(Only components)*, the system checks to see whether the issue storage location has been maintained in the material master records of the components and uses this storage location. This storage location is then used as the withdrawal storage location and is displayed in the components list in the planned order.

    You use this procedure if you always withdraw one particular component from the same storage location. That is, every component is used at a specific storage location in the plant.

*   If you set indicator 2 *(Only assembly)*, the system checks to see whether the proposal withdrawal location has been maintained in the production version of the assembly or finished products. If this has been maintained, the system uses this withdrawal storage location for all components and displays it in the components list in the planned order. If no proposal withdrawal location has been maintained, the system uses the assembly's receiving storage location as the withdrawal storage location for the components. You can define the receiving storage location in the production version of the assembly in field *GI proposed stor. loc.* or in the material master record of the assembly in field *Issue stor.location.*

    If neither of these entries has been maintained, you can enter the receiving storage location (goods receipt storage location) in the backflush transaction in Repetitive Manufacturing which is then used as the withdrawal storage location for the components.

    You should use indicator 2 when all components lie together in one storage location close to the production line where they are required.

*   If you set indicator 3, the system first proceeds as for indicator 1 described above. If it cannot find a storage location using indicator 2, it then proceeds as described above for indicator 2.

*   If you set indicator 4, the system first proceeds as for indicator 2 described above. If it cannot find a storage location using indicator 2, it then proceeds as described above for indicator 1.

You define the strategy in Customizing for Repetitive Manufacturing or for MRP under *Define stor.loc./supply area determination for BOM explosion*. You assign the strategy you want to use via the MRP group.

KANBAN Without MRP

Prerequisites

If you do not want the material to be included in the planning run, that is, you do not want any additional replenishment elements (planned orders or purchase requisitions) to be created, you have to exclude the material from the planning run in the storage location assigned to the supply area of the supply source. For further information see Excluding a Storage Location from MRP [Ext.].

If a material is procured **without MRP**, you must make the following settings:

- You have to exclude storage locations that are used for procurement with KANBAN without MRP from the planning run. You must also define from which storage location the components are to be backflushed. See also Storage Location Assignment for KANBAN [Page 20] .

- In certain circumstances, you must also maintain a valid **MRP type** for materials procured without MRP. This is necessary:

  – If run schedule quantities or planned orders are to be created as replenishment elements for KANBAN (KANBAN with run schedule quantities).

  – If capacity requirements are to be created.

  – If the material is to be included in long-term planning.

  – If the material is to be procured at certain storage locations using KANBAN production control. However, the other storage locations are planned in MRP.

  You can also enter the MRP type "ND" (No planning) for the material.

- You must maintain a repetitive manufacturing profile (in the MRP data screen) for replenishment strategies with a cost collector (in-house production with run schedule quantities, manual KANBAN). In the SAP standard system, a profile is available that is specially intended for KANBAN, that is, using this profile, the system creates a cost collector without a run schedule header. For more information, see also Cost Collector for KANBAN [Ext.]

Features

When the demand source requests a kanban from the supply source, the system creates a replenishment element (run schedule quantity, production order, purchase order, and so on) for the required quantity. The material is replenished using this element and it is also backflushed with reference to this element. The system also posts the goods receipt to this element when the material is delivered.

In this process, you must take two things into account if KANBAN controlled materials have a BOM:

- At the storage location excluded from the planning run, the BOM is not exploded further. That is, procurement elements in this storage location do **not** create dependent requirements for the components of the material controlled by KANBAN procedures. Therefore, if a material planned in this way has lower-level components, these components can only be procured using KANBAN or consumption-based planning procedures.

However, it is possible to plan the component requirements using long-term planning. In long-term planning, you can also create simulative dependent requirements for KANBAN materials which provides you with the information you require to negotiate with your vendors.

- However, it is possible to plan a material with KANBAN at certain storage locations and with MRP at other storage locations. This means:

  – Procurement elements in storage locations that are included in MRP trigger the creation of dependent requirements for lower-level components.

  – Procurement elements in storage locations that are **excluded** from MRP do **not** trigger the creation of dependent requirements for lower-level components.

KANBAN With MRP

Prerequisites

In this process, the storage location assigned to the supply area is not excluded from MRP.

If a material is planned and procured **with MRP**, you must make the following settings:

- You must maintain a valid **MRP type** for the material. This means, the setting "ND" (No planning) is not allowed.

- You must maintain all other control parameters required for MRP for the material.

- You must maintain a repetitive manufacturing profile (in the MRP data screen) for replenishment strategies with a cost collector (in-house production with run schedule quantities, manual KANBAN). In the SAP standard system, a profile is available that is specially intended for KANBAN, that is, using this profile, the system creates a cost collector without a run schedule header. For more information, see also Cost Collector for KANBAN [Ext.]

Features

Here, the total production quantity or the procurement quantities of a certain period are planned in the planning run and the replenishment elements are also created in the planning run. For in-house production, you can use either Repetitive Manufacturing or production orders to plan the production quantities per period. For external procurement, all the standard replenishment elements are available. The replenishment elements created in the planning run, however, are **not** intended to trigger production or replenishment directly. Instead, they exist to provide the supply source with a preview. Actual production and material flow are controlled and triggered by setting the kanban to FULL and EMPTY. Backflushes and goods receipts are posted with no reference to the kanban. This means that you can backflush daily quantities, for example.

In this procedure, the following is valid for materials with BOMs:

Components that are used in KANBAN materials can be planned using any one of the MRP procedures. **However, the system has to be organized so that the supply source does not produce the material for the replenishment element created in MRP immediately but awaits the kanban request.**

> As the system creates preview data in the procedure with MRP, it is particularly useful for replenishment with run schedule quantities (Repetitive Manufacturing) and scheduling agreement releases.

Master Data for KANBAN

Purpose

Various master data must be set for KANBAN production control in order to replenish a material using KANBAN, to enable a fully automated creation of purchase requisitions, production orders and other replenishment elements and to carry out goods movement.

Features

Kanban material is delivered directly to production - to supply areas. The supply area may be a shelving area or simply a storage area. One or more work centers may have access to one supply area. A supply area is assigned to one storage location for Inventory Management. In the supply area itself, only the kanbans are managed. However, the material inventory is managed in the storage location to which the supply area is assigned. A supply area can be assigned one storage location. Or, one common storage location can be assigned to either some or all of the supply areas in one plant.

Therefore supply areas must be created and storage locations assigned to them. See also Supply Area [Page 27] and Storage Location Assignment for KANBAN [Page 20].

Production is further sub-divided into areas controlled by the responsible person. Thus, control functions and responsibility are transferred to the shop floor, fulfilling one of the main KANBAN principles. The responsible person may be responsible for stocks for one or more supply areas in the demand source area and may be responsible for monitoring the production of materials in the supply source.

The responsible person must also be created and assigned. See also Person Responsible for KANBAN [Page 29] .

The relationship between the demand source and the supply source is defined in the control cycle. The main information contained in the control cycle is the replenishment type and the number of kanbans and the quantity per kanban. You can specify the number of kanbans and the quantity per kanban manually. However, as the requirements situation in many branches of industry may be prone to considerable fluctuation, the system also provides an automatic kanban calculation. The system uses this function to monitor, calculate and adjust the parameters on a regular basis. See also Control Cycle [Page 30].

Master Data for KANBAN

- You define the relationship between the supply source and the demand source in the control cycle

In addition, the replenishment strategies must be set. In the control cycle it is defined in which way replenishment is to take place for the materials. See also read Replenishment Stragegy [Page 41].

Supply Area

Definition

A supply area is an interim storage location on the shop floor which is used to provide material directly to the production line or the work center.

The supply area can be a shelving area, an area marked off on the ground, special boxes and so on. Defining the supply areas for a plant is part of the material flow design for KANBAN.

The supply area is defined in Customizing and is assigned the following objects:

• Plant

• Storage location

• Person responsible

Goods movements are posted to the storage location assigned to the supply area.

One storage location can be assigned to several supply areas, however, one supply area cannot be assigned to several storage locations.

> If a material is produced or processed in several supply areas with the same storage location, the system displays the total stock quantity at all the assigned supply sources in the stock overview of this storage location.

The person responsible is the person who (as the demand source) monitors the further processing of the materials and the stocks at the supply area.

Define the Supply Area

1. From the KANBAN menu choose *Supply area → Maintain*.

2. Enter the plant and choose *Continue*.

    The system takes you to the view for maintaining supply areas. Here, you can change existing supply areas or define new ones.

3. To create a new supply area choose *Edit → New entries*.

4. Enter the following data:

    –   Name and short description of the supply area

    –   Storage location to which the supply area is assigned. In this storage location the goods movement postings take place for the KANBAN material.

    –   Person responsible for production

        In the KANBAN application you have to enter the person responsible on creating a supply area. The person responsible is not a required entry, as you can create supply areas in Warehouse Management using the same transaction without having to enter the person responsible.

    –   Unloading point

        The unloading point is printed on the kanban card or even transferred to the summarized JIT call.

5. Save your entries.

Person Responsible for KANBAN

Definition

The person responsible can be in charge of material processing and for monitoring stocks in one or more supply areas at the demand source and/or be responsible for the provision of the materials produced in his/her area of responsibility at the supply source.

The person responsible is defined as an MRP controller in Customizing for MRP.

Use

If a person responsible is assigned to a supply area, this defines who is responsible at the demand source for material processing and for monitoring stocks at the supply area.

If in in-house production, a person responsible is maintained in the control cycle, this defines who is responsible at the supply source for replenishment, that is, for material provision and, if necessary, for delivery to the demand source.

Control Cycle

Definition

The control cycle defines the relationship between the demand source and the supply source. The control cycle contains the following control data for KANBAN production:

- Kanban circulation, that is, the number of kanbans and the kanban quantity

- The basic data required for automatic kanban calculation, if necessary

- Replenishment strategy

- Printing kanbans, if necessary

- The delivery address, if necessary

- The process control (for example, indicator for separate goods receipt, status sequence key, indicator for the logic for triggering replenishment for 'one-card' KANBAN), if necessary.

Use

You can maintain control cycles for classic KANBAN (these control cycles are also used for KANBAN with quantity signals or for 'one-card' KANBAN) or for event-driven KANBAN.

Creating/Changing Control Cycle for Classic KANBAN

Purpose

This process describes which parameters you need to enter for a control cycle with classic KANBAN.

Process Flow

To create a control cycle for classic KANBAN, proceed as follows:

1. Starting from the main KANBAN menu, select *Control cycle → Create.*

   The system displays the initial screen for maintaining the control cycle.

2. Define the demand source by entering the following data:

   – Material number

   – Plant

   – Demand source supply area

3. In the section of the screen entitled, control cycle category, select *Classic KANBAN* and press *Enter.*

   The system now displays the data screen for maintaining the control cycle.

4. Define the following parameters:

   – Replenishment strategy

     In the control cycle you define how replenishment between the supply source and the demand source is to be organized.

     For further information see also Defining the Replenishment Strategy in the Control Cycle [Page 35].

   – Kanban Circulation

     For kanban circulation you need to define the following:

     • Number of kanbans that circulate between the supply source and the demand source

     • Material quantity per kanban

     The number of kanbans as well as the kanban quantity is based on the following criteria:

     • Average consumption

     • Replenishment lead time of a kanban

     • Fluctuations in consumption and in the replenishment lead time

     This is represented in the following formula:

Creating/Changing Control Cycle for Classic KANBAN

<div style="text-align:center">

Control Cycle Calculation

</div>

(Number of containers - 1) x container content = Consumption in replenishment lead time of contnr

$$\text{No. of containers} = \cfrac{\cfrac{\text{Consumpt.}}{\text{Time unit}} \times \text{Replenishment lead time of container[time unit]}}{\text{Contnr content}} + 1$$

−   Automatic Kanban Calculation

You can also use the functions available in the automatic kanban calculation to determine the number of kanbans or the kanban quantity. For further information see also Defining the Automatic Kanban Calculation in the Control Cycle [Page 36] .

−   Kanban/Container Numbers

If the containers have their own material master records, you can enter the material number of the container for the kanbans. A new material type is provided for the kanban containers (CONT). Using the material type CONT, means that it is simpler to maintain the material master record (you only have to maintain engineering/design data). However, you can also use other material types to created kanban containers.

−   Maximum Number of Empty Containers

You can enter a limit that specifies the maximum number of containers that are allowed to be empty at one time for the supply source view of the kanban board. This limit is only used for information purposes and evaluation. If the number of empty containers exceeds this limit, the system displays an exclamation mark in the line of the appropriate control cycle in the supply source view of the kanban board.

−   Kanban Printout

You define whether or not the kanbans are to be printed and which event is to trigger the printout. You also specify the output device. For further information see Printing and Circulating Kanbans [Page 88] .

−   Locking and deleting kanbans

If necessary, you can delete or lock kanbans in the control cycle. You lock a kanban, for example, if it is not to be used for a certain length of time as consumption within the control cycle has fallen.

You can only delete a kanban if it has no further replenishment elements for which goods receipt still has to be posted. All kanbans that do not have the status WAIT, must be locked before they can be deleted.

If the status of a locked kanban is set to EMPTY, the system automatically changes the status to WAIT. A locked kanban cannot be replenished.

To lock or delete a kanban, choose *Goto → Kanban*.

A dialog box appears displaying the following information:

- kanban number

- actual quantity

- kanban status

- date and time of the last status change

To lock kanbans, select the checkbox of the appropriate kanban(s) in the *Lock* column.

To delete kanbans, select the checkbox of the appropriate kanban(s) in the *Delete* column.

– delivery address

If you want the delivery to be made directly to the production line, you can specify a precise delivery address indicating the supply area data.

To do this select *Goto → Delivery address.*

The plant address is already complete. Here, you can also enter the information required for the supply area.

Further Control Data

– **Separating the goods receipt from the status change** and **independent supply source**

In addition, you can control the separation of the goods receipt from the status change with the field *Separate GR* (for further information read Separating the Status Change from the GR [Page 73] Posting). With the field *Independent supply source* you can control whether the supply source determines the time of replenishment and whether the replenishment element has the status "independent supply source". (See also: Independent Supply Source/Separation of Status Change and Replenishment [Page 74]).

– Status sequence

You can assign a status sequence to the control cycle in the *Status sequence* field. This defines the order in which the statuses are set. It also specifies whether certain statuses are mandatory, whether some are optional, or whether some statuses are not allowed. For example, you can define that the statuses, IN PROCESS and IN TRANSIT have to be set after each other, but that the status IN USE is not allowed. You define the status sequence in Customizing for KANBAN. For further information on status see Status Change/Kanban Signal [Page 58] and Status Sequence [Page 61] .

– One-Card KANBAN

In the one-card KANBAN system, you must define a special logic for triggering the kanban signal. These logics are defined in the field *Trigger replenishment*. See also: One-Card KANBAN [Page 15] and One-Card KANBAN/Using a Special Logic for Triggering the Kanban Signal [Page 68] . If you do not want the system to trigger replenishment until a trigger quantity has been reached, you must also enter this quantity in the *Trigger quantity* field.

Creating/Changing Control Cycle for Classic KANBAN

You can also change the supply area in an existing control cycle, if the new supply area points to the same location as the old one.

Creating/Changing Control Cycle for Classic KANBAN

Defining the Replenishment Strategy in the Control Cycle

Purpose

The replenishment strategy defines how replenishment between the supply source and the demand source is to be organized in the control cycle.

This process describes how you can define the replenishment strategy in the control cycle, i.e. how you can assign a replenishment strategy type to a material.

Prerequisites

First of all you must define the appropriate replenishment strategies in Customizing. See Create Replenishment Strategies [Page 42] .

Process Flow

Proceed as follows to maintain the replenishment strategy (this defines the supply source):

1. In the control cycle maintenance screen (*Control cycle → Create)* in the tab page *Replenishment strategy,* choose how replenishment is to take place:

   - using in-house production

   - using external source (or procurement from another plant)

   - using stock transfer from another storage location

2. In the *Strategy* field, enter the key for the strategy you want to use.

3. Choose *Continue*.

4. Depending on the strategy you selected, you must fill out certain fields that specify the source:

   - For in-house production

     – person responsible for production

     – production version, if necessary

   - For external procurement

     – purchasing organization

     – vendor or supplying plant

     – contract/scheduling agreement, if necessary

   - For stock transfer

     – supply source storage location

5. Save your data.

Defining the Automatic Kanban Calculation in the Control Cycle

Purpose

You can also use the functions available in the automatic kanban calculation to determine the number of kanbans or the kanban quantity.

This process describes which parameters you must set in the control cycle so that the system can calculate kanban circulation itself.

Process Flow

1. You set the **calculation type**. This controls whether the number of kanbans or the kanban quantity is to be calculated.

2. You set the **safety factor**. This is used to buffer requirement fluctuations. It is multiplied by the result of the kanban calculation formula.

3. You set the **constant**. Using the constant, you can control the signal for reporting a kanban empty as follows:

    –   If a kanban is reported empty when the kanban is completely empty, the constant is set to '1'. If several work centers of the same supply area report empty kanbans in this way, this constant is multiplied by this number of work centers.

    –   If, on the other hand, the kanban is reported empty as soon as the first part is withdrawn, you set this constant to '0'.

    You can also use this constant to plan a safety stock.

4. You set the **calculation type**. You define the calculation profile in Customizing for KANBAN. This profile simplifies the maintenance of the calculation profile as it contains the parameters mentioned above as well as the smoothing procedure for the dependent requirements (for more information on this topic, see also, Smoothing the Dependent Requirements [Page 52]) and if necessary a distribution function for smoothing.

5. You set the **replenishment lead time**. You can enter this time in days or in hours and minutes.

6. For the kanban calculation, the dependent requirements planned in the supply area in which the material is required have to be calculated. Here, the system uses the supply area from the dependent requirements. To determine the supply area in dependent requirements read the section Storage Location and Supply Area Determination in the BOM Explosion [Page 21].
    If, in special cases, the supply source determination is not possible or desired for a dependent requirement, you can use the function *Detailed dependent requirements selection* to define any combination of plant, storage location and supply area. Here, the system then includes all dependent requirements that apply to your selection criteria in the calculation of the control cycle. The following examples are possible:

    –   If, for a material in a particular plant, you have only maintained one control cycle and if all dependent requirements in this plant are to be included in the calculation of the control cycle, then you do not have to use the storage location/supply area determination function. Instead, you only need to enter the plant in the **detailed dependent requirements selection**. Then, the system includes all the dependent

Defining the Automatic Kanban Calculation in the Control Cycle

requirements in this plant in the calculation irrespective of the storage locations or supply areas to which these dependent requirements belong.

–   If a control cycle supplies material to a buffer store which supplies material to other control cycles, dependent requirements only exist in the system for the second type of control cycle. To calculate the control cycle for replenishing the buffer store, you can assign all the other supply areas that draw material from this buffer store using the function **detailed dependent requirements selection**. This means, the appropriate dependent requirements are included in the calculation of the buffer control cycle.

When entering the detailed dependent requirements selections, note the following: if instead of entering the complete combination of plant, storage location and supply area, you only enter the plant and storage location, for example, the system reads **all** dependent requirements in the plant and storage location irrespective of the supply area recorded in the dependent requirements. The same also happens if you only enter the plant. Here, the system uses **all** dependent requirements in the plant irrespective of the storage location and the supply area.

To access the detailed dependent requirements selection, choose *Goto → Dependent reqmts selection*. The dialog box, "Detailed Dependent Requirements Selection" appears where you can make your entries.

You carry out the calculation and evaluation or copy using the function Automatic Kanban Calculation [Page 44] .

Creating/Changing Control Cycle for Event-Driven KANBAN

Purpose

This process describes which parameters you need to enter for a control cycle with event-driven KANBAN.

Process Flow

To create a control cycle for event-driven KANBAN, proceed as follows:

1. Starting from the main KANBAN menu, select *Control cycle → Create.*

   The system displays the initial screen for maintaining the control cycle.

2. Define the demand source by entering the following data:

   – Material number

   – Plant

   – Demand source supply area

3. In the section of the screen entitled, *Control cycle category*, select *Event-driven KANBAN* and Choose *Continue* .

   The system now displays the data screen for maintaining the control cycle.

4. Define the following parameters:

   – Replenishment strategy

     In the control cycle you define how replenishment between the supply source and the demand source is to be organized.

     For further information see also Defining the Replenishment Strategy in the Control Cycle [Page 35].

   – Kanbans

     In event-driven KANBAN, the number of kanbans and the kanban quantity are not defined in the control cycle. Only the following basic data is maintained in the control cycle:

   – Quantity per kanban:

       Kanban quantity proposed by the system when no order quantity is entered when creating the kanban signal.

   – Rounding quantity:

       When creating the kanban signal, the requested material quantity for this kanban is rounded up to the next complete multiple of the rounding quantity. The rounding quantity must be a multiple of the fixed kanban quantity.

   – Fixed kanban quantity:

Defines a fixed quantity of material per kanban and is used in the sense of a fixed lot size. This means, the system can only create kanbans for this material quantity.

If you enter an order quantity smaller than the fixed kanban quantity, the system creates a kanban for the fixed kanban quantity. If you enter a quantity greater than the fixed kanban quantity, the system creates several kanbans for the fixed kanban quantity until the order quantity is covered. This may mean that more material is procured than was requested as the system only procures complete multiples of the fixed kanban quantity.

– Kanban/container numbers

If the containers have their own material master records, you can enter the material number of the kanbans. A new material type is provided for the kanban containers (CONT).

– Kanban printout

You define whether or not the kanbans are to be printed and which event is to trigger the printout. In addition you can define the printer. For further information see Printing and Circulating Kanbans [Page 88] .

– Locking kanbans

In event-driven KANBAN, locking kanbans does not usually make sense.

– Delivery address

If you want the delivery to be made directly to the production line, you can specify a precise delivery address indicating the supply area data.

To do this select *Goto* → *Delivery address.*

The plant address is already complete. Here, you can also enter the information required for the supply area.

Further Control Data

You can also define the following parameters in the control cycle:

– Separation of the goods receipt from the status change

In addition you can control the separation of the goods receipt from the status change with the field *Separate GR* (see also Separating the Status Change from the GR Posting [Page 73]).

– Status sequence

You can assign a status sequence to the control cycle in the *Status sequence* field. This defines the order in which the statuses are set. It also specifies whether certain statuses are mandatory, whether some are optional, or whether some statuses are not allowed. For example, you can define that the statuses, IN PROCESS and IN TRANSIT have to be set after each other, but that the status IN USE is not allowed. You define the status sequence in Customizing for KANBAN. For further information on status see Status Change/Kanban Signal [Page 58] and Status Sequence [Page 61] .

Creating/Changing Control Cycle for Event-Driven KANBAN

You can also change the supply area in an existing control cycle, if the new supply area points to the same location as the old one.

Creating/Changing Control Cycle for Event-Driven KANBAN

Replenishment Strategy

Definition

The replenishment strategies define in the control cycle how replenishment is to take place:

- Using in-house production

- Using external procurement

- Using stock transfer

The replenishment strategies also determine whether and which replenishment elements (run schedule quantities, production orders, and so on) are created by the kanban signal.

The replenishment strategy is assigned to the material in the control cycle.

The settings for the replenishment strategy are made in Customizing for KANBAN.

See also: Create Replenishment Strategies [Page 42] and Change Replenishment Strategies [Page 43].

Create Replenishment Strategies

To set the replenishment strategies for KANBAN, proceed as follows:

1. In Customizing for KANBAN choose *Replenishment strategies*.

   Select which replenishment strategy you want to maintain:

   – In-house production

   – External procurement

   – Stock transfer

2. To create new strategies, select *Edit → New entries*.

3. Enter the corresponding parameters which control the replenishment strategies.

   The parameters that you enter vary according to the type of replenishment. If, for example, you use run schedule quantities with MRP with KANBAN in-house production, then as well as the standard parameters such as control type and goods receipt movement type you have to maintain the reduction of planned orders, the reduction period and the creation of planned orders on cancellation.

Change Replenishment Strategies

To change replenishment strategies, proceed as follows:

1. In Customizing for KANBAN choose *Replenishment strategies*.

    Select which replenishment strategy you want to maintain:

    –   In-house production

    –   External procurement

    –   Stock transfer

2. Position the cursor on the strategy you want and select, *Goto → Details.*

    This takes you to the details screen of the strategy.

3. Make the necessary changes to the control parameters.

    For further information on control parameters, see also: Create Replenishment Strategies [Page 42] .

Automatic Kanban Calculation

Use

Significant parameters for production control with KANBAN include:

- The number of kanbans (cards) that circulate in a control cycle

- The quantity per kanban

You use these parameters to define material circulation and material stock. By optimizing these parameters, you can reduce inventory levels to a minimum. The aim is to guarantee material replenishment with the lowest possible inventory. As the inventory situation in many branches of industry fluctuates considerably, it is necessary to check and adjust these parameters on a regular basis.

Prerequisites

The following prerequisites exist for the automatic kanban calculation:

- You must maintain the standard values for the automatic kanban calculation in the control cycle. For further information see also Defining the Automatic Kanban Calculation in the Control Cycle [Page 36] .

- If necessary, you must maintain the authorization profiles in Customizing for KANBAN (if the dependent requirements are to be smoothed or if you want to maintain work time).

- You must assign the supply areas to the BOM items (either via the production version or by entering the supply area in the material master) as the system only includes dependent requirements that refer to a supply area.

- If necessary, you must maintain the detailed dependent requirements selection in the control cycle. For further information see also Creating/Changing a Control Cycle for Classic KANBAN [Page 31].

Features

The proposals for the number of kanbans or the kanban quantity are calculated on the basis of the results from the planning run or from long-term planning.

The following functions are available in the kanban calculation:

- The system determines the relevant dependent requirements (either from long-term planning or from MRP). See also: Calculating the Dependent Requirements for the Automatic Kanban Calculation [Page 51].

- The dependent requirements can be smoothed according to the settings in Customizing. See also: Smoothing the Dependent Requirements [Page 52]

- If you have maintained sub-day replenishment lead times in the control cycle and the appropriate work times have been saved in Customizing, the system converts the requirements per day to the time unit of the replenishment lead time. See also: Calculating the Replenishment Lead Time and Converting the Requirements [Page 54]

- The system calculates the number of kanbans or the kanban quantity on the basis of a formula. See also: Calculating the Number of Kanbans/Kanban Quantity [Page 55]

- If the system cannot carry out the calculation, it creates appropriate error messages which you can check in the error log. See also: Accessing the Error Log [Page 50]

- Using a special function, you can check the result of the calculation and accept the proposal. See also: Checking and Copying the Automatic Kanban Calculation [Page 47].

Actions

1. First of all you must decide whether you want to carry out the calculation using the data from long-term planning or from MRP.

2. To simplify the maintenance of mass data, you can maintain the calculation profile in Customizing for KANBAN. You must maintain the calculation profile if you want the system to smooth the dependent requirements or if you want to use sub-day replenishment lead times.

3. You must enter the profile or the calculation parameters in the control cycle.

4. Using the report, *Change proposal settings for KANBAN control cycles*, the system creates proposals for the number of kanbans or the kanban quantity.

5. The proposals are checked and accepted using the function *Checking the results of the kanban calculation*.

6. You can repeat the kanban calculation as often as necessary so that you can adjust the container circulation to suit your requirements situation.

Carrying Out the Automatic Kanban Calculation

1. In the main KANBAN menu, choose *Control cycle* → *Kanban calculation* → *Create proposal.*

    The system branches to the initial screen of the report *Create Change Proposal for KANBAN Control Cycles*.

2. Enter the plant for which the calculation is to be carried out.

3. Define whether the system is to use the dependent requirements from MRP or from long-term planning. If you want the system to use the simulative dependent requirements from long-term planning, you must also specify the planning scenario.

4. Define the period in which the system is to carry out the calculation.

5. Use the selection criteria to limit the selection of the control cycles for which the calculation is to be carried out.

    If you do not specify any selection criteria, the system carries out the calculation for all control cycles in the specified plant for which a calculation is allowed.

Result

Once the calculation has been carried out successfully, the system displays a success message with the number of control cycles included in the calculation as well as the number of control cycles which were not included in the calculation.

Checking and Copying the Automatic Kanban Calculation

Prerequisites

You are recommended to carry out the evaluation at regular intervals and link the evaluation to copying the results. In the kanban calculation, the system calculates a proposed date for the next necessary change. You can use this date, for example, to select all control cycles for which a change should be made in the next five weeks.

Procedure

1. In the main KANBAN menu, choose *Control cycle → Kanban calculation → Check proposal.*

   This takes you to the initial screen for evaluating and accepting the kanban calculation for the circulation data in the control cycle.

2. Enter the plant in which you want to check the kanban calculation.

3. Enter your selection criteria. If you require additional criteria for the selection than provided on the initial screen choose, *Detailed selection*.

4. You can also limit the selection of the calculated circulation data by entering tolerance values for the current control cycle data. Then, the system only proposes the control cycles that deviate from the current data depending on your entries.

5. Choose *Enter.*

   This takes you to the overview screen for checking and accepting the kanban calculation.

Evaluate Result

In the overview screen, the system displays the following actual data:

- The previous number of kanbans in the control cycle including the locked contains

- The previous number of kanbans that are not locked

- The previous contents of the kanban

The following data is displayed from the results of the kanban calculation:

- The next date, on which the change proposal should be accepted. This is the date on which the current number of kanbans or kanban quantity is no longer sufficient to cover requirements or exceeds the requirements.

- Depending on the calculation type, the system displays the kanban quantity calculated or the number of kanbans calculated as the proposal. The system also displays the minimum number/minimum quantity or the maximum number/maximum quantity calculated. The minimum or the maximum quantity/number is calculated from the minimum or maximum requirements according to the smoothing depending on the period of examination.

   In the calculation of the number of kanbans:

   If a smoothed dependent requirements quantity > 0 is calculated, the system proposes at least two kanbans.

Checking and Copying the Automatic Kanban Calculation

> If a smoothed dependent requirements quantity of 0 is calculated, the system proposes exactly two kanbans. However, these kanbans are locked when copied to the control cycle.
>
> In the calculation of the kanban quantity:
>
> If a smoothed dependent requirements quantity of 0 is calculated, the system copies the quantity 1 to the control cycle.

A graphic is also available for further evaluation purposes. To access this graphic, choose *Graphic* and enter the period of the display in the subsequent dialog box and specify whether your data from MRP or from long-term planning is to be displayed.

The following functions are also available:

- A details screen per row. Position the cursor on the row and choose *Goto → Calculation details.*

- You can display or change the control cycle. To do this choose *Goto → Display control cycle* or *Change control cycle.*

Accept Result

You have the following options for copying the result:

- You can copy the kanban circulation data for individual control cycles.

    To do this, select one or more rows and choose *Edit → Copy → Next change → For selected.*

- You can copy the kanban circulation data for all control cycles in the overview.

    To do this, choose *Edit → Copy → Next change → For all*.

- You can copy the kanban circulation data for all control cycles whose change date lies before the date you selected.

    To do this, choose *Edit → Copy → Next change → For change to.*

    A dialog box appears where you can enter the appropriate date.

- Instead of copying the system's proposal, you can also enter your own proposal. To do this, enter your proposal in the field ready for input for the next content or the next number of kanbans. After saving, the system copies this value.

If you Choose *Continue* before saving, the change proposals are copied to the first two columns for the next contents or for the next number of kanbans and are copied to the control cycle when you save your data.

> After saving, the system immediately overwrites the old data of the control cycle. That is, the change is not only valid from the change date calculated. Therefore, it is recommended that you carry out the check and copy in regular intervals and you should use the change date as the selection criteria.

Reverse Copy

You can also reverse the copied data, **as long as it has not yet been saved.**

To do this, choose *Edit → Delete copied data → All or selected.*

Accessing the Error Log

1. In the main KANBAN menu, choose *Control cycle* → *Kanban calculation* → *Display error log.*

    The system displays the initial screen of the error log.

2. Enter the plant for which you want to check the error log.

3. Enter your selection criteria. If you require additional criteria for the selection than provided on the initial screen choose *Detailed selection*.

4. Press `ENTER`.

Result

The system displays a list of control cycles for which an error occurred in the kanban calculation.

Calculating Depndt Reqmts for Automatic Kanban Calculation

The kanban calculation is only carried out for dependent requirements that refer to a supply area. This supply area is usually assigned to the BOM item. The following options are available for mass assignment of the supply area:

- Maintenance of the supply area in the production version

- Maintenance of the supply area in the material master record

- You can enter a plant, storage location and supply area in the detailed dependent requirements selection in the control cycle

For more information on this topic, see also Storage Location and Supply Area Determination in BOM Explosion [Page 21] and for more information on the detailed dependent requirements selection, see also Creating/Changing the Control Cycle for Classic KANBAN [Page 31].

Smoothing the Dependent Requirements

Use

In the planning run, the system takes for granted that all components are available to start producing the order, that is, on the order start date of the pegged order. It then plans the dependent requirements date using this information. This means the requirements date of the components lies on one particular day although the pegged requirement is produced over a period of time (often several days). In KANBAN, you can usually take for granted that not all components have to be provided at the same time for the start date of the order. Therefore, it may be necessary to smooth the dependent requirements before calculating the control cycles.

The result of the smoothing calculation is a smoothed requirements curve with minimum and maximum values for the number of kanbans and the kanban quantity.

Features

The following methods are available for smoothing the dependent requirements:

- Dependent requirements in one week are distributed evenly over the week. The period of examination contains several of these periods. Then it is not necessary to carry out the kanban calculation for every day but for every week. This type of smoothing is particularly useful if you plan on a weekly basis. Note that, for this type of smoothing only the week in which the dependent requirement lies is relevant.

- Dependent requirements are distributed between the dependent requirements date and the latest dependent requirements date using a distribution key. This type of distribution is more performance intensive than the weekly distribution described above. In this procedure, the system finds the distribution key either from the BOM item of the individual dependent requirements or if it has been defined centrally for the kanban calculation in Customizing for KANBAN (calculation profile) and assigned to the control cycle. Here, equal distribution usually makes most sense.

The following graphic illustrates the procedure in the system:

Smoothing the Dependent Requirements

Dependent reqmts

No working time

Distribution key (between dependent reqmts and the latest dependent reqmts date)

Smoothing of all dependent reqmts acc. to distribution key

Smoothing all dependent reqmts of one week

Calculating Replenishment Lead Time and Converting Requirements

You maintain the replenishment lead time in the control cycle (in either days, hours or minutes). If you maintain no replenishment lead time in the control cycle, it is determined from the material master record for both in-house production and external procurement. For in-house production, the replenishment lead time is then the in-house production time (factory calendar days) and for external procurement, it is the planned delivery time (calendar days). For stock transfer, you can **only** maintain the replenishment lead time in the control cycle.

The replenishment lead time is initially determined in days. However, in the control cycle, you may have entered a time unit that is less than a day. In this case, a time stream which contains the work time per day is assigned to the control cycle. The system converts the replenishment lead time to hours or minutes using this time stream.

> In the conversion, the system does not take different work times per day into account. Instead, the work time in the evaluation period is split by the number of factory calendar days in the evaluation period.

Calculating the Number of Kanbans/Kanban Quantity

In the standard system, the calculation is carried out using the following formula:

$$K. = \frac{RT \times AC}{CONT} \times SF + C \quad \text{or} \quad CONT = \frac{RT \times AC}{K - C} \times SF$$

K	**Numbers of Kanbans (from control cycle)**
CONT	**Contents per Kanban (from control cycle)**
RT	**Replenishment lead time per Kanban**
	(from control cycle or material master record)
AC	**Average consumption per time (from dependent requirements)**
SF	**Safety factor (from control cycle, default 1)**
C	**Constant (from control cycle, default 1)**

KANBAN Control

Purpose

This component describes the functions of KANBAN control. It explains, amongst other things, how the signal is triggered to replenish a material and which replenishment strategies are available.

Features

The **KANBAN signal**, usually in the form of a bar code, triggers a status change. In general, it is sufficient to work with the two statuses EMPTY and FULL. The KANBAN signal occurs, in general, after using the bar code. When a kanban is empty, the system receives the necessary information on the control cycle and replenishment, and automatically makes the postings required to trigger replenishment. When a kanban is full, the system automatically posts the goods receipt for the replenishment (depending on the settings).

For further information see also .

To organize your material replenishment in KANBAN, you can use: in-house production, external procurement, stock transfer. For each of these three options, there is a series of **replenishment strategies** available. Thus, for example, if you opt for external procurement, you can use standard purchase orders, scheduling agreements, stock transport orders, and so on.

For more information on this topic, refer to .

If you use the **automatic kanban calculation,** the system can create proposals for the number of kanbans and the quantity per kanban. A report is available for this purpose that creates these proposals on the basis of either the results of MRP or long-term planning as you require. You can also specify the evaluation period the system is to use for this calculation.

An online transaction is also available to check, change and transfer the proposals created by the system. From this transaction, you can display detailed information on the control cycle which you can use when checking the system's proposals.

For further information see also and .

The **kanban board** is a tool you use for evaluations and which also provides an overview of work progress and material consumption. The kanban board presents a clear picture of missing parts situations, bottlenecks, and so on for every supply area. For this purpose, the statuses of the kanbans and the error situations are represented by different colors. The kanban board can be accessed by both the supply source and the demand source (only the relevant data is displayed in each view). You can also use the kanban board to trigger the kanban signal.

For more information on this topic, refer to .

Whereas the kanban board only offers you an overview of the kanbans at a certain point in time, the standard analysis in the Logistics Information System (LIS) provides you with tools for creating evaluations of kanban circulation for an interval of your choice.

One of the main advantages of the KANBAN production control system is that the majority of the posting operations can be carried out automatically. If, however, errors should occur due to missing master data, or posting errors, for example, various evaluation and post-editing options are available. You can access the **Error display** evaluation to view the error situation. You can reprocess incorrect kanbans by accessing the **Kanban correction** function.

For further information see also <u>Displaying Errors [Page 187]</u> and <u>Kanban Correction [Page 84]</u>

The kanban is the key to KANBAN production control. All the necessary data on the control cycle and on replenishment is recorded on the kanban. You can control the **print and circulation of the kanbans** using the replenishment strategy and the organization of the control cycles. You can instruct the system, for example, to print the kanbans for every cycle, or you may only require one printout which then goes back and forth between the supply source and the demand source. You can print per control cycle or for multi-control cycles using a special function for the collective print.

For further information, see also <u>Printing and Circulation of Kanbans [Page 88]</u> and <u>Collective Kanban Print [Page 92]</u> .

Status Change/Kanban Signal

Use

The progress of production in KANBAN is controlled by setting the kanban to the appropriate status. By changing the status, both the demand and the supply source are also guaranteed an up-to-date overview of production progress in the kanban board. Usually, only the two statuses, EMPTY and FULL are used. If the material in a kanban is used and a kanban is then set to EMPTY, then replenishment is automatically triggered with this kanban status, i.e. the supply source receives the signal to refill the kanban. When the kanban is returned, full, to the demand source, it is then set to status FULL and goods receipt is posted for the material. As a rule KANBAN is possible with both statuses EMPTY and FULL, and the status changes are made using a bar code and a bar code scanner. The system automatically sends all important information from the demand source to the supply source simply by scanning the bar code.

If additional information is required for a special case, it is also possible to set other statuses:

- WAIT

    indicates that the material has been consumed but the supply source should not yet deliver more material. This status is also set when a new kanban is introduced to the control cycle.

- IN PROCESS

    indicates that the requested material is currently being produced by the supply source.

- IN TRANSIT

    indicates that the material is currently on its way to the demand source.

- IN USE

    indicates that the demand source is currently withdrawing material.

- ERROR

    is set by the system and indicates that the status selected cannot be set successfully.

The first four statuses only make sense if you use the **kanban board**. These statuses are actually set in the kanban board and inform you exactly how far production has progressed.

Features

The following statuses are available:

- WAIT (status 1)

    The system sets the status WAIT in the following instances:

    – When a new kanban has been taken on in the control cycle and still no replenishment has been triggered, then it has status WAIT and can be set to EMPTY by the demand source.

    – If the Independent Supply Source/Separation of Status Change and Replenishment [Page 74] has been defined. In this case, the kanban signal from the demand source does not trigger replenishment. Instead, when the system registers the kanban signal, it sets the kanban status to WAIT until the supply source triggers replenishment.

– If a kanban has been locked and is then set to EMPTY.

The status WAIT can also be given by the demand source in the kanban board for information purposes if certain kanbans are not to be refilled immediately. Please also see Kanban Board from the Demand Source View [Page 78] .

- EMPTY (status 2)

   When the kanban is empty, the demand source sets the status to EMPTY. Depending on the replenishment strategy, setting the status to EMPTY automatically triggers replenishment.

- IN PROCESS (status 3)/ IN TRANSIT (status 4)

   The statuses IN PROCESS and IN TRANSIT are set by the supply source to inform the demand source that the kanbans are either being processed or they have already been sent and are currently in transit. (These two statuses can only be set in the kanban board.)

- FULL (status 5)

   The demand source sets the status to FULL on receipt of the full kanban or when posting the goods receipt for the kanban. Exception: Separating the Status Change from the GR Posting [Page 73].

- IN USE (status 6)

   The status IN USE is set by the demand source to inform the supply source which kanbans are currently being emptied. (This status can only be set in the kanban board.)

- ERROR (status 9)

   The status ERROR is set by the system if an error occurs when processing a kanban. An error may occur if a kanban is set to EMPTY and a purchase order is to be created simultaneously. If the vendor desired is locked or invalid, it does not make sense to deal with this situation online. The kanban is set to ERROR and is assigned an appropriate error message.

   If you have defined in Customizing for KANBAN that an error message is issued when a certain error occurs, then the kanban is not set to ERROR. See also the section on Error Handling [Page 83] .

Statuses 2 and 5 are mandatory statuses, used to control the KANBAN procedure. Statuses 1, 3, 4 and 6 are all optional statuses, used for information purposes.

The status of each kanban is displayed in the kanban board, each status having a different color. A legend is available so that you can easily see what each color represents (*Kanban board → Display legend*).

The sequence of the status changes is displayed in the following graphic:

Status Change/Kanban Signal

Status sequence - all options

Status Sequence

Use

You can define restrictions and fixed sequences for the status change. For this reason, status sequences are defined in Customizing. Using the status sequence, you can also indicate which statuses are not allowed, and which are mandatory.

For each status, you define whether it is one of the following:

- a mandatory status

- a recommended status

- an optional status

- a prohibited status

The next status can be specified with the kanban signal:

- If you use the bar code to change the status, the next status can be included in the bar code information.

    The next status can also be selected in the input screen for the manual kanban signal or the kanban signal via bar code. If no next status has been selected and if this information is not included in the bar code, the system determines the next status automatically using the data recorded in the status sequence. If the next status field has been selected, and no status sequence has been defined, the system uses the standard status sequence with the two mandatory statuses FULL and EMPTY.

- In the kanban board, the next status is always set by selecting the corresponding function.

Depending on whether the next status is specified or not, the status sequence has the following effect:

- If the appropriate next status is included in the kanban signal, the system checks whether a status defined in Customizing as prohibited is to be set or whether a mandatory status has been missed out in the status sequence.

- If the corresponding next status is not given with the kanban signal, the system determines the next status automatically using the status sequence. The next recommended or mandatory status is set in the status sequence as follows: WAIT, EMPTY, IN PROCESS, IN TRANSIT, IN USE.

    The status WAIT can only be prohibited for the status change by the user. However, the system will continue to set this status, even if it is set to "prohibited" in the status sequence (for example, if a new kanban is introduced to the control cycle).

Triggering the Kanban Signal

Purpose

You use the kanban signal to change the status of a kanban and to carry out the activities linked to the status change (for example, posting the goods receipt when setting the kanban to FULL or creating a replenishment when setting the kanban to EMPTY).

You have several options for triggering the status change:

- Entry using an instrument for mobile data entry (barcode scanner with or without display).

    With the barcode scanner without a display, all the necessary data is imported automatically and the status is changed correspondingly.

    The bar code contains the following data:

    − a 10 character kanban ID number

    − the last character contains the next status to be set or a 0.

    If the next status is included in the bar code, then you require a separate bar code for every possible status. This means that at least the two bar codes FULL and EMPTY must be recorded on the kanban.

    If you only want to use one bar code on the kanban, then use 0 instead of the status code. The next status is usually determined automatically in the background if you select the *StatusSeq.* field, EMPTY and FULL being used alternately. If you want the system to take other statuses into account in the automatic search, you can define a status sequence in Customizing.

    If you then want to deviate from this set status sequence, you can also set the statuses manually. To do so you can enter the respective bar code number in the screen *Kanban signal* and choose the status desired.

    Please note: if a status sequence has been defined in Customizing, you can only select the statuses that have been maintained here.

    With the barcode scanner with a display, the necessary data is also imported automatically and the status is set correspondingly. If errors should occur when setting the status, then you can process the kanban and the conversion using the display of the instrument.

    For further information on the settings for the mobile data entry, see the section Mobile Data Entry for KANBAN [Page 69] .

- Manually using the KANBAN menu (without bar code)

- In the kanban board

    For further information here, see The Kanban Board [Page 75].

Process Flow

- Using the bar code scanner

    Entering a kanban

Triggering the Kanban Signal

    i.   Choose *Control → Kanban signal → Bar code.*

    ii.   The Kanban signal screen appears. The tab page *Processed kanbans* is active.

    iii.   To enter a kanban enter the bar code. If you want to carry out a goods receipt and the quantity is smaller than the kanban quantity, enter the actual quantity under *Actual quantity*.

    iv.   Save your entries.

    v.   The status is changed as soon as you Choose *Continue* .

Entering several kanbans

    i.   Choose *Control → Kanban signal → Bar code.*

    ii.   The Kanban signal screen appears. The tab page *Processed kanbans* is active.

    iii.   Choose the tab page *Preliminary entry*.

    By choosing this tab page and then *Kanban processing → Save*, you can ensure that the tab page *Preliminary entry* is immediately active on entering the screen.

    iv.   To enter a kanban, specify the bar code. If you want to carry out a goods receipt and the quantity is smaller than the kanban quantity, enter the actual quantity under *Actual quantity*.

    v.   Select *Continue*.

    vi.   The system lists the kanban in the table.

    vii.   Enter the other kanbans in the same way.

    viii.   Save your entries.

    ix.   The system carries out the status change and lists the kanbans in the tab page *Processed kanbans*.

You have the option of entering kanbans from different control cycles and with different statuses at the same time. The individual kanbans are processed one after the other.

- Manually using the KANBAN menu

    i.   To do this, select *Control → Kanban signal → Manual entry*.

    ii.   In the initial screen, enter the number of the control cycle or the following selection data:

    −   Material

    −   Plant

    −   Supply area

or

    −   Kanban ID number

or

    −   Control cycle number/kanban number

iii.   Also enter the actual quantity and if necessary the batch. If you do not enter the actual quantity, the system uses the target quantity defined in the control cycle for posting.

The next status is usually determined automatically in the background if you select the *StatusSeq.* field, EMPTY and FULL being used alternately. If you want the system to take other statuses into account in the automatic search, you can define a status sequence in Customizing.

If you then want to deviate from this status sequence, you can also set the status manually. To do this, select the status you want. Please note: if a status sequence has been defined in Customizing, you can only select the statuses that have been maintained here.

Trigger Kanban Signal for Event-Driven KANBAN

Prerequisites

You can only trigger the event-driven kanban signal for materials which are procured by a control cycle for event-driven KANBAN.

Using this function, the system only creates a new kanban with status EMPTY and depending on the replenishment strategy, it also creates the appropriate replenishment element automatically. You can only set the kanban to FULL or make another status change using the bar code or the appropriate function in the menu or using the kanban board. The kanban created here is deleted again when it is set to EMPTY (for example, by the kanban signal from the bar code scanner). A new event-driven kanban signal then creates another new kanban with replenishment.

> The kanban is deleted as follows in the system: For performance reasons, when the kanban is set to empty, it is flagged for deletion. The next time the event-driven kanban signal is triggered, the system creates a kanban with this **same** kanban number.

Procedure

1. In the main KANBAN menu, choose *Control* → *Kanban signal* → *Event-driven KANBAN.*

   The system displays the entry screen for the event-driven kanban signal.

2. Enter the number of the control cycle for the following selection data:

   – Material

   – Plant

   – Supply area

3. Enter the requested quantity and save your entries.

Result

Depending on the data you entered in the control cycle, the system either creates a kanban for the complete requested quantity or it creates one or more kanbans according to the following criteria:

- If you entered a rounding quantity, the quantity requested is rounded if necessary.

  - If you entered a fixed kanban quantity, the following options exist:

    – If the requested quantity is smaller than the fixed kanban quantity, the system replenishes the fixed quantity.

    – If the requested quantity is greater then the fixed kanban quantity, the system splits the total quantity by the fixed quantity and creates the appropriate number of kanbans for the fixed kanban quantity. If a rest quantity remains after dividing the quantity requested by the fixed quantity, the system creates an additional kanban for the fixed quantity to cover this rest quantity.

- If you entered a proposed value for the kanban quantity and you do not define a requested quantity, the system uses this proposed value.

The kanbans created are displayed in a list in the section of the screen entitled *Processed kanbans*.

> If you change the quantity of the replenishment element created in event-driven KANBAN, the quantity requested is **not** changed. The quantity requested documents the original quantity requested. The goods receipt, however, is posted for the current quantity of the procurement element.

Trigger the Quantity Signal

Prerequisites

Instead of triggering the kanban signal by setting a kanban to EMPTY, you can withdraw quantities from kanbans in a control cycle using the quantity signal. Here, the system automatically sets the kanban to empty .

The system sets the kanban to FULL as normal with the kanban signal.

> Only the actual quantity of the kanban is updated when you use the quantity signal - no stock postings are carried out. The stock postings are carried out when the material is backflushed.

Procedure

1. In the main KANBAN menu, choose *Control → Kanban signal → Quantity signal*.

2. Enter the number of the control cycle for the following selection data:

    –   Material

    –   Plant

    –   Supply area

3. Enter the withdrawal quantity.

4. Save your entries.

Result

If only the actual quantity of a kanban is changed, the system displays the message, "*Quantity was reduced*".

If in the background, the status of a kanban is changed, then the kanban appears with its new status in the list of processed kanbans.

> If you want to use the quantity signal, you do not have to change Customizing for KANBAN or the KANBAN master data. The procedure using the quantity signal is simply carried out using the function "quantity signal". It is also possible to combine the kanban and the quantity signals.

One-Card KANBAN / Special Logic for Triggering Kanban Signal

Prerequisites

To trigger a kanban signal with one of these processes, you must have defined which signal triggers replenishment in the control cycle. The number of kanbans circulating with one-card kanban is two.

The signals for triggering replenishment include:

- Set status IN USE

  Here, replenishment is triggered for kanban A when kanban B is set to IN USE

- Set status WAIT

  Here, replenishment is triggered for kanban A when kanban B is set to WAIT.

- Reaching or exceeding the trigger quantity

  Here, replenishment is triggered for kanban A when the actual quantity of kanban B reaches or falls below the trigger quantity. In this case, you must have maintained the trigger quantity in the control cycle.

Procedure

To trigger the kanban signal, you can also use the functions that are available in classic KANBAN, for example, you can use a bar code or the kanban board. A replenishment element, however, is only created if you have set the appropriate status in the control cycle.

For further information here, see One-Card KANBAN [Page 15].

Mobile Data Entry for KANBAN

Use

It is possible to process kanban signals that have been entered into the system by a barcode scanner, using an instrument with both a barcode scanner and a display. This allows you to process errors on site, for example, if you encounter errors when setting a status.

For this purpose, existing screens in the KANBAN component have been changed into character screens with the SAPConsole, so that they can be displayed on a data entry instrument. This means that it is not necessary to use external middleware to convert the screen.

Integration

- You make the settings for using this solution in Customizing for Logistics Execution.

- The screen is converted to a character screen using the SAPConsole. For information about the SAPConsole, see the SAPNet under the alias *LES*. Here, choose *Media Center → Literature*. This will take you to the SAPConsole user guide.

Prerequisites

In Customizing for Logistics Execution under *Mobile data entry → Define menu management* you have defined a main menu for KANBAN or you use the SAP KANBAN menu, which is under the warehouse number.

In Customizing for Logistics Execution under *Mobile data entry → RF Queue management assign user to queues* you have assigned the KANBAN main menu or the main menu you have defined yourself, to your users.

> ⚠️
>
> In the field *Status*, set the indicator so that the user is active for mobile data entry.
>
> The warehouse number used in menu management must match the warehouse number used for assigning the user to queues. This is simply necessary for technical reasons; the warehouse number does not have any other significance for KANBAN in this process. You can fill the field *Queue*, as you like, as it is unimportant for the KANBAN process.

Features

Actions

1. On the *Logon Screen* select a display format and then choose *F1-Save*.

    This takes you to the screen *RF Menu.*

2. Choose the number of the process you desire and then choose *F4-Con.*

    All processes run, just as if you were not using an instrument for mobile data entry.

3. To log off, choose *F8-L.off*

Explanation of the Abbreviations

Abbreviation	Explanation
F1-Save	Save or confirm the entry
F2-Rset	Reset the data entered
F3-Back	Go back one screen
F4-Con.	Continue
F8-L.off	Log off

Backflush

Purpose

If you use manual kanbans or if you use the procedure with planned orders (with and without MRP), you backflush using the backflushing function in the KANBAN menu. This is a special backflush with reference to a cost collector. As the kanban is set to FULL, the system automatically posts the goods receipt for the finished product and backflushes the goods issue for the components.

If you use KANBAN with production orders, you must use the backflushing function in the *Production Orders* menu.

Implementation Considerations

In order to be able to backflush a material procured by KANBAN, you must have maintained the KANBAN master data (e.g. control cycle, supply area).

Integration

This function is integrated both in the repetitive manufacturing menu as well as in the KANBAN menu.

Features

- Goods receipt is posted for the backflushed material.

- The current BOM is exploded.

- Goods issue is posted for the components

- The master production schedule is reduced. The planned orders are reduced corresponding to the settings in Customizing for repetitive manufacturing.

- The actual costs are posted to the production cost collector.

If KANBAN is carried out with MRP, the run schedule quantities are backflushed with reference to the kanban and reduced.

Backflushing

1. Proceed as follows: Select *Control → Backflush.*

   The system displays the initial screen for backflushing.

2. Enter the following data:

   - Posting date

     The system proposes the current date as the posting date. The system uses this date to determine the bill of material for the assigned planned order.

   - Document date

     The system proposes the current date as the document date.

   - Plant and material

     If you enter a plant and a material, you can also specify a supply area (demand source) as well as a person responsible (supply source).

   - Control cycle

     Instead of the plant and the material you can also enter a control cycle. This clearly defines the demand source and the supply source for a material. If you enter a control cycle, you do not have to enter further data.

3. Select *Continue*.

   The system displays the backflush screen.

   The system displays the selected kanbans for backflushing.

4. To backflush, you must select the kanban in the column *Backflush*.

5. If applicable change the quantity to be backflushed in the field *Actual quantity.*

6. If you also want to change the components in the withdrawal BOM, then select the column *Components*.

   The system then displays the same dialog box as in the Repetitive Manufacturing backflushing function.

7. Save the backflush.

   In kanban backflushing, you cannot post backlogs as the postings for KANBAN are not based on a run schedule header.

Separating the Status Change from the GR Posting

Use

Usually, the two procedures, posting the goods receipt and the status change "set kanban to full" are linked. This means: When the status is changed using the bar code scanner, for example, the system automatically posts a goods receipt for the material in the background. It is also possible the other way round: if a goods receipt is posted for the material that is controlled using KANBAN, then the status is automatically set to FULL.

However, in the control cycle (via the selection *Separate GR*), you can define that the goods receipt posting and the status change (kanban to FULL) are to be carried out independently of each other.

This is particularly useful in the following situations:

- If the goods receipt for externally procured materials is posted in a central warehouse.

- If the goods receipt posting is automatically linked to the backflush. This is useful when transport times are lengthy. Here, for example, you can separate the backflush which is posted by the supply source from the status change which is changed by the demand source.

If you use a replenishment strategy with direct transfer posting, the goods receipt is posted as soon as the kanban status is changed to EMPTY. This means that there is no sense in the "*Separate goods receipt*" indicator here as the status change to FULL and the goods receipt posting are always separated.

> If you use run schedule quantities, manual KANBAN, or external procurement with schedule lines, you first have to post the goods receipt before the status can be set to EMPTY again.

Independent Supply Source/Separation of Status Change and Replenishment

If you want to trigger replenishment using KANBAN, the system creates the replenishment element (such as a planned order) when the status is set to EMPTY. If necessary, you can separate these two operations.

If you have set the system so that they are separated, the supply source triggers replenishment and not the demand source. The demand source sets the kanban to EMPTY. However, no replenishment element is created and the system automatically sets the kanban to status WAIT. The supply source then sets these kanbans to EMPTY in the kanban board which creates the replenishment element. The independent supply source thus determines the time of replenishment itself.

The replenishment strategy is determined in the control cycle. The control cycle is also assigned the indicator "*independent supply source*".

> This procedure with "*independent supply source*" can only be used along with the kanban board.

The Kanban Board

Use

To provide the demand source as well as the supply source with a detailed overview of kanban circulation, you have the option of using the kanban board. The kanban board can also be used to trigger the kanban signal.

Prerequisites

You have defined the settings for the kanban board in Customizing for KANBAN.

- You have defined the control cycle display; you have set which columns are to be displayed in the kanban board and how the data is to be sorted and grouped.

- You have defined the kanban display; you have set how the kanbans are to be labeled and how they are sorted.

- You have defined what should be included in the quick info for the kanbans.

- You have defined the settings for the kanban board in Customizing for the GANTT chart.

If you do not make any settings, then the system uses the standard values.

Features

Kanban status

The kanbans are displayed in different colors according to their status. You can view the color legend by selecting *Kanban board → Display legend*.

The following information is available with the kanban board:

- Kanbans with the status EMPTY. Replenishment has been triggered for these kanbans. That is, a planned order, production order or purchase order for external replenishment has already been created in the background.

- Kanbans with status FULL, from which you can withdraw material.

    In control cycles where the status change and goods receipt are separated, the system also displays whether the separate goods receipt for the full kanban has already been made or not ('+' means goods receipt has taken place; '-' means that it has not taken place).

- Kanbans with status WAIT. These are

    - Kanbans that have been newly introduced to the control cycle and for which no procurement has yet been triggered.

    - Kanbans in control cycles, for which Independent Supply Source/Separation of Status Change and Replenishment [Page 74] has been defined. In this case, replenishment is not triggered automatically when the demand source changes the status. Instead, the supply source triggers replenishment.

    - Kanbans that have been assigned the locking indicator and for which no replenishment has been triggered since they were set to EMPTY.

Kanbans can only be locked in the control cycle or by the kanban calculation. Please also read Creating/Changing a Control Cycle for Classic KANBAN [Page 31] and Automatic Kanban Calculation. [Page 44]

- Kanbans with status IN PROCESS or IN TRANSIT. Please also see Kanban Board from the Supply Source View [Page 80] .

- Kanbans with the status ERROR.

  If an error occurs during the status change, the kanban is considered faulty.

- Kanbans with the status SEPARATE GR FOR KANBAN.

  If you want to rule out the option of setting the kanban to a specific status in one of the two views, then in the Include MMPKBDEF (under 'Functions of a New Kanban Board') you can set which status can be set only in the demand source view or in the supply source view.

Triggering the Kanban Signal

You can change the status of the kanban(s) in the kanban board, by selecting one or more kanbans.

In addition, in the kanban board using *Edit* → *Generate kanban* you can create a new kanban in an event-driven control cycle. Here, enter in the following dialog box the requested quantity and choose *Generate event-driven KANBAN.*

Display Options

You can change the display of the kanban board by selecting the *Settings* menu option. You can then save your own user-specific layout. The following options are available:

- You can increase or decrease the kanbans displayed.

- You can overwrite the Customizing settings for the kanban board with user-specific settings and thus change the display via *Settings* → *Display control cycle* or *Display kanbans* or *Display quick info.* Here, you have the same options as in Customizing. You can delete this user-specific data again at any time. You carry out the user-specific settings in the same way as in Customizing for KANBAN.

Additional Information

- You can access additional kanban information by double-clicking on the kanban.   This information includes: control cycle, material, plant, actual quantity, status, date of the last status change, replenishment strategy, number of the replenishment element. In this dialog box you can change or display the replenishment element for empty kanbans via 'Change replenishment' or 'Display replenishment'. If errors have occurred, error messages will be displayed.

- You can display the control cycle data by double-clicking on the corresponding line in the kanban board.

- Using *Goto* you can display the current stock/requirements list, the stock overview or the material master for a control cycle, i.e. for the corresponding material.

- Using Goto you can access the kanban correction for a control cycle. For the Kanban correction procedure, see Kanban Correction. [Page 84]

Search Function

The Kanban Board

Using the search function, you can search for materials or supply areas. Choose *Select*. In the following dialog box enter the search term with an asterisk before and after it.

The Kanban Board from Demand Source View

Use

In the kanban board, the system displays the control cycles, listed according to the supply areas to which they are assigned. All the kanbans that are in circulation are displayed with their current statuses for each control cycle. The demand source can use the kanban board instead of the bar code to change the status of the kanbans, that is, set them to FULL, EMPTY, WAIT, or IN USE. For further information on status see Status Change/Kanban Signal [Page 58] .

Prerequisites

- You have defined the default values for the kanban board in Customizing for the GANTT chart.

- You have made the settings for the kanban board in Customizing or defined the user-specific settings for the display in the kanban board. You have the same options for the user-specific settings as in Customizing. The user-specific settings overwrite the Customizing settings.

Procedure

1. Starting from the main KANBAN menu, select *Control → Kanban board → Demand source view*.

   The system takes you to the initial screen of the demand source overview.

2. Enter the plant.

3. You can also select with:

   – the supply area

   – the responsible person

   – the storage location

   – the material as a further selection criterion.

   If you require additional selection criteria, you can use the function *Detailed selection*. To access the detailed selections, choose *Detailed selections* and enter your selection criteria in the following dialog box.

   You can save the options for accessing the kanban board by selecting *Display → Save settings*.

4. Select *Continue*.

   Depending on the selection criterion you are given the kanban board with one or more supply areas.

5. To give a kanban another status from the demand source view, select it and choose *Set status to FULL* or *Set status to EMPTY.* All other statuses can be found in the menu under *Edit*.

   Depending on the replenishment strategy, the system carries out the appropriate transactions in the background.

The Kanban Board from Demand Source View

It is possible to select several kanbans at the same time and to change the status. If you have selected a kanban for which the desired status is not permitted, then you receive a message. The status of this kanban remains unchanged.

To generate an event-driven kanban, select a row from the corresponding control cycle and choose *Edit* → *Generate kanban*. In the following dialog box enter the requested quantity before you choose *Generate kanban.*

The Kanban Board from Supply Source View

Use

The supply source can also work with the kanban board. It receives your overview of which kanbans are full and which kanbans have to be replenished.

In the kanban board from the supply source view, the system displays the control cycles with all kanbans in circulation along with their current statuses. The supply source can also change the status of kanbans in your overview.

Prerequisites

- You have defined the default values for the kanban board in Customizing for the GANTT chart.

- You have made the settings for the kanban board in Customizing or defined the user-specific settings for the display in the kanban board. You have the same options for the user-specific settings as in Customizing. The user-specific settings overwrite the Customizing settings.

Procedure

1. Starting from the main KANBAN menu, select *Control* → *Kanban board* → *Supply source view*.

   The system branches to the initial screen of the supply source.

2. Enter

   - the plant and the person responsible for in-house production

   - the issuing plant for plant-to-plant delivery

   - the vendor for external procurement

   - the plant and storage location for stock transfer

   - the material number as a further selection criterion.

   If you require additional selection criteria, you can use the function *Detailed selection*. To access the detailed selections, choose *Detailed selections* and enter your selection criteria in the following dialog box.

   You can save the options for accessing the kanban board by selecting *Display* → *Save settings*.

3. Select *Continue*.

   Depending on the selection criterion you are given the kanban board with one or more supply areas.

6. To give a kanban another status from the supply source view, select it and choose *Set status to IN PROCESS* or *Set status to IN TRANSIT.* All other statuses can be found in the menu under *Edit*.

   Depending on the replenishment strategy, the system carries out the appropriate transactions in the background.

The Kanban Board from Supply Source View

It is possible to select several kanbans at the same time and to change the status. If you have selected a kanban for which the desired status is not permitted, then you receive a message. The status of this kanban remains unchanged.

To generate an event-driven kanban, select a row from the corresponding control cycle and choose *Edit* → *Generate kanban*. In the following dialog box enter the requested quantity before you choose *Generate kanban.*

User Exit for Customer-Specific Fields in the Kanban Board

Use

User exit MPKP0001 allows you to display customer-specific fields in the kanban board, in addition to the information available.

Integration

Previously, the user exit MPKB0002 was available. This new user exit is necessary because of technical changes. User exit MPKP0001 uses the same interface. Therefore you simply need to copy your existing coding into the new user exit MPKP0001, to be able to use it.

Error Handling

Use

When an error occurs during a status change, the SAP System provides two possibilities: The system issues an error message and retains the status of the kanban so that the action can be repeated at any time, or the system sets the kanban to status ERROR. You can only process an incorrect kanban again if you have carried out the kanban correction. Here you require the appropriate authorization.

Prerequisites

If the system simply issues an error message without changing the kanban status, then you must have already defined this in Customizing for KANBAN under *Status → Define error handling in status change.* To do so you require the transaction code, the work area and the number of the corresponding error message. For further information read the appropriate Customizing documentation.

Features

- Setting the status to ERROR.

    This can be useful, for example, if there is no valid production cost collector when carrying out the backflush of a run schedule quantity. In this case it is advisable to set the kanban to status ERROR since the user must initially complete the missing data. After completing the data, you can set the status of the kanban from ERROR to the next status in the kanban correction.

- Issuing an error message while retaining the kanban status

    In some situations, for example if the data is temporarily locked by another user, it is not advisable to change the kanban status. An error message is sufficient, which tells the user that the data is locked. The action can then be repeated at any time.

Kanban Correction

Use

You use the kanban correction functions to correct the ERROR status (status 9), that is, you reset the status to one that is valid for processing once you have corrected the error.

Errors can occur when posting goods receipts if Customizing data or master data has not been maintained correctly so that the system could not find a cost collector.

In Customizing for KANBAN under *Status → Define error handling in status change* you can define that when a kanban produces a certain error, it is not given the status ERROR but that the system simply produces an error message. In this case you do not need a kanban correction. Please read the section on Error Handling [Page 83].

Prerequisites

You should first of all correct the error in Customizing or in the master data.

Features

In the kanban correction you have the following options:

- Display error messages

  Using *Error messages* you can display the error message or the long text of the error message for a faulty kanban.

You can edit the kanban via *Choose*:

- Change status manually

  You can change the status by entering the new status in the field group *Correction* and choosing *Change status/quantity.*

  Please note: The system changes the status but does not automatically create or change a replenishment element. For faulty kanbans you can create the replenishment element with *Kanban correction* and you can change the replenishment element with *Change replenishment*.

- Change actual quantity manually

  You can change the actual quantity by entering the quantity in the field *Actual quantity* and choosing *Change status/quantity.*

  The system changes the actual quantity, but no goods receipt is posted. This means that no automatic posting is made in Inventory Management. If you want the quantity changes to have an effect on warehouse stock, you must also repeat these changes in Inventory Management.

  It can make sense to change quantities with no GR posting if, for example, the actual kanban quantity deviates from the target quantity and this information is to be passed on to the demand source and to the supply source. Therefore it is extremely informative to change quantities. This function is only used with the quantity signal.

  The batch is also very informative *(Actual quantity/batch).* This function is used with withdrawal to cost center.

Kanban Correction

- Repeat goods receipt

    If the goods receipt could not be posted as expected when reporting a kanban FULL (for example, if the system could not convert the currency or if the kanban is faulty for another reason), then you can manually post the goods receipt later.

    If you defined "separate goods receipt" for the control cycle, then the system only sets the status to FULL. The actual goods receipt must be posted in Inventory Management.

    In the field *Actual quantity* enter the quantity to be posted, check the status and select *Kanban correction.*

- Retrigger replenishment

    If an error occurred in the replenishment procedure (for example, the scheduling agreement is no longer valid), then it can be retriggered from the kanban correction screen. Here, the system creates a new replenishment element (for example, a new production order).

    This can be achieved using *Kanban correction*. The system displays a dialog box for confirmation.

    If you use this function when another valid replenishment element exists, then the system does not delete the old replenishment element. However, the reference between the kanban and the old replenishment element no longer exists. Therefore, if you set a kanban to FULL you can no longer post a goods receipt for the old element. It is recommended that you delete old replenishment elements. You will only see the number of the old element until the new element has been created.

- Reversals

    You can reverse the last kanban signal. This includes the following actions:

    - The current status is reset to the previous status.

    - The actions linked to the status change are reversed. (That is, purchase orders, reservations and production orders are flagged with a deletion indicator, planned orders and schedule lines are deleted. The document from the goods receipt is reversed and so on.)

    In the following cases, a reversal is not possible:

    - If you have already processed a kanban in the kanban correction, then you can no longer carry out a reversal.

    - If a kanban has already been reversed, you cannot reverse this kanban a second time.

    In order to carry out the reversal, press the button *Reversal*.

- Change replenishment

    If a replenishment element has already been created, you can change it here (if you have the necessary authorization).

Using *Change replenishment* the respective replenishment element appears and here you can carry out the changes.

Correcting the Kanban

You have three options for accessing the kanban correction functions:

From the main KANBAN menu

1. Select *Control → Kanban correction*.

   This takes you to the initial screen for correcting kanbans.

2. Enter the material number, plant and the supply area to define the control cycle and then Choose *Enter*.

   The system displays a list of all the kanbans in the control cycle.

From the kanban board

1. Position the cursor on the control cycle.

2. Select *Goto → Kanban correction.*

   The system displays a list of all the kanbans in the control cycle.

From the error display screen

1. Position the cursor on the error line.

2. Select *Goto → Kanban correction.*

   The system displays a list of all the kanbans in the control cycle.

   Now you can carry out the kanban correction:

3. Select the kanban that you want to process by double-clicking on it.

   In the lower half of the screen, a section appears entitled *Correction,* which includes the following data:

   – kanban number

   – kanban status

   – actual quantity

   – delivery date

   – delivery time

4. Carry out your corrections (e.g. manually change the status or actual quantity etc.).

5. Save your entries.

Printing and Circulating Kanbans

Use

In the following paragraphs, the various options for printing and circulating the kanbans (cards) are described. The form for printing the kanban is determined in the replenishment strategy.

Features

Single kanban print

The kanbans (cards) are only printed once or they are printed for replacement purposes using the *Create control cycle* and *Change control cycle* functions. The same kanban is used over and over again. The following options exist:

- The kanban card circulates between the supply source and the demand source with the container.

- The kanban card is passed from the demand source to the supply source without a container but returns to the demand source with one. Here, you have to organize the transport of the cards to the supply source.

- The card remains at the demand source and is attached to the full kanban or is stored without a kanban at a predefined location. There is no information on the circulating kanbans and the information on empty kanbans is kept at the demand source. Information is passed on to the supply source by means of the kanban board.

Kanban (card) reprinted for every control cycle run

The kanban is thrown away at the end of each control cycle. Here, you have the following options for reprinting the new kanbans:

- Kanban printed when replenishment is triggered

  With in-house production or for stock transfer, the kanban is printed at the supply source. This means:

  – The kanban does not have to be transported to the supply source

  – The kanban can be used as an extra written request for delivery (for example, for in-house production with planned orders or manual kanbans).

  – For production orders, printing is carried out using the print control for production orders, in all other cases, it is carried out using the KANBAN transaction. (The output device is taken from the control cycle, and the form from the replenishment strategy.)

- Kanban printed at goods receipt posting

  It makes sense to print the kanban at goods receipt for external procurement with central goods receipt. If you work with a strategy where the GR is carried out automatically in the background as soon as the status is changed to FULL, then do not use this print control technique. The kanban is printed when a GR is posted for a purchase order or a production order (or a stock transfer reservation) using the GR function in Inventory Management. This means:

  – The kanban is printed with or instead of the GR papers and is attached to the kanban.

Printing and Circulating Kanbans

- – The kanban is printed using the GR print control.

- Kanban printed at backflush (for planned order and manual kanban). This means:

  - – The kanban is printed at the supply source and is sent to the demand source along with the kanban.

  - – The kanban is printed using the settings in the control cycle.

  - Kanban printed with the purchase order to which it is attached. This means:

    - – The kanban is printed together with the purchase order and must be defined as a part of the order form. The order form controls whether or not a kanban is printed and not the entries in the control cycle.

    - – The kanban is printed along with the purchase order print.

Exception: kanbans printed by vendor

The data required to print the kanban is passed on to the vendor in the purchase order. Settings as in single kanban print.

Set to Single Kanban Print

You can trigger the single kanban print from the control cycle. Proceed as follows in the control cycle:

1. Maintain the output device for printing the kanban.

2. Select *Goto* → *Print kanban.*

   The system displays the *Print kanban* dialog box*.* The individual kanbans are numbered and are each provided with a checkbox.

3. If you only want to print some of the kanbans, select those that you want to print and then choose *Selected kanbans*.

   If you want to print all the kanbans, choose *All kanbans*.

   The system prints the kanbans you selected.

   You must maintain a form in the replenishment strategy for the kanban printout.

Set to Regular Kanban Print

If you want the kanban to be printed for every control cycle run, you must maintain the following data in the control cycle:

1. Maintain the output device for printing the kanban.

2. Maintain the indicator for printing the kanban.

    This defines the event that triggers the kanban print:

    –   every time replenishment is triggered (that is, set status to EMPTY)

    –   for every goods receipt posting

    You must maintain a form in the replenishment strategy for the kanban printout.

Collective Kanban Print

Use

Using the collective print for kanbans, you can simultaneously print kanbans for several control cycles.

Features

The following selection criteria are available for selecting the kanbans to be printed:

- Limitations for the demand source via the selection criteria:

    – Storage location

    – Supply area

    – Person responsible

- Limitations for the supply source via the selection criteria:

    – Vendor (for external procurement)

    – Issuing plant (for multi-plant stock transfer)

    – Storage location (for stock transfer within a plant)

    – Person responsible (for in-house production)

- Select kanbans by the material number.

- Select kanbans by the replenishment strategy by entering the strategy key.

- Select kanbans by the settings made in the control cycle for printing the kanban (print indicator) or by the printer that is assigned to the control cycle for printing the kanban.

- Selection of kanbans by the current status as well as date and, if necessary, the time of the last status change. Here, you can select all kanbans, for example, that were set to EMPTY at 2.00p.m as the printer was out of service at this time.

Print Kanbans Collectively

1. Starting from the main KANBAN menu, choose *Control cycle* → *Print kanban.*
    The system displays the initial screen of the report.

2. If you want to print kanbans and they are to be printed on a central printer instead of the one
    set in the control cycle, then enter the required printer in the field *Output device*.

3. Enter the plant in which the kanbans are to be selected.

4. Define the appropriate criteria for the selection. You can save these criteria as a variant as
    you can for every report.

5. Press *Execute* .
    The system displays the results of your selection.

6. In order to print all of the kanbans in the control cycle chosen, select all control cycles and
    choose *Print kanbans*.

7. To select or display individual kanbans per control cycle for printing, choose *Kanban list.*

8. To display data for a kanban, you have to first of all display the kanban list. Then position the
    cursor on the appropriate kanban and choose *Display kanban* or double-click the kanban.

To display the master data of the control cycle, position the cursor on the desired control cycle
and choose *Goto* → *Display control cycle* or double-click the appropriate control cycle.

Sending EDI Messages

> This is a function from former releases, which should no longer be used. Instead, you should use the function Replenishment via Summarized JIT Calls [Page 109] .

Use

In some cases, it may be necessary to send a kanban as an EDI message. This kanban does not then represent a separate purchase order or a schedule line (which can already be sent via EDI). Instead, this kanban represents a manual release order for a quantity of a purchase order or a schedule line that may already have been sent to the vendor as a preview. At present, no standards exist for such a procedure. Instead, the customer and the vendor must agree between themselves on the type of EDI message to be sent and how this is to be organized. The processing of these messages by the vendor must also be solved on an individual basis.

Features

However, to support such procedures, a solution does exist that is based on a user-exit and a customer modification.

The enhancement MPKD0001 contains two function modules. With one of the function modules, the control record is created for an EDI message which also defines which type of EDI message is to be sent. The contents of the EDI message is defined in the second function module. A program modification determines if, and under what circumstances, an EDI message is to be sent. To do this, you must replace the line, CHECK 1 = 2 in the program include LMPKBEDI, in the form routine FORM SEND_EDI with coding that controls whether an EDI message is to be sent. For example, you can define a special replenishment strategy for control cycles for which an EDI message is to be sent and refer to this strategy here.

Replenishment Strategies

Use

KANBAN replenishment is controlled by various different replenishment strategies. The replenishment strategies determine in which way the kanban quantity is produced or procured, in other words whether a replenishment element (or which replenishment element) is created by the system.

The replenishment strategy, which is defined in Customizing for KANBAN and which is assigned to a material in the control cycle, controls whether procurement is to take place using in-house production or external procurement or whether stock is to be transferred between storage locations.

You can choose between the following:

Features

- Replenishment Strategies for In-house Production [Page 96]

    Here, you produce the kanban quantity yourself, to supply your own production.

- Replenishment Strategies for External Procurement [Page 104]

    Here, you obtain the kanban quantity using an order or a scheduling agreement from a vendor, for example.

- Replenishment Strategies for Stock Transfer [Page 135]

    Here, you transfer the kanban quantity to supply your own production.

Replenishment Strategies for In-house Production

Use

There are several replenishment strategies available for in-house production.

The following sections show you how you can trigger replenishment of in-house procured components with KANBAN.

Replenishment Using Manual KANBAN

Use

If the demand source empties the kanban, no replenishment elements are created. You use this type of replenishment if your production is controlled purely by the kanban card or the kanban board and not by the planned orders created by the system.

Prerequisites

If you want to work with the manual KANBAN procedure, you must provide the material with a repetitive manufacturing profile in the material master record which allows settlement via cost collector. In the standard system, the repetitive manufacturing profile *0005* is used. This profile contains the parameters for this replenishment strategy, in particular for the determination of the cost collector. For more information on the cost collector and the repetitive manufacturing profile, see Cost Accounting for KANBAN [Page 148].

Features

Standard Procedure

As soon as the kanban is empty, this information is conveyed to the source. The supply source receives the information either via the kanban (card) or via the kanban board. The supply source produces the kanban quantity. If the kanban board is in use, the supply source can set the kanban status to IN PROCESS or IN TRANSIT which informs the demand source of production progress.

Backflushing is carried out using the backflush transaction or by setting the kanban status to FULL. The backflush transaction is linked to the goods receipt posting of the manufactured product and the goods issue posting for the components.

If the status is set to FULL or the backflush transaction is posted without component processing, then the system explodes the current BOM. If you want to change components, you should work with the backflush transaction where it is possible to branch into the component processing functions.

The costs incurred in production are posted to the cost collector. To determine the cost collector see Product Cost Collectors. [Page 149]

Independent Supply Source

This is only used for information purposes, as no replenishment element is created.

Separate Goods Receipt

During the backflush, the goods receipt is posted, but the kanban status is not set to FULL. If a goods receipt is posted before the backflush, the system does not automatically set the kanban status to FULL.

In a separate goods receipt, only the backflush increases the kanban quantity and not the status change to FULL. Therefore, if the backflush is carried out, the kanban quantity is refilled, even if at this point in time, the kanban status has not been set to FULL. (This change is displayed in the kanban board by a + in the kanban status.) If the kanban status is set to FULL before the backflush has been carried out, the kanban quantity remains at zero until the backflush has been saved.

It is not possible to reset the kanban status to EMPTY before the backflush has been carried out.

Also read the section Separating the Status Change from the GR Posting [Page 73].

Replenishment Using Run Schedule Quantities

Use

You use this function when you produce the necessary material yourself, using repetitive manufacturing. As soon as a kanban is set to EMPTY the system creates run schedule quantities for this material, for example planned orders for repetitive manufacturing, and this triggers production.

Prerequisites

- You have entered a repetitive manufacturing profile for the material in the material master, that guarantees billing with cost collector.

- You have created a production version for the material in the material master record.

- You have created a cost collector.

  In this process the system posts the costs incurred in production to the cost collector. To determine the cost collector see Product Cost Collectors [Page 149] .

- You have placed an appropriate replenishment strategy in the control cycle:

  - In addition, you can use the standard replenishment strategy 0002, which you cannot, however, use in combination with material requirements planning. Here, you must exclude the MRP storage location.

  - You can also use replenishment strategy 0005. With this strategy you can combine KANBAN with MRP. Planned orders, which are created using MRP, are reduced on creating run schedule quantities by emptying a kanban. In the replenishment strategy you determine which planned orders are reduced, until which time planned orders are included in the reduction and whether, in the case of a cancellation of a run schedule quantity, another planned order is created.

    The advantage of this process is that you have the option of a preview, you can plan components and you have current data available for the kanban calculation.

- You have entered the production version in your control cycle under *In-house production*. In this way the system immediately creates run schedule quantities; it assigns the planned order directly to the line entered in the production version.

Actions

1. You set a kanban to EMPTY.

2. The system creates a run schedule quantity.

   If you have chosen replenishment strategy 005, then the system also reduces the planned orders, which have been created by MRP.

3. The kanban or the information is transported by the demand source to the supply source. If necessary, the card is reprinted at the supply source or it is attached to the kanban.

4. The supply source receives the information on all the empty containers by means of the kanban or via the kanban board.

5. After the container has been filled by the supply source, you have three options:

– The supply source backflushes the replenished quantity. The goods receipt for the material produced, the goods issue for the components and the deletion of the run schedule quantity are all automatically combined with the KANBAN backflush function in repetitive manufacturing (from the repetitive manufacturing menu under *Backflush → KANBAN backflush*). In this backflush transaction, you can also branch into the component processing screen where you can change component materials or quantities. When you save the backflush, the system automatically sets the status to FULL.

Also read the section Posting Goods Receipt for KANBAN Materials [Ext.].

– The demand source sets the container to FULL. Then the system automatically backflushes the current data of the run schedule quantity. Backflush includes: GR for the replenished material, GI for the components and deletion of run schedule quantity.

If you manually change the component list of the run schedule quantity (in order to change component quantities for example), the system automatically carries out the backflush with the changed run schedule quantity data when the kanban is set to FULL.

If the status is set to FULL or the backflush transaction is posted without component processing, the system explodes the current BOM. If you want to change components, then you must use the backflushing function or you can manually change the run schedule quantity. In so doing, you access the component screen.

In the replenishment strategy you can determine whether and in what way planned orders are created again, if the user cancels the emptying of a kanban.

Replenishment Using Production Orders

Use

You use this function when you process your in-house production with production orders. When the demand source sets the kanban to EMPTY, the system creates a production order for the kanban quantity for the supply source.

Prerequisites

- You have determined the master data, BOM, routing and work center.

- If necessary, you have assigned an applicable production scheduling profile to the material to make sure that the production order is released and printed when it is opened. You can define this profile in Customizing for production orders. In Customizing for production control choose *Master data → Production control profile* : In the material master (work preparation data screen 1) assign the profile to the material.

- You have defined a production order type. You have to set the following control criteria for the order type used for KANBAN:

  − Scheduling

    As a rule you work with KANBAN with forward scheduling. The production order type *PPK1,* which contains all necessary settings, is preset in the SAP standard system for KANBAN.

    To determine backward scheduling (for event-driven KANBAN) enter the standard production order type *PP01*.

  − Automatic routing selection

    For this, you maintain the automatic selection of the routing as well as the selection ID for automatic selection in the order type.

    You make these settings in Customizing for production orders: *Master data → Order → Define order types.* These allocations are already available for the standard order types.

- In Customizing for KANBAN you have already defined a replenishment strategy of control type 3 or 6 and the corresponding production order type. The following are used in standard:

  - Replenishment 0003 (forward scheduling) to be used with control type 3.

  - Replenishment strategy 0006 to be used with control type 6. With this strategy you can combine KANBAN with MRP. Planned orders, which are created using MRP, are reduced on creating planned orders by emptying a kanban. In the replenishment strategy you determine which planned orders are reduced, until which time planned orders are included in the reduction and whether, in the case of a cancellation of a run schedule quantity another planned order is created.

    The advantage of this process is that you have the option of a preview, you can plan components and you have current data available for the kanban calculation.

- You have entered this replenishment strategy in the control cycle.

Actions

1. You set a kanban to EMPTY or you generate an event-driven kanban.

2. The system creates a production order that (depending on the settings in Customizing) is automatically released and printed.

3. The empty kanban or the information is transferred to the supply source.

4. Once the order has been completed, the supply source backflushes the quantity produced. In Customizing, you can link the backflush to the goods receipt posting. This provides the following options:

- Backflush and goods receipt are not linked. In this case, the backflush is carried out in a separate transaction from the goods receipt posting and the status change. Here, if a goods receipt is posted, the system automatically sets the kanban status to FULL in the background.

   > And similarly, if you do not set the kanban status to FULL, but always carry out the order backflush first, this automatically sets the kanban to FULL. However, if you manually set the kanban to FULL, then as a consequence the goods receipt is posted twice, both on setting the kanban to FULL and then later on the order backflush.

   > In order to avoid this, in Customizing set the error type 'E' for message CO823, under *Shop floor control → System modifications → Define attributes of system messages System messages*.

   > As a result of this, the kanban that you manually set to FULL, has the status ERROR and so goods receipt is not posted twice.

- Backflush and goods receipt are linked. Here, the system automatically posts the goods receipt and sets the status to FULL in the background when the backflush is saved.

   > If the goods receipt is posted before the backflush, the system sets the kanban status to FULL, but the backflush is not carried out automatically. Then when you backflush, the system recognizes that the goods receipt has already been posted and does not post a second goods receipt.

The costs incurred in production are posted to the production order.

Kanban Control: In-House Production

Use

In this procedure, the replenishment elements are created in the planning run and not by setting the kanban status to EMPTY. Setting the status to EMPTY and FULL (as well as the other status changes) controls the material flow. This triggers production and informs the supply source and the demand source of production progress. No replenishment element is created as a result of the kanban signal.

Features

- Standard Procedure

  Depending on the settings, the MRP run creates planned orders or run schedule quantities for repetitive manufacturing or planned orders for the process with production orders. The order quantities depend on the lot-sizing procedure you use (for example, weekly lot size). The system carries out scheduling according to the lead time scheduling procedure or using the basic dates.

- Working with production orders

  This procedure corresponds to the usual procedure with production orders. That is, you can use all the functions available for production orders.

  The planned orders created in the planning run are converted into production orders and are released for production. With the help of the kanban control functions in KANBAN, you can closely control the production of the partial lots.

  Backflushing is carried out with reference to production orders and not with reference to the kanban (separate goods receipt), in which partial and complete backflushes are possible. Thus, within the period of production, the production order can either be under- or over-delivered.

- Working with repetitive manufacturing

  This procedure corresponds to the usual repetitive manufacturing procedure. That is, you can use all the functions available for repetitive manufacturing.

  Depending on how the system is set, planned orders or run schedule quantities are created in the planning run. You can process the run schedule quantities in the repetitive manufacturing planning table. With the help of the kanban control functions in KANBAN, you can closely control the production of the partial lots.

  Backflushing is carried out either with reference to the run schedule header, which reduces the planned production quantities. Or you can carry out the backflush by setting the kanban to FULL. In this case you must not set the indicator *Separate GR*.

Replenishment Strategies for External Procurement

Use

There are several replenishment strategies available for external procurement.

The following sections show you how you can trigger replenishment of externally procured components with KANBAN.

Replenishment Using Standard Purchase Orders

Use

This function allows you to trigger replenishment with a purchase order.

Features

Standard Procedure

The purchase order (possibly with reference to a contract) is created and sent automatically when the kanban status is set to EMPTY. You define when the printout is made and the print layout is defined in message control. The vendor must be defined in the control cycle. The delivery address of the vendor can be defined in the control cycle. If the system finds no address here, it uses the plant address.

The vendor delivers the goods to the location defined. Two options exist for this; the vendor delivers the goods to a central goods receipt location or goods are delivered directly to the supply area. If the goods are delivered directly to the production line, the status change (by bar code or kanban board) triggers an immediate goods receipt posting using the target data. The goods receipt can also be carried out manually using the transaction for goods receipt (for example, if you want to make any changes or if you want to enter any additional data). When the goods receipt is posted the system changes the status in the background. For this type of goods receipt posting, the system issues an information message indicating that the goods receipt will be carried out for KANBAN.

Separate Goods Receipt

If the goods are delivered to a central warehouse so that the time between receipt of the goods, the goods receipt posting, and the actual availability of the goods is too high, you can separate the GR posting from the status change. Similarly, the system will not automatically post the GR when the status is set to FULL.

If the function "separate goods receipt" is active for the control cycle, then the system will not automatically set the kanban status to FULL when GR is posted (for example, when the goods are received in the central warehouse). The status is only set to FULL at the demand source.

It is also possible to set the kanban status to FULL first and then to post the GR separately later. (For example, you do not have to make a GR posting for each individual delivery on arrival. Instead, you can collectively post several goods receipts when the last delivery has been made).

Read also Separating the Status Change from the Goods Receipt Posting [Page 73].

Replenishment Using Stock Transfer Orders (Plant to Plant)

Use

You use the stock transfer order as a replenishment strategy if the material required in a plant is stored in another plant of the same company. Here, when a kanban is set to EMPTY, a purchase order is generated, which requests the other plant to deliver the material required.

Features

When the kanban is set to EMPTY, a purchase order is created in the receiving location and a release order in the delivering plant. The release order is procured and then posted using the goods movement type 351. In the receiving location posting takes place with movement type 101. However, instead of posting the goods receipt, the status can also be set to FULL (then goods receipt takes place in the background).

> If the removal from stock in the delivering plant is to be carried out using MM functionality, the vendor indicator must be set to blank in Customizing for Purchasing (*Purchase order processing -> Set up stock transport order*). If the stock transfer is to be carried out in SD, the appropriate vendor has to be maintained.

Replenishment Using Scheduling Agreement

Use

This function is used if you have negotiated a scheduling agreement with a vendor for a certain material. The scheduling agreement determines the purchase quantity for a longer period of time. As soon as a kanban is set to EMPTY, the system generates a schedule line for this scheduling agreement.

Features

Standard Procedure

When the kanban status is set to EMPTY, the system automatically creates a schedule line. The schedule line is transferred to the vendor. The schedule line item number is assigned to the replenishment strategy in the control cycle. Here, delivery can also be made either directly to the production lines or via the central goods receipt. In both cases, the delivery address is recorded in the schedule line item.

In the procedure using standard purchase orders, the goods receipt can be posted manually using the transaction for goods receipt or automatically by setting the kanban status to FULL. Here, the status change to FULL is carried out in the background. Or, the status is set to FULL (via bar code or kanban board) and afterwards the GR is posted in the background using the target data.

If a goods receipt is posted that corresponds exactly to the open kanban quantities, the system issues an information message with the kanban numbers for which the GR was posted.

If a GR that is smaller than the open kanban quantity is posted, the system displays a dialog box where you can manually assign the quantity delivered to the kanbans.

If a GR that is greater than the open kanban quantity is posted (and if you have also allowed overdelivery for the schedule line item), the system also displays a dialog box where you can manually assign the quantity delivered to the kanbans. Here, you can first post the target quantity for the kanbans. Then, in a second step, you can post the excess quantity with no reference to a kanban.

Separate Goods Receipt

If the transit time between the central goods receipt and the demand source is very long and therefore, the status is not to be changed at the same time as the GR posting, you can set the indicator *Separate GR*. If this indicator is set, the system will not automatically change the status to FULL when the GR is posted. Similarly, the system will not automatically post the GR when the status is set to FULL.

As in run schedule quantities, you can also change the status before posting the goods receipt in the replenishment strategy with schedule lines. However, you can then only reset the kanban status to EMPTY again once the goods receipt has been posted.

Also read the section Separating the Status Change from the Goods Receipt Posting [Page 73].

Scheduling Agreement Settings: Tips

The scheduling agreement item to be planned using KANBAN techniques must be provided with the indicator for KANBAN in the additional data for the item.

Replenishment Using Scheduling Agreement

The scheduling agreement item must be assigned to the same storage location as the supply area for which the material is being procured.

Scheduling agreement items with the KANBAN indicator cannot be used in MRP for the automatic creation of schedule lines, nor can schedule lines be created manually.

> Scheduling agreement items with the KANBAN indicator cannot have an entry for MRP in the source list.

The address and the receiving storage location cannot be specified in the control cycle or in the supply area with this particular procedure. Instead, you must maintain them in the scheduling agreement item.

Replenishment with Summarized JIT Calls

Use

With the summarized JIT call you can take quantities from the production system that are relevant for delivery and transmit them to the vendor. The delivery of a summarized JIT call can be specified to the hour and minute and can also take place several times a day. You have the option of grouping several material requirements to a JIT call. In addition, a JIT call can contain an unloading point for the materials.

You do not create JIT calls from MRP, but from production.

First, you generate schedule lines from requirements planning as a forecast, which you transmit as a forecast delivery schedule or a JIT delivery schedule to the vendors and which is not relevant for delivery for the vendors.

As soon as you actually require the material in production, generate a summarized JIT call, which is relevant for delivery, by setting a kanban to EMPTY or create a new item in an existing JIT call. You can trigger a summarized JIT call both via classic as well as event-driven KANBAN.

Features

- You generate a summarized JIT call in the SAP system by setting a kanban to EMPTY or by creating an event-driven kanban. See also Creating and Transmitting a Summarized JIT Call [Page 111].

- A summarized JIT call can contain delivery dates using exact times as well as exact days. See also Determination of Delivery Date [Page 113].

- It is possible to group several material requirements/kanbans to a JIT call. In a grouping, the system attaches the individual requirements as items to the JIT call header. You can group kanbans in various ways.

    – You can group all material requirements/kanbans, whose delivery dates are in a specific period of a shift sequence or a planning calendar.

      The grouping can take place both using exact days or times.

    – You can group requirements via a plant or via a combination of plant and unloading point.

      If you group according to delivery date you must simultaneously group according to plant or according to plant and unloading point). You can, however, group according to plant or plant and unloading point, without having to group according to delivery date.

    To group kanbans, see also Grouping Kanbans to a Summarized JIT Call [Page 115].

- You can transfer the summarized JIT call via various media and in several formats.

- You can send summarized JIT calls via EDI as well as via printer (letter), fax or E-mail. The dispatch is controlled via message management. Message management checks whether a message can be found for the criteria entered and triggers a message default. See also Create a Summarized JIT Call [Page 118],Transmit a Summarized JIT Call [Page 123] and Structure of Message Determination [Page 119].

- You can carry out the goods receipt both via KANBAN and the summarized JIT call as well as by your scheduling agreement item. See also Goods Receipt with Summarized JIT Call [Page 131].

Creating and Transmitting a Summarized JIT Call

Purpose

This process describes how to procure materials from a vendor using a JIT call.

Prerequisites

- You have created a material.

    Your material must be assigned to a storage location.

- You have entered a vendor and if necessary you have maintained the corresponding partner functions for this vendor (the standard partner function LF is available).

- You have created a scheduling agreement for your material and your vendor, the storage location of which displays the same storage location as your material:

    - You have created a schedule line for this scheduling agreement. Even when you do not want to send it to the vendor, you have to create a schedule line, in order to be able to post the goods receipt at a later date.

    - You have set the KANBAN indicator 'Y' (for summarized JIT calls) for your item(s) in the scheduling agreement.

    - In the scheduling agreement you have transferred the corresponding partner functions from the vendor.

- If you want to group the requirements according to delivery date, then you need to define a time definition in Customizing for KANBAN, which you then enter in the JIT call profile. For grouping using exact times you have defined a shift sequence; for grouping using days you have established a planning calendar.

- You have defined an appropriate JIT call profile in Customizing for KANBAN. It includes the following entries:

    - You have entered the JIT call type summarized JIT call.

    - You have entered a partner function. You need the partner function in order to group calls and for   message determination.

    - If necessary, you have established the grouping according to plant or to plant and loading point (via *Summary*).

    - If you group according to delivery date, then you have also entered a time definition.

- In Customizing for KANBAN you have defined a replenishment strategy to create a summarized JIT call (corresponding control type).

- You have created a supply area in the Kanban application for the above mentioned Kanban storage location. If necessary you have defined an unloading point in this supply area.

- In the kanban application you have created a control cycle for your supply area and your material. This control cycle contains the defined replenishment strategy, the data for external procurement (e.g. scheduling agreement number) and the JIT call profile (on the tabstrip *Flow control*).

Creating and Transmitting a Summarized JIT Call

If necessary you must also make scheduling entries in the control cycle. Please also read the section Determination of Delivery Date [Page 113]

- In Customizing for KANBAN under *JIT calls → Message determination summarized JIT call* you have carried out the applicable settings for the message determination.

- In the Kanban application you have created the appropriate message condition records. If you have not entered the data for the message determination correctly, then you will receive a warning on creating the control cycle, that messages cannot be found. You can analyze your errors in *Message Determination* on the tabstrip *External procurement.*

Process Flow

1. You set a kanban to EMPTY or you generate an event-driven kanban.

2. The system either creates a new summarized JIT call or attaches the requirement as an item to an existing summarized JIT call.

   To group material requirements, please also see Grouping Kanbans to a Summarized JIT Call [Page 115].

3. The system accesses the message determination in case a new JIT call is generated. The system determines the appropriate message by means of your Customizing settings for message determination and your condition records. Please read the section on Structure of the Message Determination [Page 119] .

4. You transmit the message to the vendor.

   You can transmit the message at various times:

   - You transmit the summarized JIT call directly on creating it.

   - You start regular output runs which define which summarized JIT calls you have to transmit.

   - You test yourself which summarized JIT calls you have to transmit.

   For the last two options you create a list of messages with help from selection criteria. You can transmit the desired message from this list to the vendor. See also Create a Summarized JIT Call [Page 118],Transmit a Summarized JIT Call [Page 123].

   You determine the time of the output in Customizing on creating a *Message type* under *Default values* in the field *Time*.

Determination of Delivery Date

Use

A summarized JIT call contains a delivery date by which the vendor must deliver the requested quantity of materials to supply production. You have the option of defining a scheduling agreement for your material requirements using an exact time.

For a summarized JIT call with several items, the item with the earliest date defines when the material must be delivered to this JIT call.

You determine the delivery date in varying ways, according to whether you create the summarized JIT call according to classic or event-driven KANBAN.

Prerequisites

You have maintained the necessary data for the summarized JIT call. Please also read the section Creating and Transmitting a Summarized JIT Call [Page 111].

If you want to determine a specific delivery date, you should have added the following settings:

- You have set the indicator *Sched. to min.* in Customizing when determining the replenishment strategy.

- You have determined a shift sequence in the calculation profile.

Features

- Classic KANBAN

  In classic KANBAN the delivery date is the sum of the JIT call creation time and the material replenishment lead time.

  You enter the replenishment lead time and, if applicable, the calculation profile (you only need the calculation profile when scheduling to the minute) on creating the control cycle on the tabstrip *KANBAN calculation*.

  If a kanban is set to EMPTY at 10.00, for example, and the replenishment lead time is 5 hours, then the kanban must be delivered at 15.00 at the latest (assuming that the shift sequence is not broken). This is forward scheduling.

  This point in time serves as the basis for requirements grouping. In this way you can group kanbans, which you need within one shift. The system groups all the kanbans together, by basing the delivery date of the entire quantity of materials on the item with the earliest date (e.g. shift sequence).

- Event-driven KANBAN

  In event-driven KANBAN you generate an empty container and when creating a delivery date you give both the date and the time.

  If you do not give the delivery date when creating a container, in other words if it is to be forward scheduled, then you must enter the replenishment lead time and (for scheduling to the minute) the calculation profile in the control cycle on the tabstrip *KANBAN calculation.*

The delivery date forms the basis of requirements grouping. The system can group all requirements, whose delivery dates are in the same period, to one JIT call (from various control cycles).

To group material requirements, please read Grouping Kanbans to a Summarized JIT call [Page 115].

Grouping Kanbans to a Summarized JIT Call

Use

You group material requirements, or kanbans, in order to achieve optimization in delivery. If you have set the grouping of material requirements in the system, on emptying a kanban, the system checks whether this material requirement can be attached to an existing summarized JIT call. If this is the case, then the system generates an item for an existing summarized JIT call. If this is not the case, the system creates a new summarized JIT call.

In principle, you can only group kanbans that have

- the same vendor

- the same message partner

- the same plant

and have not yet been transmitted.

If you decide to group kanbans, then you may choose the type of grouping:

- according to plant

- according to plant and unloading point

- according to delivery date (if you group according to delivery date, then you must also always group according to plant or according to plant and unloading point).

Prerequisites

You have defined the grouping of material requirements in the JIT call profile (Customizing for KANBAN):

- You have maintained a partner function.

    You have placed the message partner in the scheduling agreement with the partner function. The system can calculate the message partner via the partner function in the JIT call profile.

- You have defined the type of grouping (according to plant or plant and unloading point or also according to delivery date by making an entry in *Time definition*).

- You have placed the JIT call profile in your control cycle.

Features

- Grouping according to plant

    You group requirements which are in the same plant.

    - Here, you define a partner function and the grouping according to plant in the JIT call profile.

    On emptying the kanban, the system checks whether there is already a summarized JIT call for this plant. If so, the system creates a new item in an existing summarized JIT call, if this is not the case, a new JIT call is formed.

- Grouping according to plant and unloading point

    You group requirements, which are delivered to the same unloading point.

- Here, you define a partner function and the grouping according to plant and unloading point in the JIT call profile.

    The process is the same as grouping according to plant.

- Grouping according to plant

    You group requirements together, whose delivery dates lie within a specific period.

- Here, you define a partner function and the grouping according to plant or according to plant and unloading point in the JIT call profile.

- In addition, you define a time definition in Customizing for KANBAN that can use either exact days or exact times.

    For grouping using exact times, enter the following:

    - Grouping

    - Shift sequence

    - Factory calendar

    For grouping using exact days, you need:

    - Plant

    - Planning calendar

  - You place this time definition in the JIT call profile.

Example for Summarizing According to Delivery Date

1. You create a kanban, the delivery date of which lies within a period of a defined time and for which there are not yet any summarized JIT calls.

   The system creates a summarized JIT call header and an item.

2. You create another kanban.

   – If the delivery date falls in the same period, the system attaches a second item onto the summarized JIT call header (on condition that the plant or the plant and the unloading point match).

   – If the delivery date falls in a different period, then the system checks to see if there is already an appropriate summarized JIT call. If this is the case, the system attaches this requirement to the existing release. If this is not the case, then the system generates a new summarized JIT call with an item.

The summarized JIT call header contains the delivery date of the summarized JIT call. This deadline is dependent on the item with the earliest delivery date. The system automatically transfers the earliest deadline to the header.

Take for example a summarized JIT call, the header of which contains the delivery date 06.06.1999, 15.00. You now create a kanban with a delivery date of 06.06.1999, 14.30. If summarizing is possible (see requirements) and if the delivery date falls in the same period of the defined time, then the system attaches the requirement as an item to the summarized JIT call and takes on 06.06.1999 14.30 as the delivery date for the summarized JIT call.

Create a Summarized JIT Call

Prerequisites

For the prerequisites please read the section Creating and Transmitting a Summarized JIT Call [Page 111]

Procedure

1. Set a kanban to EMPTY. To do so choose the following from the kanban menu: *Control → Kanban board → Demand source view.*

    The Kanban board screen appears. *Demand Source Overview, Initial Screen.*

2. Enter the appropriate selection criteria, such as the *plant* and the corresponding *supply area* and select *Continue*.

    The Kanban board screen appears: *Demand source Overview*.

3. Set a kanban to EMPTY, by selecting *Edit → Set status to EMPTY,* selecting one of the kanbans and then choosing *Save*.

    The system tests whether a grouping has been planned for this control cycle . Depending on the settings, the system either creates a new summarized JIT call or attaches the kanban as an item to an existing summarized JIT call. Please also read Grouping Kanbans to a Summarized JIT Call [Page 115] .

    With new summarized JIT calls, the system accesses message determination. The system tests whether a corresponding condition record is available. If this is the case, then the system generates a message. Please also read Structure of the Message Determination [Page 119].

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    As an alternative to classic KANBAN, you can create event-driven KANBAN via *Control → Kanban signal → Event-driven KANBAN*. Here, enter the control cycle number or the material, the plant and the supply area and also the requested quantity and the delivery date. After this, the procedure is identical (see above).

4. If necessary transmit the message to your partner. Please also read the section Transmit Summarized JIT Call [Page 123] .

Structure of the Message Determination

Purpose

This process describes how the message determination is carried out in the case of a summarized JIT call. Message determination always appears when you create a new JIT call.

Prerequisites

You have determined the necessary prerequisites for the summarized JIT call (control cycle with appropriate replenishment strategy, scheduling agreement etc.) Please read Creating and Transmitting a Summarized JIT Call. [Page 111]

- You have set your Customizing for the message determination.

  In the SAP standard system, Customizing is already set for the message determination. However, you can carry out extensions in the customer name period. For the message determination the following are necessary:

- Condition table

- Access sequence

- Output type

- Message determination schema

- Partner function

  - In addition, you have defined condition records in the KANBAN application for the message type(s) that you use (in the KANBAN menu choose *JIT call* → *Message conditions* → *Create*).

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    Condition records are not provided in the SAP standard system; you have to fill out the condition tables yourself.

Detailed information on message determination can be found in the section Message Determination [Ext.] ff.

Process Flow

1. You set a kanban to EMPTY or you generate an event-driven kanban, for which the replenishment strategy is planned as JIT call.

2. The system checks whether a new JIT call is created or whether this material requirement as an item is attached to an existing JIT call.

3. If a new summarized JIT call is created, the system opens the message determination.

4. The system checks whether there is a condition record available in the condition table, whose content matches the data of the kanban which has either been set to EMPTY or which has been created (e.g. plant and JIT call profile or plant, JIT call profile and vendor).

The Customizing settings for message determination schema, partner function and message type determine which messages have been permitted and which partner functions can be used with these message types.

When searching for suitable condition records, the message determination covers the tables in the message determination schema, partner functions and message types.

5.   Since condition records are created for a specific message type, the system can create a message when the message determination has found a corresponding condition record.

Using the partner function in the JIT call profile, the system can find the message partner, to whom the message is to be transmitted, with the vendor master record. The vendor, who is maintained in the corresponding scheduling agreement with this partner function, is transferred into the JIT call as message partner.

6.   You can now transmit the message.

7.   On issuing the message, the system reads the data from the JIT call and its items (e.g. in case items have been added after the creation of the message) and transfers this data to the vendor.

Structure of the Message Determination

Example for Message Determination Structure

Application	JIT calls
Schema	0001 Summarized JIT calls
Message type	Summarized JIT call EDI / Summarized JIT call print
Access sequence	0001
Access conditions table	x Vendor / x JIT call profile / x Plant / x JIT call profile / x Plant

Creating Message Condition Records

Use

With this procedure you can fill out the condition tables, which you created in Customizing for KANBAN under *JIT calls → Message determination*.

Procedure

1. In the kanban menu, select *JIT call → Message conditions → Create.*

    The system branches to the screen *Create Output - Condition Records: JIT call*.

2. Enter a *Message type*, for which you would like to create a condition record and choose *Continue*.

3. Enter the key combinations (for example *Plant/JIT call profile*) and choose *Continue*. With the key combinations you define which conditions table you want to use.

    The system branches to the screen *Create Condition Records: Fast entry*.

4. Enter the *JIT call profile* and a *partner function* and select *Continue.*

    The system takes on the transmission medium and the dispatch time defined for this message type in Customizing.

5. In case of the message type 'Print' mark the condition record and choose *Communication*.

6. The system branches to the screen *Create Condition Records*: *Communication*

7. Here you can enter the printer from which the message is to be printed.

8. Save your entries.

Transmit a Summarized JIT Call

Use

You can transmit the message to your JIT call at various times. In Customizing for KANBAN enter the dispatch time for the corresponding message under *Define message type for summarized JIT call* (under *Default settings*). You have the following options:

- You start regular output runs which define which summarized JIT calls you have to transmit (dispatch time 1 and 2).

- You test yourself which summarized JIT calls you have to transmit (dispatch time 3).

  The advantage of this process is that you can choose messages with specific selection criteria via a report and you can transmit these in an operation.

- You transmit the message directly on creating the summarized JIT call. In this case the system always creates a new summarized JIT call (dispatch time 4) on emptying a kanban.

Procedure

If you have chosen indicator 3, you issue your messages manually:

1. Starting in the kanban menu, select *JIT call → Message output.*

   The screen *Messages from JIT calls* appears.

2. Enter the selection criteria to display the message(s) to be issued. You can select the following criteria amongst others:

   – Output type

     In this way you receive all messages for the selected output type.

   – Transmission medium

   – Processing mode

     The mode 'First Processing' is given as standard so that the list only contains messages that are being issued for the first time.

   – JIT call number

     Selects all messages for this JIT call or for these JIT calls.

   – Delivery period

     Selects all messages within this period.

3. Press *Execute* .

   You receive a list with messages according to the criteria entered.

4. Mark the message(s) that you would like to transmit.

5. Select *Edit*.

   The system issues the selected message(s). If you use EDI or e-mail the system issues the message to the vendor. If you are printing, the system issues the message to the printer, which you have entered on creating the condition record.

You can change the dispatch time after creating the summarized JIT call with *Change JIT call* → *Change message,* if the message has not been issued. Please also read the section Display or Change Summarized JIT Call [Page 125]

Display or Change a Summarized JIT Call

Use

You can individually display or change summarized JIT calls that are available in the system. You can, for example, change the delivery date of a JIT call item, if you need the material earlier or later.

If you want to display a summarized JIT call, it does not matter whether you have already transmitted the messages for this JIT call or not.

However, you can only carry out changes to items with JIT calls, whose messages have not yet been transmitted.

Procedure

1. In the KANBAN menu, select *JIT call → Display* or *JIT call → Change.*

   This gives you the initial screen *Display or Change a JIT call.*

2. Enter the number of the desired JIT call and select *Continue*.

   This gives you the screen *Display* or *Change Summarized JIT Call,* which is divided in the entries for *Summarized JIT call header* and *Summarized JIT call item*. In the area for the Summarized JIT call item the tab page *Single Item* displays the item 10.

   Alternatively you can also access the screen *Display or Change Summarized JIT Call* by selecting a kanban in the kanban board, *Goto → Kanban information* and then select *Display* or *Change replenishment.*

   In the tab page *All items* you can display all the items in the entire JIT call.

   In order to go from the tab page *All items* back to the detailed display of a summarized JIT call item, select the desired item and choose the tab page *Single item*.

3. If you are in change mode, then you can change the delivery date, the delivery time and the JIT call quantity for the item that is displayed in detail.

   For a summarized JIT call with several items, the delivery date in the JIT call header corresponds to the item with the earliest date and is automatically updated as soon as you save the change.

   The changed delivery date must be within the corresponding period of the time definition.

   In change mode via *Change message* you can also change for example the dispatch time of an output, repeat a message that has already been processed or change the output device.

• If you want to change the dispatch time of a message, then select a message and choose *Further data*. In the screen that follows, you can change the dispatch time. Select *Back* and then *Save.* In this way you can transmit a message immediately.

- If you want to repeat a message that has already been processed, then select a message and choose *Repeat Output.* Save the change.

- If you want to change the output device, then select the corresponding printer and choose *Communication method*. Now you can change the printer. Then go back and save your changes.

    The system informs you about the manual change. Select *Continue*.

4. In change mode save the changes that you carried out to the item or items.

Access Collective Display of Summarized JIT Calls

Use

You can display all summarized JIT calls available in the system in a list, according to specific selection criteria. In this way, you can display a complete overview of your summarized JIT calls. For example, you can display all summarized JIT calls for one plant, or alternatively, all JIT calls in one plant for a specific vendor.

When you want to display JIT calls, it does not matter whether you have already transmitted the messages for this JIT call or not.

You can make changes to the items of the summarized JIT calls, in the result list of the collective display.

Procedure

1. Choose *Production → KANBAN → JIT call → Collective display*.

    This takes you to the screen *Collective Display Summarized JIT Calls*.

2. Enter the plant and further selection criteria if necessary. Ensure that the *Delivery time from* is always the current date.

3. Press *Execute* .

    This takes you to the result screen *Collective Display Summarized JIT Calls*.

Result

Corresponding to your selection criteria, the system displays an overview of all summarized JIT calls. You can call up an individual summarized JIT call item to make changes or to simply display it, by choosing *Goto → Change or display item.*

Example for Summarized JIT Call

Use

This section should show you, by means of a complex example, the options available with the summarized JIT call. The structures and functions described in the units Creating and Transmitting a Summarized JIT Call [Page 111] and Grouping Kanbans in a Summarized JIT Call [Page 115] are used here.

You have the following scenario:

- Your vendor LIEF1 delivers three materials from two different plants: MAT1 and MAT2 from North plant and MAT3 from South plant. For each of these materials there is a scheduling agreement.

- The forecasts, that is to say the forecast delivery schedules for the scheduling agreements, should be transmitted to the vendor's headquarters. For the material MAT1, this forecast should also be transmitted to the subvendors SUBLIEF.

- You want to send the summarized JIT calls directly to the vendor's plant, without delivering the material. In addition, you want to transmit the summarized JIT calls, which you are sending to South plant, to the carrier SPED.

- You want to summarize the material requirements for MAT1 and MAT2, which are delivered from North plant, in a summarized JIT call.

Prerequisites

- You have created a vendor master record for all the partners you want to send messages to. These are the vendors LIEF 1, LIEF1_Nord, LIEF1_Süd, SUBLIEF and SPED.

- At the same time, the following partner functions exist: VN (vendor), OA (ordering address - headquarters), OJ (ordering address JIT call), C (carrier), SV (subvendor).

- In the vendor master record you have entered the vendors with their partner functions.

    You assign all partner functions, which are necessary for this processing, to LIEF1 as headquarters. For North plant you only require the partner functions VN and OA; for South plant you also require the partner function C, because you want to transmit the summarized JIT call not only to the plant but also to the carrier.

Vendor	LIEF1	LIEF1_NORD	LIEF1_SÜD
Partner functions with message partner	VN - LIEF1	VN - LIEF1_NORD	VN - LIEF1_SÜD
	OJ - LIEF1	OA - LIEF1_NORD	OA - LIEF1_SÜD
	OA - LIEF1_NORD		C -SPED
	OA - LIEF1_SÜD		
	SV - SUBLIEF		

Example for Summarized JIT Call

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You can only take on those partner functions in the scheduling agreement which you have also maintained in the vendor master record.

- You have defined scheduling agreements with partner functions for vendor LIEF1 for your materials.

    As the forecast delivery schedules are transmitted to headquarters, you must enter partner function OA - LIEF1 for all materials. For MAT1, the forecast delivery schedule must also be sent to the subvendors. For this reason maintain the partner function SV: MAT1 and MAT2 are delivered from North plant. For both of these scheduling agreements you maintain the partner function OA - LIEF1_NORD, so that you are later able to summarize material requirements. For South plant enter the corresponding partner function OJ - LIEF1_SÜD.

Scheduling agreement/ material	LP_MAT1	LP_MAT2	LP_MAT3
Partner functions in the scheduling agreement	VN - LIEF1	VN - LIEF1	VN - LIEF1
	OJ - LIEF1	OJ - LIEF1	OJ - LIEF1
	OA - LIEF1_NORD	OA - LIEF1_NORD	OA - LIEF1_SÜD
	SV - SUBLIEF		

- In the control cycle of materials MAT1 and MAT2 you have created a JIT call profile, which contains the partner function AJ: The system therefore summarizes your summarized JIT call according to LIEF1_NORD and LIEF1_SÜD.

- You have set the message determination for the scheduling agreements in such a way that messages are found for the partner functions or the partners OJ - LIEF1 and SV - SUBLIEF.

- You have set the message determination for the summarized JIT calls in such a way that messages are found for either the partner functions or the partners OJ-LIEF1_NORD or OJ-LIEF1_SÜD and C - SPED. Please also read the section on .

Process Flow

1. You are starting a planning run.

2. The planning run generates a schedule line.

3. You transmit this schedule line as a forecast delivery schedule to OJ - LIEF1 and in the case of MAT1 also to SV - SUBLIEF.

    The system carries out the message determination for the schedule line with the partner table, which is maintained for LP_MAT1.

4. You set a kanban for MAT1 to EMPTY or you generate an event-driven kanban.

5. If there is still no applicable summarized JIT call available, to which the material requirements can be attached (same vendor, same message partner, same plant), then the system generates a new summarized JIT call.

6. In generating a summarized JIT call, the system calls the message determination. The system finds the message via the vendor master record with help from the partner function(s) and message partners.

    The system carries out this message determination with the partner table, which is maintained for LIEF1_NORD in the vendor master record.

7. You set another kanban for MAT2 to EMPTY or you generate an event-driven kanban.

    The system checks whether this requirement can be attached to the current summarized JIT call, in other words whether the vendor, message partner and plant are identical.

    Whether or not the message partner is the same, the system can check the JIT call profile. It contains the partner functions, through which the system can determine the message partner in the scheduling agreement.

    In our example, the JIT call profiles from MAT1 and MAT2 contain the partner function OJ. The message partner LIEF1_NORD is assigned to the partner function for both materials.

8. If all necessary entries match, then the system attaches the material requirements to the current summarized JIT call as an item. In this case, the summarized JIT call contains material requirements from two different scheduling agreements. The system does not carry out a new message determination.

9. For all further material requirements, the system carries out the same review.

10. If you do not want to transmit the message, then the system reads the data in the summarized JIT call and transmits this message to LIEF1_NORD.

    In the case of MAT3, the system would transmit the message to the South plant and also to the carrier.

◼◤ SAP AG

Goods Receipt with Summarized JIT Call

Use

This function describes the ways in which you can carry out goods receipt with a summarized JIT call. There are two main options:

- You post the goods receipt manually. As a result the kanban is set to FULL.

- You set the kanban to FULL. As a result the system posts the goods receipt automatically.

If a summarized JIT call contains several items, you can carry out the goods receipt per item, i.e. per kanban.

Prerequisites

If applicable you have permitted under/over delivery in the scheduling agreement.

Features

In the following you will find a detailed list of options for posting the goods receipt:

- Manually using the KANBAN menu

  Starting in the KANBAN menu, you find a function under *JIT calls* → *Goods receipt* which enables you to post the goods receipt to a JIT call number.

  In this way you can post the goods receipt in the background or in the foreground (see Activities).

  If you post the goods receipt in the foreground, then the goods receipt quantities, which were suggested for backflush and which match the quantities to be released can be posted by item. You can also alter the suggested quantity; i.e. if it is permitted in the scheduling agreement you can post an under or over delivery.

- Manually via the R/3 application component *Materials Management.*

  Starting in the inventory management menu you find a function under *Goods movement*→ *Goods receipt* → *For purchase order* → *PO number unknown*, which enables a manual final backflush in the summarized JIT call or scheduling agreement.

  ⚠️

  If you carry out the goods receipt in the scheduling agreement, JIT calls or kanbans are not updated. You should not use this function for adjustments.

- Automatically through the system on setting a kanban to FULL.

  In this procedure the system posts the quantity, which you have released from your vendor.

Actions

When you post the goods receipt manually via KANBAN, either you or the system must carry out the following actions:

1. Starting in the kanban menu, select *JIT call*→ *Goods receipt.*

2. The system displays the screen *Goods receipt for JIT call*.

3. If you post the goods receipt in the background, then enter the JIT call number and select the indicator *In background* and choose *Enter*. In this case the system posts the goods receipt for the entire summarized JIT call; you cannot change the quantities. You have finished the operation.

   If you post the goods receipt in the foreground, then enter the JIT call number and Choose *Continue*.

4. The screen *Goods receipt for JIT call* : *Item overview* appears. Here you see the JIT call item(s) with the recommended goods receipt quantity/quantities.

5. If applicable, change the goods receipt quantity/quantities and other data.

6. Mark the item(s) to which you want to post the goods receipt.

7. Save your entries.

8. The system posts the goods receipt for the item(s) marked.

Replenishment Using Source List

Use

The procedure using the source list is similar to the procedure with standard purchase orders or with scheduling agreements. The only difference is that the system reads the source list to determine the source of supply. The vendor or the outline agreement (scheduling agreement, quantity/value contract) is recorded in the source list.

> The entry cannot be relevant to MRP for scheduling agreements with the KANBAN indicator. Moreover, only one entry is allowed so that the scheduling agreement can be specifically identified in KANBAN procedures.

Kanban Control: External Procurement

Use

In this strategy, the replenishment elements are first created in the planning run and are used by the vendor for information purposes. Replenishment is controlled in KANBAN with the help of the kanbans (cards). No replenishment element is created as a result of the kanban signal. The procedure with scheduling agreements is recommended for external procurement with kanban control.

Features

Depending on how your system is set, purchase requisitions or schedule lines are created in the planning run. The order quantities depend on the lot-sizing procedure you use. Basic dates are used for scheduling.

When the kanban status is set to EMPTY, the kanban (card) is sent to the vendor and is used as a sort of JIT delivery schedule for the schedule lines or the purchase requisition. Therefore, in this strategy, the kanban is printed to inform the vendor of the quantity required. On the other hand, in replenishment strategies where the kanban signal triggers replenishment, the printout of the purchase order and not the kanban (card) is used.

When the material is delivered, the goods receipt and the kanban status change to FULL must be carried out in two separate steps.

Replenishment Strategies for Stock Transfer

Use

There are several replenishment strategies available for stock transfer. The following sections show how you can use KANBAN to trigger the replenishment of components that are procured via stock transfer.

Contrary to the replenishment strategies for external procurement and in-house production, in stock transfer it is not important whether the material at the KANBAN storage location is excluded from the MRP or not.

Replenishment Using Reservation

Use

You use this function if you want to provide components using stock transfer with reservation.

Prerequisites

You have maintained a replenishment strategy, which provides a stock transfer with reservation (in the SAP standard system, replenishment strategies 0001 or 0003 are used) and have copied this into your control cycle.

Features

Standard Procedure

On setting a kanban to EMPTY a reservation is generated from the supplying to the receiving storage location. The material is transferred with reference to the reservation and transferred to the receiving storage location. The transfer posting automatically sets the kanban status to FULL or, on the other hand, the status change to FULL automatically triggers the transfer posting.

Separate Goods Receipt

The status change and the goods receipt are separated. This means that when the kanban status is set to FULL, it does not lead to a transfer posting. Nor does the transfer posting for the reservation automatically trigger the status change to FULL. The operations have to be posted separately.

Also read the section .

Replenishment Using Direct Transfer Posting

Use

You use this function if you want to transfer components without any previous reservation. When the kanban is set to EMPTY this automatically triggers a transfer posting.

Prerequisites

You have created a relevant replenishment strategy (in the SAP standard, strategies 0002 and 0004 are used) and you have put this in your control cycle.

Features

Standard Procedure

No reservation is created when the kanban status is set to EMPTY. Instead, the goods issue is posted directly at the delivering storage location and the goods receipt at the consuming storage location. Here, the information required for the goods withdrawal at the delivering storage location is recorded in either the kanban (card) or the kanban board. The kanban can be reprinted at the delivering storage location. Once the material has been delivered, the demand source sets the status to FULL. This does not lead to any material posting.

The function 'separate goods receipt' should not be used with this process.

Independent Supply Source

If the supply source posts the transfer for the material instead of the demand source, you can use the "independent supply source" function. If you use this technique for a control cycle, the kanban receives the status WAIT when reported empty by the demand source. Here, the supply source uses the "replenishment" function to post the transfer. At delivery, the demand source changes the status to FULL. This status change is linked to no other functions in the background.

In this process you cannot manually change the material posting.

Replenishment with WM Based Storage Locations

Use

You use this function if your supply storage location is managed by WM and you want to transfer components from this storage location to the production storage location that is MM based.

In this procedure the system transfers the components directly when the kanban is set to EMPTY. This transfer posting leads via the MM-WM-interface to the creation of a transfer requirement in WM.

In this process the inventory posting takes place first of all, followed by shipment. Therefore you must carry out a manual correction in case the quantity posted does not match with the quantity actually shipped. You can avoid this costly procedure by using the function Replenishment from WM Based Storage Locations [Page 140] .

Features

Standard Procedure

The status change EMPTY is accompanied by a transfer posting. This creates a transfer requirement which has to be converted into a transfer order either automatically or by the warehouse manager . The transport request must be confirmed when the delivery has taken place (e.g. via barcode). By confirming, the status of the kanban is set to FULL. It is not possible the other way around - you cannot set the status to FULL and thus trigger the confirmation. If the status is already FULL, the confirmation of the transfer order has no effect on the kanban status.

You can print kanban data on the transfer order.

Separate Goods Receipt

If you do not want the status to be changed to FULL when the transfer order is confirmed, you can use the separate GR indicator.

See also Separating the Status Change from the Goods Receipt Posting [Page 73].

Independent Supply Source

Here, the delivering storage location posts the transfer. This means that the transfer posting is not automatically triggered by the status change to EMPTY. In this situation, the delivering storage location has to use the kanban board.

See also Independent Supply Source/Separation of Status Change and Replenishment [Page 74].

Transfer Posting Using Replenishment Elements from MRP

The replenishment elements for a storage location are scheduled in the planning run (MRP). Withdrawals are made from several storage locations. Here, planned orders or purchase requisitions corresponding to the lot-sizing procedure are created in the planning run instead of stock transfer reservations. No replenishment elements are created as a result of the kanban signal.

Standard Procedure

Three options are available for stock transfer with replenishment elements created in the planning run:

- kanban control

    No replenishment elements are created when the status is changed to EMPTY. This status change is only passed on to the supply source for information purposes. The supply source is responsible for delivering the material and making the transfer posting.

    The demand source sets the kanban status to FULL. Here, no goods receipt is carried out in the background.

- stock transfer with reservation

    A stock transfer reservation for the kanban quantity is created when the kanban status is changed to EMPTY. This means that in this strategy, KANBAN is used to finely control the quantity to be transferred and the time of the transfer. For more information on this topic, refer to Replenishment Using Reservation.

- direct stock transfer

    When the kanban status is changed to EMPTY, a direct stock transfer is carried out. This means that in this strategy, KANBAN is used to finely control the quantity to be transferred and the time of the transfer. For more information on this topic, refer to Replenishment Using Direct Transfer Posting.

Replenishment from WM Based Storage Locations

Use

You use this function if your supply storage location is managed using WM and you want to transfer components from these storage locations to the production storage location that is MM based. In this way the KANBAN material is taken to an interim storage location and from there is transferred via the KANBAN control cycle to the supply area.

With this process you initially create a transfer requirement, which will be converted in Warehouse Management into a transfer order. Only on confirming the transfer order, i.e. after stock transfer has been completed, does the system post the material.

Prerequisites

- You have entered both a WM based and a KANBAN storage location.

- You have created a replenishment strategy with control type 6 for this type of stock transfer (in the standard system, strategy 0006 is used).

- If you want to create a transfer order directly in the KANBAN application, then you must maintain *Direct TO Creation* in the replenishment strategy.

- If applicable, you have maintained the difference indicator in the replenishment strategy. If on confirming, the actual quantity does not match the KANBAN quantity, this value determines where the difference will be posted to.

- You have created a storage type and storage section in WM Customizing under *Master data* and a storage bin in the WM application (in the standard system storage type 150 is used).

- In WM Customizing under *Logistics Execution → Warehouse management → Interfaces → Define kanban → Stor.location control in warehouse management* you have assigned transaction type 350 to the storage type. With this transaction type in WM, the kanban parts are transferred to the interim storage bin.

- In Customizing under *Logistics Execution → Warehouse Management → Interfaces → Define kanban → Inventory Management → Define storage location control → Movement type assignment to Kanban supply* you have assigned the WM storage type (interface) to the KANBAN storage location and in addition, you have defined the transaction type for the transfer posting from the WM storage location to the KANBAN storage location (standard 311).

- You have created a material that shows the WM warehouse number and the storage type both in your KANBAN storage location (demand source) as well as in your WM storage location (supply source).

- You have created a control cycle for your material that

    – contains the replenishment strategy mentioned above

    – contains the WM storage location, the warehouse number mentioned above, the storage type and the storage bin from the WM as the KANBAN interface.

Process Flow

1. You set a kanban to EMPTY.

Replenishment from WM Based Storage Locations

2. The system generates a transfer requirement for the Warehouse Management system with one item per kanban.

   Alternatively the system can also immediately generate a transfer order (see Prerequisites).

3. Warehouse Management converts the transfer requirement into a transfer order.

4. The material will be transferred from the WM storage location via the kanban interface to the supply area, which is set in the control cycle.

5. Warehouse Management confirms the order.

6. The system sets the kanban to FULL and posts the goods movement.
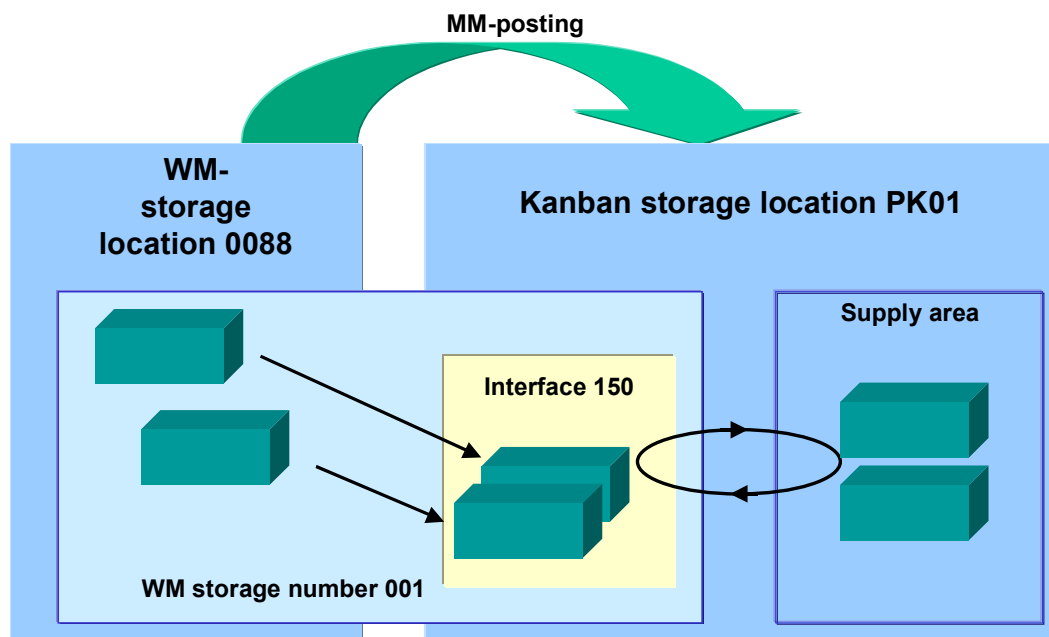
   Alternatively you can also initially set the kanban to FULL, whereupon the system confirms the open transfer order in WM in the background and posts the goods movement.

   You can only use a transfer order item to confirm a kanban quantity with variance, otherwise the difference cannot be assigned to any transfer order.

The following graphic describes this process:

Additional KANBAN Processes

Use

The KANBAN application allows you to combine the KANBAN replenishment strategies with additional functions.

Features

- Cross-plant KANBAN

    You also have the option of using KANBAN cross-plant for the replenishment strategies stock transfer and in-house production. In the case of in-house production you can trigger production directly in the production plant.

- Procurement and Withdrawal to Cost Center

    It is also possible to procure materials via KANBAN, which are not included in the assembly BOM and are therefore not backflushed. This so-called bulk material that you cannot assign exactly to an assembly, is posted to cost center.

- KANBAN with SD delivery

    You can deliver a kanban directly to your customer. While you usually supply your own materials for KANBAN production, with this process you can deliver the procured materials directly to your customer.

Cross-Plant KANBAN

Use

You have the option of using the replenishment strategy for in-house production and stock transfer, cross-plant.

In the case of in-house production you can trigger production directly in the production plant.

Prerequisites

- You create either an in-house production or a stock transfer replenishment strategy with the indicator *From other plant*.

- Enter this replenishment strategy in your control cycle.

- If you enter such a replenishment strategy, then you must also maintain the *Issuing plant* along with other with other entries for the supply source in the tab page *Stock transfer* or *In-house production.*

Features

- In-house production

  You trigger production directly in the production plant, i.e. in the issuing plant. You post the goods receipt in the requesting plant and the goods issue and the backflush in the issuing plant.

  You can use this plant-to-plant process for all in-house strategies.

- Stock transfer

  You transfer your KANBAN material from plant to plant without having to create a stock transfer order.

  Again, you can use this cross-plant process for all replenishment strategies.

Procurement and Withdrawal to Cost Center

Use

You also have the possibility of procuring bulk material, which is not backflushed, via KANBAN. This bulk material is not contained in the assembly bill of material and cannot, therefore, be assigned to an assembly. For this reason you must post the costs for this bulk material to cost center as material overhead costs .

If you use grease in your production, for example, you do not usually assign a certain consumption of grease to every assembly. In this case, grease is a bulk material and is posted to cost center.

You have two options for this KANBAN process.

- Procurement to Cost Center

- Withdrawal to Cost Center.

Prerequisites

- You have set the bulk material indicator for your material in the material master. In this way you ensure that this material will not be backflushed.

- You have created a replenishment strategy in Customizing for KANBAN that plans the procurement or the withdrawal to cost center. If applicable you have defined the transaction type for the withdrawal to cost center yourself.

- On creating the control cycle you have entered this replenishment strategy for the bulk material.

- You have entered the cost center in the control cycle on the tabstrip *Sequential control*.

> With procurement to cost center via scheduling agreement or contract you do not have to enter a cost center on this tabstrip, as the scheduling agreement or contract is already assigned to an account. The field *Cost center* is not ready for input in this case.

> With all other types of replenishment, however, you must enter a cost center here.

Features

- Procurement to Cost Center

  You can consume the material directly to cost center. In this case the system posts the material to cost center on setting a kanban to FULL. The material is not, therefore, available in the storage location.

  You can procure bulk material via KANBAN using external procurement and stock transfer (except with the replenishment strategy 'Replenishment from a WM warehouse with transfer requirements').

  The advantage of this procedure is that the posting expenditure is minimized.

- Withdrawal to Cost Center

Procurement and Withdrawal to Cost Center

Here, on setting the kanban to FULL, the system posts the material initially to the storage location of the demand source. On setting the kanban to EMPTY the quantity available is then posted to cost center.

The advantage of this procedure is that the warehouse stock in the production is available in the storage location and that the bulk material can also be procured by means of in-house production.

Through double posting the expenditure is larger, however, than with procurement to cost center.

KANBAN with SD Delivery

Use

Usually you supply your own production via KANBAN. Now you have the possibility to deliver a kanban directly to your customer via an SD scheduling agreement.

In this process you receive a KANBAN call from your customer. First of all you procure the desired material via KANBAN from your goods issue storage location for example, and then you deliver it to your customer.

Prerequisites

- You have created an SD scheduling agreement with a delivery block for the delivery due list (in the standard system SAP uses 08 'KANBAN delivery').

- You have created a replenishment strategy in Customizing for KANBAN that plans the process via *KANBAN with SD*.

    You can use this process for all replenishment strategies (external procurement, in-house production and stock transfer).

- You have created a KANBAN control cycle for this material with the above mentioned replenishment strategy and entered the scheduling agreement number and item in the control cycle under *Sequential Control.*

Actions

1. You receive a KANBAN call from the customer (by fax for example).

2. From the KANBAN menu you choose *Control → Kanban signal → KANBAN call.* In addition enter the requested quantity. Save your entries.
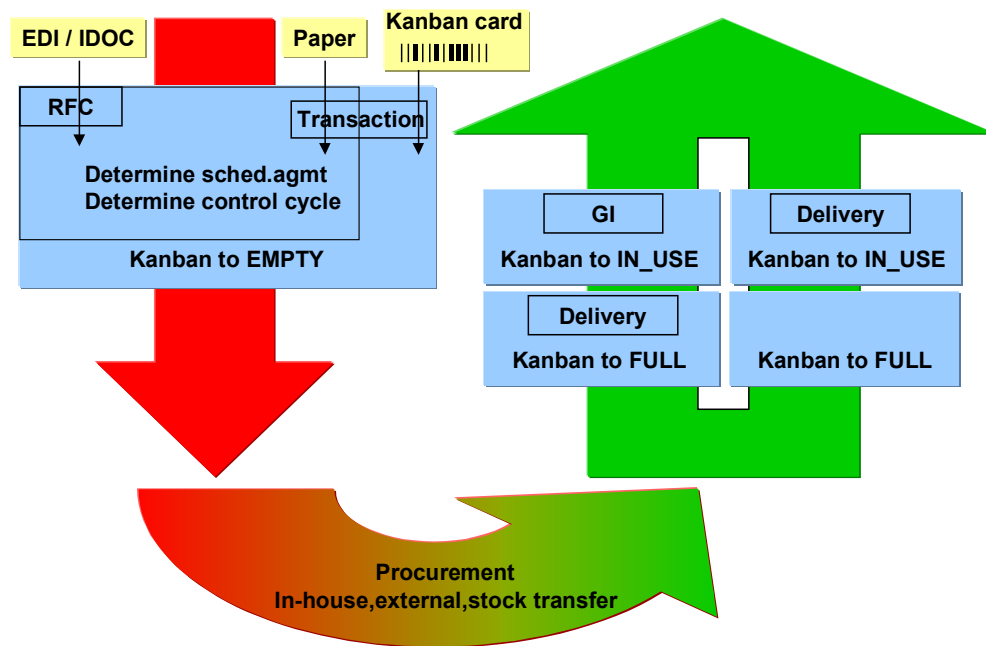
    If you receive the message via EDI, then the system automatically determines the scheduling agreement and processes the requested quantity.

3. The system sets the kanban to EMPTY.

4. In this way the usual KANBAN process begins and the requested quantity is procured, depending on the replenishment strategy.

5. You set the kanban to FULL as soon as the kanban quantity has been procured.

6. The system posts the kanban quantity to the supply area, which you have entered in your control cycle and which serves, in this case, as a goods issue warehouse.

7. a) If you have selected indicator 1, then the system creates a delivery when the kanban is set to FULL. As soon as the kanban has the status IN USE, the system posts the goods issue.

    b) If you have set the indicator 2, then the system only creates delivery if the kanban is IN USE. The goods issue must be posted manually.

The following graphic describes this process:

KANBAN with SD Delivery

EDI / IDOC

Paper

Kanban card
|||▮|||▮||||▮|||

RFC

Transaction

Determine sched.agmt
Determine control cycle

Kanban to EMPTY

GI

Kanban to IN_USE

Delivery

Kanban to IN_USE

Delivery

Kanban to FULL

Kanban to FULL

Procurement
In-house,external,stock transfer

Cost Accounting for KANBAN

Cost objects can be controlled in various ways for KANBAN, depending on the replenishment elements that are used to control the control cycles.

- If you use run schedule quantities, the costs are collected at a so-called cost collector and can be settled periodically in product costing.

- If you use manual kanban, the costs are also collected at a cost collector.

- If you use production orders for controlling replenishment, the costs are settled to the individual production orders.

Product Cost Collector

Definition

Cost object in the *Product Cost by Period* component that collects the periodic actual costs incurred in the production of a material. When you use a product cost collector, the product becomes the main cost object.

Use

Product cost collectors are independent of the production type. This means that you can collect actual costs on product cost collectors in the following production environments:

- In order-related production (that is, when you are using production orders) when you want to analyze the costs by period rather than by lot

- In process manufacturing (that is, when you are using process orders) when you want to analyze the costs by period rather than by lot

- Repetitive manufacturing

  In repetitive manufacturing, you always use product cost collectors as the cost objects.

  Product cost collectors are available from Release 4.5A onwards. In earlier releases, the costs of repetitive manufacturing materials were collected on production cost collectors. From Release 4.5A onwards, production cost collectors are converted into product cost collectors. For information on conversion, refer to the following section: Converting Production Cost Collectors into Product Cost Collectors [Ext.]

- Order splits for production orders

  When you split production orders, the costs for the parent order and child order are allocated to the same product cost collector.

  See also: Order Splits in Cost Object Controlling [Ext.]

- Kanban

- Mass production based on sales orders [Ext.] if you are using a valuated sales order stock [Ext.] and manufacture the individual requirements material in repetitive manufacturing (see also: Product Cost Collectors in Sales-Order-Related Production [Ext.]).

You can also use **one** product cost collector on which the costs for a material are collected that is manufactured both for the sales order and for the make-to-stock inventory. A requirement is that the *Repetitive manufacturing* indicator in the material master record is selected.

You create a product cost collector for the material, plant, and production process [Ext.].

  You do **not** need to manually create the production process for the product cost collector. The system generates the production process automatically when you create the product cost collector.

If you use product cost collectors, there are relatively fewer cost objects than in *Product Cost by Order*. This improves performance in period-end closing and in the information system.

You can precost product cost collectors (see also: Preliminary Cost Estimates for Product Cost Collectors [Page 167]).

Actual costs can be collected on the product cost collector in the following ways:

- Through logistical transactions (such as goods issues or confirmations) for manufacturing orders (production orders or process orders) and run schedule headers For example, goods issues for a production order or reporting point backflushes in repetitive manufacturing debit the product cost collector with actual costs. Goods receipts credit the product cost collector.

- Directly, for example through G/L account postings in *Financial Accounting* (FI)

In the screen *Display Product Cost Collector*, you can access reports by choosing *Display Costs*. You can also view the actual costs for the product cost collector in the *Information System* at any time.

During the period-end closing process, you can:

- Charge the product cost collector by means of template allocation [Ext.]

- Revaluate the activities at actual prices

- Calculate overhead for the product cost collector

- Calculate the value of your unfinished products (work in process) for the period

- Calculate the variances of the period

- Settle the work in process and variances to other application components

> Note the following in the period-end closing process for product cost collectors:
>
> If you don't enter a production process in the individual processing mode of the period-end closing transaction, but only enter the data for the material and plant, this period-end closing transaction will be performed for all production processes for that material.

You always create product cost collectors manually.

Constraints

Product cost collectors **cannot** be used for the following objects and production environments:

- Manufacturing orders [Ext.] that settle to a sales order item if you are using a nonvaluated sales order stock [Ext.] in sales-order-related production [Ext.]

- Sales-order-related production with a valuated sales order stock, except in repetitive manufacturing environments

- Engineer-to-order environments

- Manufacturing orders that are part of a collective order [Ext.]

- Joint production [Ext.]

Structure

You can create a product cost collector for a material, plant, and production process.

Product Cost Collector

The production process is defined in accordance with a Controlling level.

When you create a product cost collector, you specify which Controlling level you want to assign to a material. The Controlling level for the plant material can only be changed under certain conditions. See also: Editing the Controlling Level [Ext.]

The Controlling level contains characteristics (such as BOM/routing or production version) that are used to determine the quantity structure.

You always create the product cost collector for the production process. The following Controlling levels for the production process are allowed in the standard system:

- Production: Production Version

    If the material has production versions, you should always use the Controlling level *Production: Production Version*. In repetitive manufacturing, use only this Controlling level.

- Production: BOM/Routing

- Production: Production Plant/Planning Plant

    Read the section Product Cost Collector Material / Production Plant / Planning Plant: Constraints [Ext.].

For detailed information on Controlling levels, refer to the documentation Controlling Level [Ext.].

Integration

Integration with the Production Process

To access the product cost collector, you do not need to enter the number of the production process even though the production process appears on the screen. Instead, enter the material and the plant and then select the F4 help for the production process. In the subsequent dialog box, you can then enter the selection criteria in accordance with the characteristics of the production process (such as the production version). The system then finds the production process using the selection values entered (such as material, plant, production version).

Integration with Manufacturing Orders

If you have specified in the order type of your manufacturing orders that the costs should be collected on a product cost collector rather than on the manufacturing order, the system creates a link to the product cost collector when you create a manufacturing order for the corresponding combination of characteristics (such as material / plant / production version). The manufacturing order receives the status PCC (product cost collector). This status prevents costs from being allocated to the manufacturing order. The production process number is shown in the manufacturing order. You can edit the following fields in the product cost collector:

- Costing variant actual

- Variance key

- Results analysis key

- Profit center

- Business area

- Costing sheet (actual)

- Overhead key

- Functional area [Ext.] (when manufacturing orders are assigned to a product cost collector)

In the manufacturing order, these fields are not ready for input. When the manufacturing order is created, they are transferred from the associated product cost collector. If these fields in the product cost collector are changed, the changes are not transferred into existing manufacturing orders. The entries in the product cost collector are used for daily postings and for period-end closing.

The valuation variant specified in the *Costing variant actual* of the product cost collector is used to valuate the data confirmed for the manufacturing order.

The *Costing variant planned* in the manufacturing order is not transferred from the product cost collector but is defaulted from the order type of the manufacturing order. This costing variant results in a temporary preliminary cost estimate for the manufacturing order. This preliminary cost estimate **cannot** be saved.

No settlement rule is generated for a manufacturing order that is linked to a product cost collector.

Manufacturing orders are automatically linked to product cost collectors of the production process whose characteristic values match the manufacturing order. The product cost collector cannot have a deletion flag.

You can view the product cost collector from within the manufacturing order.

The link between the manufacturing order and the production process of the product cost collector can only be changed as long as no functions that result in costs have been performed for the manufacturing order. If no such functions have been performed, then if you change the production version or the BOM and routing, for example, the manufacturing order can be assigned to a different product cost collector. If costs have already been incurred, the original assignment is retained even if you change the production version or the BOM and routing.

If no product cost collector to which the manufacturing order can be linked has been created, the system issues a message informing you of this fact when you create the manufacturing order. In this case the system uses the manufacturing order itself as the cost object. If no actual costs have been collected on the manufacturing order, it is still possible to switch to a product cost collector as the cost object rather than the manufacturing order, as specified in Customizing. To do this, you create the product cost collector in the menu of *Product Cost by Period*. To link the manufacturing order to the product cost collector, read the master data into the production order.

If you want to assign manufacturing orders to a product cost collector, note that **before** this assignment is made, the manufacturing orders may have different default values for the functional area than does the product cost collector. This is because product cost collectors take the functional area from the order type for product cost collectors, but manufacturing orders take the functional area from the order type for manufacturing orders.

When you assign a manufacturing order to a product cost collector, the system transfers the functional area of the product cost collector into the master data of the manufacturing order. In this case, it is no longer possible to change the functional area in the master data of the manufacturing order.

For information on linking manufacturing orders to product cost collectors and changing the assignment, refer to the section Linking Manufacturing Orders to Product Cost Collectors [Ext.].

Integration with Cost Object Hierarchies

You can assign product cost collectors to cost object hierarchies.

Editing Product Cost Collectors

Use

You use this function in the following situations:

- When you want to create one or more product cost collectors but don't want to use the collective entry function for repetitive manufacturing (see also: Product Cost Collectors: Collective Entry for Repetitive Manufacturing [Ext.]).

- When you want to change one or more product cost collectors

- When you want to view one or more product cost collectors

Prerequisites

- In order-related production environments, select the indicator *Product cost collector* in Customizing for *Product Cost by Period* or *Product Cost by Order* under *Product Cost Collector* or under *Manufacturing Orders* → Define Default Values for Order Types [Ext.] for all order types of order category 10 (PP production order) whose costs you want to collect on a product cost collector rather than on a production order.

  Check the order category in Customizing for *Production* under *Basic data* → *Production orders* → *Master data* → *Order* → *Define order types*.

- If you are in a process manufacturing environment, select the indicator *Product cost collector* in Customizing for *Product Cost by Period* or *Product Cost by Order* under *Manufacturing Orders* → *Define Default Values for Order Types* for all order types of order category 40 (process order) whose costs you want to collect on a product cost collector rather than on a process order.

  Check the order category in Customizing for *Production Planning for the Process Industries* under *Process order* → *Master data* → *Order* → Define Order Types [Ext.].

- In repetitive manufacturing environments, you always use a product cost collector.

Product cost collectors have the order category 05 (product cost collector). You do **not** need to select the *Product cost collector* indicator for the product cost collector itself.

The default rule STR (strategy for tracing factor determination) is specified in the order type of the product cost collector.

You can specify the default rule, the planned costing variant, the actual costing variant, and the results analysis key as default values in Customizing. The default rule can no longer be changed in Customizing. Check the default rules in Customizing for *Product Cost by Period* under *Product Cost Collector* → *Define Default Values for Order Types*.

Make sure that the default value in the order type of the manufacturing orders assigned to the product cost collector is PP2 (Production Material Periodic Settlement).

You **cannot** use product cost collectors for the following:

- Production orders or process orders that are manufactured for a sales order stock [Ext.] or project stock [Ext.]

- Production orders or process orders that are part of a collective order [Ext.]

- Joint production [Ext.] environments

Editing Product Cost Collectors

Procedure

1. Choose *Accounting* → *Controlling* → *Product Cost Controlling* → *Cost Object Controlling* → *Product Cost by Period.*

   The screen *Product Cost by Period* appears.

2. Choose *Master Data* → *Product Cost Collector* → *Edit.*

   The screen *Display Product Cost Collector* appears.

Edit Product Cost Collector: Screen Layout

Note the layout of the screen:

- The **selection area** is in the top half of the screen. Here you enter the material number range and the plant for the product cost collectors that you want to edit.

- The icons above the selection area provide functions such as the following:

  – Switching between the modes *display*, *change*, and *create*

  – Costing

  – Display costing log

- The left-hand side of the screen shows an **overview tree** with the product cost collectors that match the selection parameters you specified in the selection area.

  To process product cost collectors, first select them.

- The right-hand side of the screen contains information on one or more product cost collectors. This information can only be changed under certain conditions. You must select

one or more product cost collectors in the left-hand side of the screen to be able to see this detailed information.

This right-hand side of the screen is called **Detail Display/Work Area**.

Information on the product cost collector is located under the following tabs:

− *Data*

The *Data* tab shows the control parameters for the selected product cost collectors, such as the costing variants, results analysis keys, and variance keys.

− *Header*

The *Header* tab contains various information on the product cost collector such as material, company code, order type, and status.

− *Production Process*

The *Production process* tab shows the name and number of the production process, the costing lot size, and other information.

To Create a Product Cost Collector

1. To create a product cost collector, enter the following data in the selection area:

   − Plant (enter the number of the production plant)

   − Material number (from/to)

2. Choose *Product Cost Collector → Create*. The dialog box *Create Product Cost Collector* appears.

3. Enter an order type of order category 05 (product cost collector).

   − If no Controlling level has been specified for the plant material, choose the Controlling level [Ext.].

   − Enter the characteristics for the production process. The characteristics vary depending on the selected Controlling level.

   − Choose *Confirm*.

4. Save the product cost collector when you leave the change mode.

5. The dialog box *Do you want to create a preliminary cost estimate for the product cost collector?* appears. Choose *Yes* or *No* (see also: Preliminary Cost Estimates for Product Cost Collectors [Page 167]).

   If you have chosen the Controlling level *Production Plant/Planning Plant*, the dialog box will not appear because in this case it is not possible to precost the product cost collector.

The system creates the product cost collector.

The system does the following:

• When you save, the system creates a production process [Ext.] on the basis of the Controlling level (if no such production process exists), and enters the number of the production process in the product cost collector.

Editing Product Cost Collectors

In order-related production and process manufacturing, the number of the production process is entered in the manufacturing orders assigned to the product cost collector.

In repetitive manufacturing, the production version is linked to the product cost collector through the production process.

- When you save, the system creates a settlement rule for the product cost collector.

    The settlement rule for the product cost collector always specifies the distribution rule *100% to material* and the settlement type is always PER (periodic).

    You cannot manually change the settlement rule for the product cost collector. It is therefore **not** possible to deduct the scrap from the variances before the variances are settled to *Financial Accounting* (FI), and settle the scrap to a cost center.

- When you save, the system automatically sets the status REL (released) and SETC (settlement rule created) for the product cost collector.

- The system creates a procurement alternative for the product cost collector internally.

    If you are using separate valuation types or a valuated sales order stock, the system does not create the procurement alternatives for each valuation type or for each sales order stock until the first goods receipt in each case.

- The system automatically creates a preliminary cost estimate for the product cost collector [Page 167] (if applicable).

The following **data** are updated for the product cost collector:

- Profit center

- Business area

- Costing variant planned

    The system creates the preliminary cost estimate for the product cost collector using the *costing variant planned*. The default *costing variant planned* is selected through the default values for the order type of the product cost collector.

- Costing variant actual

    The system valuates the activities on the basis of the *valuation variant* specified in the *costing variant actual*. The default *costing variant actual* is selected through the default values for the order type of the product cost collector.

- Costing sheet actual

    The *costing sheet actual* is selected through the *valuation variant* specified in the *costing variant planned*. This ensures that the same costing sheet is used in preliminary costing and for calculation of the actual overhead. If no *costing sheet planned* exists, the *costing sheet actual* is selected through the valuation variant specified in the *costing variant actual*.

- Overhead key

    The overhead key is taken from the material's master record. The material's master record specifies an overhead group that is linked to an overhead key in Customizing for

Product Cost Planning. The system checks which overhead key is linked to the overhead group of the material being manufactured, and enters this overhead key in the product cost collector.

- Results analysis key

  The results analysis key is defaulted from the order type of the product cost collector that you have defined in Customizing for *Product Cost by Period*.

- Variance key

  The variance key is taken from the material master record. In the material master record, the variance key is proposed on the basis of the plant. You make this setting in Customizing.

The information shown in the **header** of the product cost collector includes:

- Company code

- Material

- Order type

- Created by

- Last changed by

- Status of the product cost collector

- Functional area

You can also access the following objects from the header of the product cost collector:

- The assigned manufacturing orders and production versions

- The preliminary cost estimate

- The settlement rule

- The cost display

You can view the following information on the **production process** assigned to the product cost collector:

- Designation

- Production process number

- Costing lot size used in the preliminary cost estimate of the product cost collector

  If you don't enter a costing lot size, the system uses the costing lot size from the material master record for the preliminary cost estimate of the product cost collector.

  If you created a procurement alternative with a costing lot size and the procurement alternative corresponds to the production process (that is, it has the same characteristic values), the costing lot size of the procurement alternative is transferred into the production process.

- The system uses the characteristics of the production process that are not already shown in the selection area.

  The characteristics *Material* and *Production Plant* are always shown in the selection area. In the production process, further characteristics are shown depending on the Controlling level. For example, if the Controlling level *Production Version* was defined for

Editing Product Cost Collectors

a material, the additional characteristics *Planning Plant* and *Production Version* are shown for the production process.

Check the proposed data.

Displaying and Changing Product Cost Collectors

Switching from Display Mode to Change Mode

You can switch back and forth between change mode and display mode from within a transaction. To do this, choose *Product Cost Collector → Display / Change*. The screen *Change Product Cost Collector* or *Display Product Cost Collector* appears. Before you can switch to the change mode, you must select the product cost collector that you want to change.

Showing or Hiding Product Cost Collectors with Deletion Flag

This function can be performed in either the display mode or the change mode.

To add the product cost collectors with a deletion flag to the display, choose *Product Cost Collector → With Deletion Flag → Show*. To remove the product cost collectors with a deletion flag from the display, choose *Product Cost Collector → With Deletion Flag → Hide*.

Costing Product Cost Collectors

This function can only be performed in the change mode.

For more information, see the following section: Creating a Preliminary Cost Estimate for a Product Cost Collector [Page 171]

Setting and Removing Deletion Flags

This function can only be performed in the change mode.

To set or remove the deletion flag for a product cost collector, go into the change mode, select the product cost collector(s), choose *Edit → Set Deletion Flag* or *Edit → Remove Deletion Flag* (See also: Reorganizing Product Cost Collectors [Ext.]).

Selecting and Deselecting Product Cost Collectors

These functions can be performed in either the display mode or the change mode.

Select All

To select all product cost collectors (such as to make a change), choose *Edit → Select All*.

Deselect All

To deselect all selections, choose *Edit → Deselect All*.

Selecting Product Cost Collectors with Particular Data

You can select groups of product cost collectors that have particular data, such as all product cost collectors with a specific profit center.

1. Choose *Edit → Selection For...*

    The screen *Select with Criteria* appears.

2. Choose the data for which you want to make the selection. Then enter the data that you want to search for (such as profit center 1010).

If you have selected a field but haven't entered anything, the system will select all product cost collectors for which there is no entry in that field (for example, no profit center). Multiple selection is possible. The system then selects the product cost collectors that fulfill all conditions simultaneously. Choose *Confirm*. The system selects the product cost collectors that have the specified data.

3.   The business area and profit center of the product cost collector can only be changed if no actual costs have been assigned to the product cost collector.

Viewing Cost Estimates

To view the preliminary cost estimate of the product cost collector, choose *Goto → Display Cost Estimate*.

Viewing Orders/Production Versions

To view the manufacturing orders and production versions assigned to a product cost collector, choose *Goto → Display Orders/Production Versions*.

Viewing the Settlement Rule

To view the settlement rule, choose *Goto → Display Settlement Rule.*

Classification

Choose *Goto → Classification.*

Logs on Change

Choose *Goto → Logs → Change*.

Logs on Cost Estimate

Choose *Goto → Logs → Cost Estimate*.

Displaying Reports

To see various reports on product cost collectors, select **one** product cost collector and choose *Goto → Display Reports* or choose *Display Costs*.

See also:

For information on the control parameters for *Cost Object Controlling*, refer to the following section:

Control Parameters in Cost Object Controlling [Ext.]

For information on settlement, refer to the following section:

Settlement in Product Cost by Order or Period [Ext.]

Standard Cost Estimates

Use

You usually create a standard cost estimate for a material at the beginning of a fiscal year or a new season. The standard cost estimate is then valid for the entire year or season. You can use it to determine a standard price for materials in this period.

You should not change the standard cost estimate during this period. The results of the cost estimate then remain constant and are not influenced by price fluctuations or changes in the production setup during the course of the planning period.

You valuate the planned quantity structure of a standard cost estimate with standard prices. A standard cost estimate for a material is not linked to an order or to a production version.

Prerequisites

You create a cost estimate based on a costing variant. For standard cost estimates, the costing variant contains the following settings:

- The costing type specifies that the costing results can be updated as the standard price in the material master.

- The valuation variant specifies that the materials are valuated with standard prices or planned prices.

For more information, see Preparing for Costing: Customizing [Ext.].

For standard cost estimates for materials involving **repetitive manufacturing**, you must do the following in the MRP view of the material master:

- Set the *Repetitive mfg* indicator

- Enter a *repetitive manufacturing profile*

Features

The standard cost estimate calculates a standard price for materials with "S" price control:

- If you mark the standard cost estimate [Ext.], the system writes the results of the cost estimate into the costing view of the material master record as the future standard price. You can use this price to valuate a material component in the cost estimate.

- If you release the standard cost estimate [Ext.], the system transfers the result of the standard cost estimate into the material master record of the material as the standard price. This price is then active for **Financial Accounting** and is used for valuation of the material until the next time a standard cost estimate is released.

- From this period on, all transactions involving products produced in-house are valuated in the Logistics module using the standard price (that is, the results of the standard cost estimate). If a material with standard price control is delivered to stock, for example, inventories of this material are valuated with the standard price as determined by the standard cost estimate. This provisional valuation can be corrected at a later date following the settlement of the actual costs that occurred in the period.

Valuation using standard prices calculated in the standard cost estimate applies **only** to materials with "S" price control.

You can also use the results of the standard cost estimate to determine the following data for each production order or run schedule header (make-to-stock production) at the end of the accounting period:

- **Variances** for the actual costs of a product

- Prices for confirmed **scrap quantities**

- Target costs for valuating the **work in process** based on the confirmed quantities

See also:

For more information about using the costing results [Ext.], see the following documents:

- Purpose of Product Cost Planning [Ext.]

- Price Update [Ext.]

For more information about executing a cost estimate, see Cost Estimate with Quantity Structure: Process Flow [Page 164].

For more information about standard cost estimates in connection with valuated sales order stock, see *CO Cost Object Controlling (CO-PC-OBJ)* in the R/3 Library under the following documents:

- Valuated Sales Order Stock: Valuation [Ext.]

- Standard Price Calculation with a Valuated Sales Order Stock [Ext.]

For more information about calculating material prices when using the *Actual Costing/Material Ledger* component, see the R/3 Library under *Actual Costing/Material Ledger (CO-PC-ACT)* in the documents

- Actual Costing/Material Ledger [Ext.]

- Standard Price Versus Moving Average Price [Ext.]

- Price Control and Material Price Determination [Ext.]

- Integration of Actual Costing/Material Ledger [Ext.]

For more information about using standard prices for material valuation, see the R/3 Library under *MM Material Valuation* in the following documents:

- Price Control [Ext.]

- Value Calculation with Standard Price: Example [Ext.]

Material Cost Estimate with Quantity Structure

Purpose

The cost estimate with quantity structure is a tool for planning non-order-related costs and establishing prices for materials. It is used to calculate the cost of goods manufactured and cost of goods sold [Ext.] for each product unit. You can use the results of the standard cost estimate for material valuation for standard prices.

Implementation Considerations

The cost estimate with quantity structure presupposes that a bill of materials and routing (PP) or a master recipe (PP-PI) exist for the material to be costed . For more information about this, see Master Data for the Cost Estimate with Quantity Structure [Ext.].

Features

The cost estimate with quantity structure [Page 164] uses the *PP* or *PP-PI* master data to determine the material consumption and internal activities required to produce the product. The cost estimate is created automatically using this data.

You can use the costing run [Ext.] to process mass data.

There are a number of reports in the cost estimate itself and in the information system for Product Cost Controlling [Ext.] that you can use to display the costing results together with the relevant quantity structure:

- Costed multilevel BOM [Ext.]

- Itemization [Ext.]

In addition to the PP-oriented displays of the costing results mentioned above, there is a **cost component split** for each material that divides the costs into cost components [Ext.]:

- Cost component split for the cost of goods manufactured [Ext.]

- Primary cost component split [Ext.]

- Partner cost component split [Ext.]

See also:

Purpose of Product Cost Planning [Ext.]

Calculation of Cost of Goods Manufactured and Cost of Goods Sold [Ext.]

Cost Estimate with Quantity Structure: Process Flow

Purpose

The cost estimate with quantity structure enables you to calculate the non-order-related **cost of goods manufactured** and the **cost of goods sold** for products, based on the BOMs and routings (PP).

Prerequisites

You have checked the settings in the costing variant. For more information, see Preparing for Material Costing [Ext.].

Process Flow

1. Create a cost estimate for a material. If you want to cost more than one material, create a costing run.

   For further information, see the following:

   – Creating a Cost Estimate with Quantity Structure [Ext.]

   – Costing Run [Ext.]

2. The system creates the quantity structure (BOM and routing/master recipe) automatically through the quantity structure control as defined in the costing variant in Customizing, or copies an existing quantity structure using a reference variant.

   For further information, see the following:

   – Master Data for Costing with Quantity Structure [Ext.]

   – Quantity Structure Determination [Ext.]

   – Use of Existing Costing Data [Ext.]

3. The system valuates the quantity structure using the valuation variant that you defined in Customizing, or copies existing costing data.

   For further information, see the following:

   – Valuation of the Quantity Structure [Ext.]

   – Use of Existing Costing Data [Ext.]

4. The system includes any additive cost estimates, if you have provided for this in the costing variant in Customizing.

   For further information, see Additive Costs [Ext.].

5. The system calculates overhead.

   For further information, see Overhead [Ext.].

6. You analyze the costing results and save the cost estimate.

   For further information, see the following:

   – Costing Results [Ext.]

   – Managing the Costing Results [Ext.]

Cost Estimate with Quantity Structure: Process Flow

7. You can update the costing results in the material master record, and transfer them into Profitability Analysis.

    For further information, see the following:

    −   Purpose of Product Cost Planning [Ext.]

    −   Price Update [Ext.]

8. You can archive and delete material cost estimates.

    For further information, see the following:

    −   Archiving Material Cost Estimates [Ext.]

    −   Deleting Material Cost Estimates [Ext.]

Example

You create a cost estimate with quantity structure for material P-100.

M P-100	100 PC	66,800 EUR
M 100-100	100 PC	7,300 EUR
M 100-110	100 PC	1,000 EUR
M 100-120	100 PC	5,000 EUR
M 100-130	800 PC	800 EUR
E 1420	100 PC	500 EUR
M 100-200	100 PC	16,000 EUR
M 100-300	100 PC	31,000 EUR
N 100-400	100 PC	11,000 EUR
E 1421	100 H	500 EUR
G 625000	-	1,000 EUR

First, the system determines the quantity structure, being the BOM and routing. It then valuates the materials in the BOM and the production activities from the routing with prices and calculates the overhead.

The material costs are calculated for the material components [Ext.] by multiplying a price from the material master record [Ext.] by the input quantity from the BOM. For example, the unit price for material M 100-110 is EUR 10. For materials not included in inventory (that is, non-stock materials), the unit price is entered in the BOM itself, such as material 100-400. The costs of the material components are variable costs.

The costs of the assemblies [Ext.] are calculated using the input quantity in the BOM and the data on the material in the BOM and routing. For example, the costs for material 100-100 consist of the material costs for materials 100-110, 100-120 and 100-130 and the costs specified in the routing for the assembly of these components (activity 1420). These costs comprise variable costs (for the raw materials used) as well as fixed and variable costs (for the internal activities, overhead and, if applicable, process costs).

Cost Estimate with Quantity Structure: Process Flow

The costs of the assemblies are calculated level by level. This means that the costs for assemblies 100-100, 100-200, 100-300 and so on are first calculated, and then included in the total costs for assembly P-100. The process of assigning the costs of the subordinate material components and assemblies to each of the higher production levels is called cost rollup [Ext.].

See also:

- Origin of Costing Data [Ext.]

- For more information about the relevant settings in Customizing, see the *Implementation Guide (IMG) for Product Cost Planning*.

Preliminary Cost Estimates for Product Cost Collectors

Use

Preliminary costing in the *Product Cost by Period* component calculates the costs for the product cost collector.

A preliminary cost estimate for a product cost collector can calculate the costs for the production process [Ext.] (that is, on the basis of a particular production version or for a particular combination of BOM and routing). In repetitive manufacturing, you can therefore create cost estimates for specific production versions.

If you are using a product cost collector with the Controlling level [Ext.] *Production Plant/Planning Plant*, you **cannot** create a preliminary cost estimate for the product cost collector because the product cost collector does not have a quantity structure. In this case you compare the actual costs only with the standard cost estimate for the material.

You can do the following on the basis of the preliminary cost estimate:

- Confirm actual activity quantities

  In simultaneous costing in repetitive manufacturing, you can use the activity quantity structure of the preliminary cost estimate. This means that reporting point backflushes use the activity quantities that were used in the preliminary cost estimate for the product cost collector. However, the actual quantities confirmed are valuated using the valuation variant of simultaneous costing rather than the valuation variant of preliminary costing. You control whether the system uses the quantity structure of the preliminary cost estimate for reporting point backflushes in Customizing for *Product Cost by Period* under *Simultaneous Costing* → *Check Control Data for Repetitive Manufacturing Profiles*.

- Valuate the work in process

  The system calculates the target costs on the basis of the preliminary cost estimate for the product cost collector to valuate the confirmation quantities for the calculation of work in process.

- Calculate the production variances in variance calculation

  The system calculates the target costs on the basis of the preliminary cost estimate for the product cost collector, and compares these target costs against the actual costs.

- Valuate the unplanned scrap in variance calculation

  The system calculates the target costs on the basis of the preliminary cost estimate for the product cost collector to valuate the confirmation quantities for the calculation of scrap.

  In repetitive manufacturing, SAP recommends that you valuate work in process and scrap using the target costs calculated in a preliminary cost estimate for the product cost collector. This enables you to calculate work in process and scrap variances even if changes have been made in the reporting point structure. You must update the preliminary cost estimate after the reporting points have been changed.

  Read the following sections:

  - Reporting Point Backflushes in Repetitive Manufacturing [Ext.]

Preliminary Cost Estimates for Product Cost Collectors

       −   Valuation with Reporting Point Backflushes [Ext.]

       −   Flexible Reporting Points [Ext.]

       −   Updating the Preliminary Cost Estimate [Ext.]

This function is available in the menu of *Product Cost by Period* and in the menu of *Repetitive Manufacturing*. It can also be used in *kanban* processing.

Integration

In preliminary costing, the system accesses the master data and transaction data of *Production Planning* (PP) and of *Controlling* (CO).

Prerequisites

- Enter a costing lot size in the product cost collector (see also: Maintaining Product Cost Collectors [Page 154]).

- In the product cost collector, a costing variant for the preliminary cost estimate has been entered in the field *Costing variant planned*.

  To specify the *Costing variant planned* as a default value in the order type of the product cost collector, go into Customizing for *Product Cost by Period* under *Product Cost Collectors* → Define Default Values for Order Types [Ext.] and enter a costing variant in the *Preliminary costing* field. The costing variant for a preliminary cost estimate for the product cost collector must specify costing type 19 in which the indicator *Preliminary costing for product cost collectors* is selected. You do this in Customizing for *Product Cost by Period* under *Product Cost Collectors* → Check Costing Variants for Product Cost Collectors [Ext.]. In the dialog box, choose *Costing variants to determine activity quantities*.

  The system selects the costing sheet for overhead calculation in preliminary costing through the valuation variant linked to the *costing variant planned* that is specified in the master data of the product cost collector. (The costing sheet specified in the product cost collector is used for overhead calculation in the period-end closing process.)

- You can enter an overhead key in the product cost collector. You link an overhead key to an overhead group that you specify in the material master record. In the costing sheet, you specify a separate overhead rate for each overhead key. This enables you to define different overhead rates depending on the material being produced.

       The use of overhead keys may adversely affect performance.

Check the setting in Customizing for *Product Cost by Period* under *Product Cost Collectors* → *Check Costing Variants for Product Cost Collectors* and go to *Costing Variants for Determination of Activity Quantities*.

You can include overhead costs in preliminary costing using the following functions:

- Overhead calculation
- Process cost planning

For overhead allocation, check the settings in Customizing for *Product Cost by Period* under *Basic Settings for Product Cost by Period* → *Overhead*.

Preliminary Cost Estimates for Product Cost Collectors

If you are using activity-based costing (CO-OM-ABC), check the settings in Customizing for *Product Cost by Period* under *Basic Settings for Product Cost by Period → Process Costs*.

Features

In preliminary costing, the BOM components and activities are valuated in accordance with the valuation variant specified in the *Costing variant planned*. To calculate the overhead, the system uses the costing sheet specified in the valuation variant.

Preliminary costing of the product cost collector generates a cost component split and an itemization [Ext.].

> ⚠️
>
> The cost component split displayed here is not a true cost component split. It is only a single-level cost component split. This means that the assemblies are not exploded. Instead, the total value of the assembly is shown under the cost component to which the cost element of the assembly is assigned.

If the controlling area currency is not the same as the company code currency, the costs are updated in both currencies. You can view both currencies in the reports of the *Information System*.

> 💡
>
> Reports on preliminary costing of product cost collectors can be found in the information system of *Product Cost Planning*. The information system of *Cost Object Controlling* does not provide reports on the preliminary costing of product cost collectors.

If the reporting point structure of your routing has changed in repetitive manufacturing, you can update the preliminary cost estimate.

The cost calculated in the preliminary cost estimate is **not** updated to the product cost collector.

User-Defined Error Management

You can influence the messages output in the log of preliminary costing of product cost collectors by using user-defined error management [Ext.].

Activities

You can start preliminary costing for a product cost collector in the following ways:

- When you create the product cost collector

- Manually in the change mode of the product cost collector (see also: Editing Product Cost Collectors [Page 154])

- As a collective report specified in the menu of *Product Cost by Period* under *Planning → Preliminary Costing for Product Cost Collector*

See also:

Product Cost Collector [Page 149]

Creating a Preliminary Cost Estimate for a Product Cost Collector [Page 171]

Preliminary Cost Estimates for Product Cost Collectors

For detailed information on viewing costs in the information system, see the documentation
Product Cost Controlling Information System [Ext.].

Creating Preliminary Cost Estimates for Product Cost Collectors

Prerequisites

You have created a product cost collector with the Controlling level *Production Version* or *BOM/Routing*.

You have entered a *costing variant planned* in the product cost collector. This costing variant must specify costing type 19 (in this costing type, the indicator *Preliminary costing for product cost collectors* is selected). Check this setting in Customizing for *Product Cost by Period* under *Product Cost Collectors* → Check Costing Variants for Product Cost Collectors [Ext.]. In the dialog box, choose *Costing Variants to Determine Activity Quantities*.

Procedure

Single and Multiple Processing

You can create a preliminary cost estimate for one or more product cost collectors with the function **edit product cost collector** when you create the product cost collector, or in the change mode. When you create a preliminary cost estimate in the function *edit product cost collector*, you can check the costing parameters before starting the costing process. You can view the cost estimate in the same function immediately after creating it.

Costing Product Cost Collectors When You Create Them

When you save, the dialog box *Do you want to create a preliminary cost estimate for the product cost collector?* appears. Choose *Yes*.
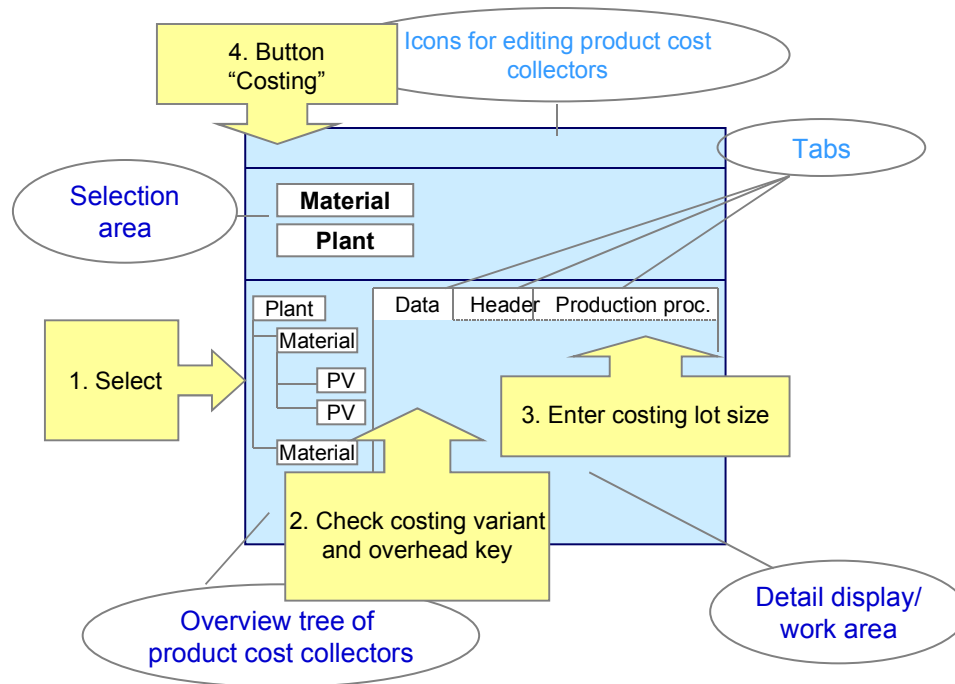
Costing in the Change Mode

Before costing, check the costing variant and the overhead key in the *Data* tab.

Enter a costing lot size in the *Production process* tab. The tabs also show which quantity structure the preliminary cost estimate is based on.

Select the product cost collector(s) that you want to cost, and choose the button *Costing.*

Creating Preliminary Cost Estimates for Product Cost Collectors

Edit Product Cost Collector: Screen Layout

See also: Editing Product Cost Collectors [Page 154]

Preliminary Cost Estimates for Product Cost Collectors: Collective Processing

You can also create preliminary cost estimates with report program RMSERI40. This report program increases **performance** when costing a large number of product cost collectors, since the data can be processed simultaneously on multiple servers.

1. Choose *Accounting → Controlling → Product Cost Controlling → Cost Object Controlling → Product Cost by Period → Planning → Preliminary Costing for Product Cost Collector*.

    The screen *Creation of Preliminary Cost Estimates for Product Cost Collectors* appears.

2. Enter the required data. If you want to use parallel processing, enter a server group. Choose *Execute*.

Result

The cost estimates receive the number of the production process. The product cost collector receives the status PRC (pre-costed).

In the function **Edit Product Cost Collector** you can view the message log [Ext.] by choosing *costing log*. From the log, you can view the messages that are listed in the log and that can be influenced by user-defined error management (see also: User-Defined Error Management in Cost Object Controlling [Ext.]).

You can view the cost estimate with *Goto → Display Cost Estimate*. The system first displays a selection list of all preliminary cost estimates of different dates for the product cost collector. The screen *Display Material Cost Estimate with Quantity Structure* appears.

Creating Preliminary Cost Estimates for Product Cost Collectors

You can view the following information on a preliminary cost estimate for a product cost collector:

- The cost component split under *Costs → Display Cost Components*

  ⚠️

  The cost component split displayed here is not a true cost component split. It is only a single-level cost component split. This means that the assemblies are not exploded. Instead, the total value of the assembly is shown under the cost component to which the cost element of the assembly is assigned.

  For information on cost component splits, refer to Cost Component Report [Ext.].

- The itemization [Ext.] with *Costs → Itemization*

- The costed multilevel BOM [Ext.] with *Costs → Costed Multilevel BOM*.

- The cost reports defined in the user exit display with *Costs → User Exit Display*

  Cost reports 1 and 2 are preset.

- The message log for costing with *Extras → Log*

- Other information with *Extras → Information*

- The quantity structure used in the cost estimate with *Extras → Quantity Structure*

Other functions are also available, such as switching to a different cost component view and changing the cost base.

💡

The preliminary cost estimate of a product cost collector does not update planned costs to the product cost collector. A preliminary cost estimate for a product cost collector differs in this respect from a preliminary cost estimate for a manufacturing order.

In a preliminary cost estimate for a manufacturing order, the planned costs calculated on the basis of the quantity structure specified in the manufacturing order are charged directly to the manufacturing order. The planned costs for a manufacturing order can be used to calculate planning variances. This enables you to determine the most suitable production lot size, for example.

The preliminary cost estimate for the product cost collector, on the other hand, uses the costing lot size specified in the product cost collector in the *Production process* tab, rather than the production lot size. You cannot determine planning variances with the preliminary cost estimate for a product cost collector.

💡

If you have created preliminary cost estimates for product cost collectors in collective processing (report program RMSERI40), you cannot view the cost estimates from the report program. To view the cost estimates, use the function **Edit Product Cost Collector**. A message log is output after you have executed the report program.

See also:

For detailed information on costing materials, refer to the document Product Cost Planning [Ext.].

For detailed information on the reports in *Product Cost Controlling*, refer to the documentation Product Cost Controlling Information System [Ext.].

For more information on performance improvements in Product Cost Controlling, see the following section: Performance in Product Cost Controlling [Ext.]

Cost Object Controlling: Make-to-Stock Production

In make-to-stock production, you can use Cost Object Controlling as follows:

- *Product Cost by Order*

    You can manage your costs at the level of production orders and process orders. You can analyze cumulative costs or period costs.

- *Product Cost by Period*

    You can manage your costs by period at the level of production cost collectors. You can create production cost collector for run schedule headers, for the combination material / production version at plant level, or only for materials at plant level.

    You can also use cost object hierarchies for cost management when you have costs that cannot easily be assigned to particular orders, production cost collectors, production versions, or materials. You can also use cost object hierarchies in conjunction with production orders or process orders.

See also:

Selected Logistical Processes and Cost Objects [Ext.]

For detailed information, see the following documents:

Product Cost by Order [Page 180]

Product Cost by Period [Page 176]

For information on *Cost Object Controlling* with sales-order-related production, refer to the following sections:

Cost Object Controlling: Mass Production on the Basis of Sales Orders [Ext.]

Cost Object Controlling: Complex Make-to-Order Production [Ext.]

Product Cost by Sales Order [Ext.]

Product Cost by Period

Purpose

The application component *Product Cost by Period* enables periodic analysis of costs at the product level.

In contrast to *Product Cost by Order* in which you analyze costs by lot, in *Product Cost by Period* you analyze costs by period. This means that you collect the costs on a cost object over an extended period of time, and analyze the debits and credits in each period.

You can use the following cost objects in *Product Cost by Period*:

- Product Cost Collector [Page 149]

    Product cost collectors enable you to collect costs at the product level independently of the production type. Regardless of whether the production environment is order-related production, process manufacturing, or repetitive manufacturing, you collect the production costs for the product on a product cost collector and analyze the costs in each period.

- Cost object hierarchies [Ext.] with their cost object nodes and assigned objects (such as materials)

    You can use cost object hierarchies in addition to product cost collectors. Costs that cannot be assigned directly to particular orders (usually product cost collectors) can be collected at higher levels by means of a cost object hierarchy. In this case, the costs are collected on *cost object nodes* in the cost object hierarchy. You can structure cost object hierarchies in different ways, for example according to product group or area of responsibility. This enables you to collect costs according to how closely the costs are related to the product. All orders assigned to a cost object hierarchy must be settled in each period.

You can also periodically analyze and settle costs for manufacturing orders. However, it is recommended that you settle manufacturing orders by lot rather than by period. If you want to settle costs by period, you should use a product cost collector. If you want to collect and analyze costs directly on manufacturing orders [Ext.], read the information under Product Cost by Order [Page 180].

You can use the *Product Cost by Period* component for the following purposes:

- Create a preliminary cost estimate for product cost collectors

- Calculate and analyze target costs and actual costs for product cost collectors and cost object hierarchies

- Calculate or update the work-in-process inventory [Ext.] and the finished goods inventory

- Calculate and analyze variances for each period

- Transfer data to *Financial Accounting* (FI)

- Transfer data to *Profitability Analysis* (CO-PA)

- Transfer data to *Profit Center Accounting* (EC-PCA)

- Transfer data to *Actual Costing/Material Ledger* (CO-PC-ACT)

You can use the *Product Cost by Period* component in the following production environments:

Product Cost by Period

- [Make-to-stock production [Page 175]](#)

- [Mass production based on sales orders [Ext.]](#) if you are using a [valuated sales order stock [Ext.]](#) and the production environment is repetitive manufacturing

Implementation Considerations

You normally use the *Product Cost by Period* component in the following situations:

- Repetitive manufacturing environments

    In repetitive manufacturing environments, you **always** collect and analyze your costs on product cost collectors.

- Make-to-order or process manufacturing when you are not interested in managing your costs at the order level In this case, instead of using the manufacturing orders as the basis for *Cost Object Controlling*, you create a product cost collector.

- When you have costs that you cannot (or do not want to) assign to particular orders

    You then assign these costs to the cost object nodes in a cost object hierarchy.

Integration

For general information on Cost Object Controlling, refer to the section [Cost Object Controlling [Ext.]](#).

You can use both the *Product Cost by Period* component and the *Product Cost by Order* component in conjunction with the [Product Cost by Sales Order [Ext.]](#) component.

When production orders or process orders are assigned to a cost object hierarchy, you use the [Product Cost by Order [Page 180]](#) component in conjunction with the *Product Cost by Period* component.

You can see the costs in the *Product Cost Controlling Information System* (see also: [Information System for Product Cost by Period [Ext.]](#)).

Features

You analyze the costs of product cost collectors in the *Product Cost by Period* component. Product cost collectors enable realization of lean cost management scenarios that are not integrated with the logistics components.

The use of product cost collectors does not prevent you from performing logistical functions on the manufacturing order or production version (such as goods issues, confirmations, and goods receipts). The costs incurred from the logistical transactions are updated directly on the product cost collector.

- You enter reporting point backflushes in repetitive manufacturing. The product cost collector is charged with actual costs.

- You create a goods receipt in repetitive manufacturing. The product cost collector is credited.

If you are in a sales-order-related production environment and are using a valuated sales order stock in repetitive manufacturing, you can collect the costs for individual requirements materials

on product cost collectors. (See also: Product Cost Collectors in Sales-Order-Related Production [Ext.])

You can use cost object hierarchies in addition to collecting costs at the level of product cost collectors. You can distribute the costs assigned to the cost object nodes to the orders on the basis of keys. You can then calculate and analyze the variances on the orders. It is also possible to calculate the variances on the cost object nodes instead of distributing the costs.

In the *Product Cost by Period* component you always calculate the work in process at target costs. All orders used in the *Product Cost by Period* component have the settlement type PER (periodic).

You can do the following at the end of the period:

• Allocate process costs to product cost collectors and to the cost object hierarchy.

• Revaluate activities and business processes at actual prices

• Allocate overhead

• Distribute the actual costs if you are using a cost object hierarchy

• Calculate work in process for the product cost collector

• Calculate variances for the cost object hierarchy or for the product cost collector

• Transfer data to other application components such as FI, EC-PCA, CO-PA, and CO-PC-ACT

Constraints

Period-based cost analysis at the level of manufacturing orders is **not** recommended. At the level of manufacturing orders, you should analyze lot-based costs in the *Product Cost by Order* component.

In sales-order-related production, product cost collectors are possible if you are using a valuated sales order stock and the production environment is repetitive manufacturing. If you are manufacturing on the basis of production orders and process orders in sales-order-related production, you cannot use product cost collectors as cost objects.

You cannot use the *Product Cost by Period* component together with the *Product Cost by Sales Order* component in sales-order-related production environments when you are using a nonvaluated sales order stock [Ext.]. The reason for this is that all orders in which the sales order item is the settlement receiver have the settlement type FUL (full settlement).

See also:

Recommendations for repetitive manufacturing environments are provided in the following section:

Recommendations and Notes for Repetitive Manufacturing Environments [Ext.]

For detailed information on the *Product Cost Controlling Information System*, see the documentation Product Cost Controlling Information System [Ext.].

For detailed information on *Profitability Analysis* (CO-PA), see the document *CO Profitability Analysis*.

For detailed information on *Profit Center Accounting* (EC-PCA), see the document *EC Enterprise Controlling.*

Product Cost by Period

Product Cost by Order

Purpose

The *Product Cost by Order* application component enables you to analyze costs at the level of manufacturing orders [Ext.]. You can use the *Product Cost by Order* application component in make-to-stock and sales-order-related production environments. In sales-order-related environments, you can use *Product Cost by Order* in mass production on the basis of sales orders and as a complement to the *Product Cost by Sales Order* component (including complex make-to-order environments).

In *Product Cost by Order,* the manufacturing orders themselves are the cost objects. Costs charged to manufacturing orders are usually analyzed and settled by lot. This means that variances can only be analyzed after the entire planned production quantity has been put into inventory.

The *Product Cost by Order* component allows you to do the following:

- Calculate and analyze planned costs, target costs, and actual costs of production orders and process orders

- Calculate or update the work-in-process inventory [Ext.] and the finished goods inventory

- Calculate and analyze variances

- Transfer data to *Financial Accounting* (FI)

- Transfer data to *Profitability Analysis* (CO-PA)

- Transfer data to *Profit Center Accounting* (EC-PCA)

- Transfer data to *Actual Costing / Material Ledger* (CO-PC-ACT)

Implementation Considerations

You can use the *Product Cost by Order* component in the following situations:

- In sales-order-related production [Ext.] environments when you are using complex make-to-order production [Ext.] with valuated sales order stocks [Ext.] and want to calculate the work in process and variances at the level of the logistical orders (production orders and process orders)

  In this case you use the *Product Cost by Order* component together with the *Product Cost by Sales Order* component.

- In sales-order-related production environments with mass production on the basis of sales orders [Ext.] when you are using valuated sales order stocks and you want to concentrate your cost-management efforts more on the costs of the logistical orders than on the cost of the products

- In make-to-stock environments [Page 175] when you want to focus on the cost of the order

When based on manufacturing orders, the *Product Cost by Order* component is particularly suitable for measuring the cumulative cost of lots (that is, when the settlement rule specifies *full settlement*).

Product Cost by Order

You can implement *Product Cost by Order* with production orders and process orders in order-related production or process manufacturing environments.

Integration

For general information on Cost Object Controlling, refer to the section Cost Object Controlling [Ext.].

You can use both the *Product Cost by Order* component and the *Product Cost by Period* component in conjunction with the *Product Cost by Sales Order* component.

You can use the *Product Cost by Order* component with projects.

You can look at the costs in the *Product Cost Controlling Information System*.

Features

You can analyze costs of manufacturing orders by period. However, SAP recommends lot-based cost controlling for manufacturing orders. The manufacturing order must have settlement type FUL (full settlement) in this case.

You can implement *Product Cost by Order* with or without the *Production Planning* application component. If the *Production Planning* component is not installed, you can create a production order without a quantity structure [Ext.] in *Controlling*.

In *Product Cost by Order*, you can link production orders and process orders into a collective order [Ext.].

You can represent joint production with process orders and production orders. (See also: Special Requirements in Joint Production [Ext.]).

When you are costing by lot, you calculate the work in process using the actual costs (difference between debits and credits for the order). When you are costing by period, you calculate the work in process at target costs based on the confirmed operations or reporting points.

You can do the following at the end of the period:

- Allocate process costs to the manufacturing orders

- Revaluate activities and business processes at actual prices

- Allocate overhead

- Calculate the work in process, variances, and scrap

- Transfer data to other application components such as FI, EC-PCA, CO-PA, and CO-PC-ACT

The information system allows you to summarize the data in various ways, so that you can view the costs by material, by order type, or by plant.

Constraints

If you are using the *Product Cost by Sales Order* component with a nonvaluated sales order stock [Ext.], you cannot calculate work in process or variances for production orders or process orders assigned to a sales order item. Variance calculation is not supported by the system when you are using a nonvaluated sales order stock. Standard costing is therefore not possible in this case. However, all these functions are available if you are using a **valuated** sales order stock.

See also:

You can cost production orders and process orders by period. For information on the *Product Cost by Period* functions, such as on using cost object hierarchies, refer to the documentation on the application component Product Cost by Period [Page 176].

You can use production orders and process orders in conjunction with the *Product Cost by Sales Order* component. It is advisable to use the *Product Cost by Sales Order* component together with cost object controlling on the basis of lots. For more information, refer to the documentation on the application component Product Cost by Sales Order [Ext.]. This document also provides information on the special aspects of valuated sales order inventories, such as calculating standard prices.

For detailed information on logistical processing, see the documentation *PP Production Planning* and *PP-PI Production Planning Process Industries*.

You can view the data of the *Product Cost by Order* component in the information system in a number of different formats. For more information, see the document *Product Cost Controlling Information System*.

For detailed information on *Profitability Analysis* (CO-PA), see the document *CO Profitability Analysis*.

For more information on *Profit Center Accounting*, see the document *EC Enterprise Controlling*.

For more information on engineer-to-order environments, see the document *Project System*.

For information on rework, see the following sections:

Integration of Rework for Production Orders [Ext.]

Representing Rework in the System [Ext.]

Rework Operations and Rework Quantities [Ext.]

Rework and Confirmations [Ext.]

Preliminary Settlement for Co-Products, Rework [Ext.]

Preliminary Settlement for Rework [Ext.]

Performing Preliminary Settlement for Co-Products, Rework [Ext.]

Evaluations

The following tools are available for evaluating KANBAN:

- **Error display**

    Using the error display function, you can instruct the system to display various existing errors and you can also delete the corresponding error messages.

    Displaying Errors

- **Plant overview**

    Using the plant overview, you can instruct the system to display an overview of the work flow at the various control cycles either for one plant or per plant and certain selection criteria.

    Plant Overview

- **Control cycle and kanban overview**

    Using the control cycle and kanban overview, you can evaluate the control cycles in detail.

    Accessing the Control Cycle and Kanban Overview

- **Evaluations from other areas**

    From the KANBAN menu, you can access the following evaluations:

    – The **Current stock/requirements list** from Material Requirements Planning.

        To do this, choose *Evaluations → Stock/reqmts list.*

    – The **Stock overview** from Inventory Management.

        To do this, choose *Evaluations → Stock overview*.

    – The **Logistics Information System**

        To do this, choose *Evaluations → Information system.*

    For more information on these evaluations, please refer to the appropriate SAP documents in the applications mentioned.

Plant Overview

Proceed as follows:

1. Starting from the main KANBAN menu, select *Evaluations* → *Plant overview.*

    The system branches to the initial screen of the plant overview.

2. Enter the appropriate plant.

    If you require additional selection criteria, you can use the function *Detailed selection*. To access the detailed selections, choose *Detailed selections* and enter your selection criteria in the following dialog box.

    You can also preset the display of the control cycles using the following criteria:

    – **Sort list according to material number**

        In this case, the material numbers are sorted either numerically or alphabetically.

    – **Sort list according to supply areas**

        In this case, the supply areas are sorted either numerically or alphabetically.

    – **Sort list according to urgency using the maximum empty limit**

        Urgency is calculated by dividing the number of empty kanbans in the control cycle by the total number of kanbans in the control cycle. Thus, you can also take the maximum number of empty kanbans allowed into account.

        Urgency is calculated using the following formula:

        $$\frac{\text{no. of empty kanbans - maximum empty}}{\text{no. of kanbans in control cycle}}$$

        All kanbans with the following statuses are regarded as EMPTY:

        – WAIT

        – EMPTY

        – IN TRANSIT

        – IN PROCESS

        Incorrect kanbans are not regarded as EMPTY.

    – sort according to priority without using the maximum empty limit

        Urgency without maximum empty limit is calculated using the following formula:

        $$\frac{\text{no.of empty kanbans}}{\text{no. of kanbans in control cycle}}$$

3. Select ENTER.

    The system displays the plant overview.

    You are provided with an overview of the control cycles with the kanban status, in which the number of kanbans per status is displayed.

Plant Overview

The kanbans are displayed in different colors depending on the status. You can refer to the legend to determine what the different colors represent. To access the legend select *Kanban board → Legend*.

Accessing Additional Information

You can display the control cycle data by double-clicking on the control cycle line.

You can display the current stock/requirements list by placing the cursor on the control cycle line and selecting *Goto → Stock/reqmts list*.

You can display the stock overview by placing the cursor on the control cycle lines and selecting *Goto → Stock overview*.

Accessing the Control Cycle and Kanban Overview

1. Starting from the main KANBAN menu, choose *Evaluations* → *Control cycles/Kanbans.*

    You branch to the initial screen of the evaluation.

2. Enter the plant in which the control cycles/kanbans are to be selected.

3. Define the appropriate criteria for the selection. You can save these criteria as a variant as you can for every report.

4. Choose *Execute.*

    The system displays the results of your selection.

Accessing Additional Information

You can display the control cycle data by double-clicking on the control cycle line. If you want to change a control cycle, position the cursor on the control cycle and choose, *Edit* → *Change control cycle.*

You can display the data of an individual kanban by double-clicking on the kanban.

You can display the current stock/requirements list by placing the cursor on the control cycle line and selecting *Goto* → *Stock/reqmts list.*

You can display the stock overview by placing the cursor on the control cycle lines and selecting *Goto* → *Stock overview.*

You can access the kanban correcting by choosing *Goto* → *Kanban correction.*

Displaying Errors

Using the error display function, you can instruct the system to display various existing errors and you can also delete the corresponding error messages.

To access the error display, proceed as follows:

1. Starting from the main KANBAN menu, select *Evaluations → Error display.*

    The system displays the initial screen of the error display report.

2. The following selection criteria are available:

    Demand source; limitations

    –   storage location

    –   supply area

    –   person responsible

    Replenishment strategies; limitations

    –   in-house production

    –   external procurement

    –   stock transfer

    Enter the selection criteria and select *Execute*.

    The system displays a list of the error messages based on your selection criteria.

Display Options

In the error display screen, you can view the following information:

*   If you want to view the error message, position the cursor on the error line and select *Err.mssge:long text.*

*   If you want information on the kanban, position the cursor on the error line and select *Kanban info.*

    *   If you want information on the control cycle, position the cursor on the error line and select *Displ. control cycle*.

Processing Options

The following options are available for processing the error display:

*   To delete error messages, you can either,

    –   select the appropriate lines and then *Edit → Delete messages → All selected entries,* or

    –   you can delete the messages up to a certain date

        To do this, select *Edit → Delete messages → All until the...*

        The system displays a dialog box where you enter the appropriate date.

        Enter the date and select *Continue*.

The system deletes the error messages you selected.

The error is not solved automatically simply because you have deleted the error message.

- If you want to reprocess a kanban, you can branch into the kanban correction functions.

    To do this, position the cursor on the appropriate line and select *Goto* → *Kanban correction.*

    The system branches into the kanban correction screen.

See also:

Kanban Correction [Page 84].

Confirmations to PP-PK (CC5)

During kanban processing the material supply between the material source and the demand source is controlled by so-called kanbans (for example, card and container). The relationship between a material source and a demand source with regard to the material is defined in a control cycle. A certain number of kanbans are allocated to each control cycle. Each of these kanbans contains a target quantity. During operative kanban processing, the kanbans are set to the desired status by an impulse (kanban impulse), for example, from "empty" to "full", or from "full" to "empty").

This impulse is usually generated through the import of a bar code. However, alphanumeric entries are also possible.

When the status of a kanban is set to "full", you can also optionally transfer a confirmed quantity. This value is then allocated to the kanban instead of the target quantity. If you use a background job to post a goods receipt at the same time, the system uses the confirmed quantity.

For certain types of processing an additional function is available, that makes it possible to reduce the material quantity in a kanban by a defined amount (quantity impulse). Bar code support for the entry (for example, for quantity 1) is also possible.

The data used for the plausibility check are as follows:

•	`pkhd5`	Kanban control cycles
•	`pkps5`	Kanbans
•	`pkst5`	Possible status of kanbans

Impulse confirmations are transferred to the transfer structure:

•	`conf51`	PP-PK confirmations

Record Types [Page 190]

Data Structures in CC5 [Ext.]

Record Types

The following record types are used:

Record type	Function	Remark
K10	Kanban impulse	Status change of kanban container
K20	Quantity impulse	Debit quantity from kanban container

The following fields must be filled, when confirmations are transferred to structure `conf51`:

Record type	Fields to be filled (see "Data structures in CC5")	Required fields	Optional fields
K10	SATZA, TERID, LDATE, LTIME, ERDAT, ERTIM, PKKEY, PKBST,	X X	
	PKNUM, PKPOS, PKIMG		X
K20	SATZA, TERID, LDATE, LTIME, ERDAT, ERTIM, PKNUM, ABMNG	X X	

The record type is filled through the selection of an entry transaction or through the entry of an identifier.

The kanban impulse (K10) can be encrypted in 11-digit bar code that features the following structure:

Position 1-7	= PKKEY
Position 11	= PKBST

The quantity impulse (K20) can be encrypted in an 8-digit bar code that features the following structure:

Position 1-7	= PKNUM
Position 8	= ABMNG

Fields in CC5

Field name	Description	Content is checked for
SATZA	Record type of confirmation	Valid record type

Record Types

TERID	Terminal ID	Valid terminal ID
LDATE	Actual date of confirmation	Valid date
LTIME	Actual time of confirmation	Valid time
ERDAT	Entry date of confirmation	Valid date
ERTIM	Entry time of confirmation	Valid time
PKKEY*	Kanban ident. number	Against `pkps5`
PKNUM**	Control cycle number	Against `pkhd5`
PKPOS	Container number	PKNUM, PKPOS against `pkps5`
PKBST	Target status	PKSFG***, PKBST against `pkst5`
PKIMG	Actual quality	Numeric value
ABMNG	Debited quantity	Numeric value

*   If you make manual entries, you should use the *PKNUM* field (or the *MATNR* field, the *WERKS* field, and the *PRVBE* field, see also definition of the *PKNUM* field) and the *PKPOS* field (secondary key), rather than the *PKKEY* field (primary key). The *pkPS5* data structure is then used to determine the value with which the *PKKEY* field is filled.

**   If you want to make manual entries in the *PKNUM* field (primary key), it is advisable to fill the *MATNR* field, the *WERKS* field, and the *PRVBE* field (secondary key) instead. You can then use *pkhd5* data structure to determine the value for the *PKNUM* field.

*** As a rule, the value of the *PSKFG* field is a blank when checking the value of the *PKBST* field in the *pkst5* table. In this case, the system checks for existence of the entry `pkst5-pksfg`=blank, `pkst5-pkbst=pkbst`.

The system fills the *TERID* field, the *LDATE* field, the *LTIME* field, the *ERDAT* field, and the *ERTIM* field in the background.

Customer-Specific Enhancements

Use

It is possible to make use of customer-specific enhancements in the KANBAN module. Both BAPIs and user-exits are available for this purpose. In the following, the individual enhancements are listed and the various functions are described. For detailed information please read the documentation for each enhancement in the SAP system.

Features

BAPIs

With BAPIs you can implement your own KANBAN functions. These can be used for the conversion of a PDC-interface or of internet KANBAN.

For business object KANBAN Control Cycle, there are the following BAPIs/methods.

- WithdrawQuantity

    Triggers a quantity signal in the KANBAN control cycle.

- AddEventdrivenKanban

    Creates an event-driven kanban in the control cycle.

- GetList

    Defines one or more KANBAN control cycles for the selection criteria.

Business-Object KANBAN:

- GetListForSupplier (Internet KANBAN)

    Provides KANBAN data for a vendor.

- SetInProcess (Internet KANBAN)

    Sets the status of one or more kanbans to IN PROCESS.

- GetListForSupplier 1 (Internet KANBAN)

    Provides KANBAN data for a vendor, 2nd version (new address fields).

- GetList

    Defines one or more kanbans for the selection criteria.

- ChangeStatus

    Changes the status of a kanban.

You can find BAPIs as function modules in the function groups MPKW (KANBAN) and MPKV (control cycle).

User-Exits

A User-Exit calls a customer-specific program:

- MPKB0001

Customer-Specific Enhancements

> When the status of a kanban is changed, it is checked to see if there are any user-specific functions in the KANBAN process.

- MPKB0002

> A user-defined display in the kanban board can be pre-set.

- MPKC0001

> The user can use his/her own formula for the KANBAN calculation.

- MPKD0001

> Kanban as EDI (should no longer be used).

- MPKR0001

> The user can define user-specific fields in the KANBAN control cycle.