Handling Unit Management (LO-HU)

HELP.LOHU

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Handling Unit Management (LO-HU)

Handling Unit Management

Purpose

You can use Handling Unit Management (HUM) to reflect packing-based logistics structures in the SAP System. Using this method, you track the movements of entire handling units [Page 10] and the materials they contain rather than tracking each material individually.

When you base logistics processes [Page 19] on handling units, goods movements processing is made easier, which in turn optimizes all logistics operations. This simplified processing includes the existing packing function in shipping and warehouse processing in the Warehouse Management system, which is expanded here.

Features

In the system, the handling unit [Page 10] (HU) expands on the shipping unit. Handling units can be nested, which means that you can create new handling units from several handling units as often as you like. At the material item level, HUs contain the complete material identification, the quantity, and, in the case of serial numbers [Page 190], the respective object list. Handling units have unique, scannable identification numbers that can be developed according to standards such as EAN 128 or SSCC.

Handling units contain all inventory management information of the materials they contain that are maintained in Inventory Management. There are also status messages that you can call up at any time that indicate whether a handling unit is only planned or if the ship-to party has been notified of the arrival of this handling unit, or whether it is in the warehouse or has already been posted to goods issue. The integrated history function also records each business process in the life cycle of each handling unit, meaning that you can track the handling unit's path and development at any time.

In HU-managed storage locations, all goods movements are executed through the specification of the respective HUs, and Inventory Management is performed through the handling units. If you are not working with HU-managed storage locations, you can use handling units (without stock information) as before in the delivery and in the shipment.

In HU-managed storage locations, materials can be managed in HUs only. Mixed stock (stock made up of packed and non-packed materials within the same storage location) is not supported. HUs can also be managed in interim storage types. Unpacking a material from an HU means that the stock of the material is posted to a storage location that is not HU-managed.

> If you call up normal **material movements** in connection with an HU-managed storage location, **a delivery is created,** rather than a direct material posting, which has been the procedure up to this point.

Handling units are unique at client level in at least one system. Using an indicator at client level (see Unique Identification of Handling Units [Page 18]), you can control whether you are going to work with the HU functions. Since the handling unit is a physical unit, the central logistics processes are controlled through the input of the handling unit identification. These processes include putaway, picking, and stock transfers, as well as goods receipts and goods issues.

A handling unit's mobility can be limited if quality checks are active. Changes in the stock category caused by a quality inspection are made using a posting change in the handling unit.

There is also a report available that you can use to find and display handling units using different selection criteria such as material, packing instruction, or storage location.

Although the handling unit is basically a unit that remains constant in the system, you can change it by repacking the materials it contains. All the packing functions, such as packing, repacking, and unpacking, are completely supported by the handling unit function. In this way, handling units can be created in production, during goods receipt, or in the packing areas of the warehouse. If you have automatic packing, the handling unit is created from the packing proposals defined in the system (from the packing instructions, for example).

Handling Unit

Definition

A handling unit is a physical unit that consists of the packaging materials (load carrier / packaging material) and the goods contained therein. A handling unit is always a combination of materials and packaging materials [Page 12]. All the information contained in the material items, such as batches and serial numbers, is always available by way of the handling units.

Handling units can be nested, meaning that you can also create new handling units from several handling units as often as you like.

Handling units have unique, scannable identification numbers that can be formed according to standards such as EAN 128 or SSCC.
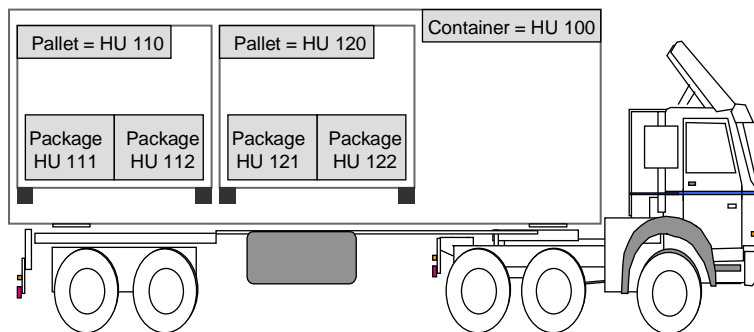
Figure 1: Handling unit example

Structure

The handling unit object contains the following attributes:

- Identification number
- Dimensions
- Weight
- Volume
- Status
- Materials and quantities
- Packaging materials
- Packing instructions

A handling unit consists of a handling unit header and handling unit items. For identification purposes, it is given a unique number.

Handling unit header

The header data of a handling unit is divided in the following way:

- Weight/Volume/Dimensions

- General data

- Means-of-transport data

- Additional data

- Output determination procedure

For more information about each of these detailed points, see Editing detailed data for handling units [Page 40].

Status

The handling unit is linked to general status management. In this way, the various physical states (planned or implemented) and other attributes (weighed, loaded, blocked or posted goods issue) of handling units can be documented.

You can use the HU_ST_INIT user parameter when you create handling units without object reference to set which initial status the handling unit is to have when it is created.

If you want to implement a status of your own, you can define a user-specific procedure for the packaging material type (see also Define Packaging Material Types [Ext.]).

Handling unit item

The items of a handling unit can consist of material items, packaging materials or other handling units that appear in an overview. For more information about this overview, see the **Contents** section of Editing detailed data for handling units [Page 40].

To access the item data of an individual handling unit, select the handling unit concerned and choose *Goto →Detailed HU data →Contents.*

Integration

Handling units can be used in all processes within the supply chain.

Packaging Materials

Definition

Packaging materials are intended to enclose or hold together the materials that are to be packed. In other words, the material that is to be packed can be packed into or onto the packaging material. The packaging material can be a load carrier. The most important packaging materials include crates, boxes, containers, wire baskets, and pallets.
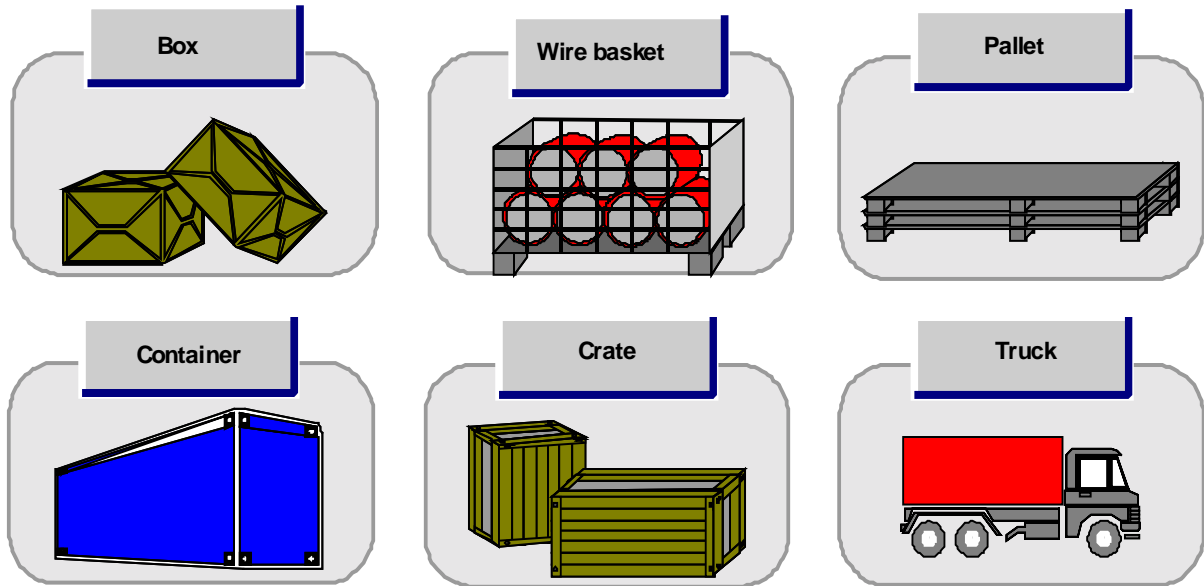
Use

You have to maintain the material master data for each packaging material you want to use. When creating material master records for packaging materials, enter either material type `VERP` (packaging) or a customer-specific material type that you have already set in Customizing. Material type VERP contains additional packing-relevant fields (*Sales: General/Plant Data* screen). You can use the field selection to make the additional fields available for input for all of the material types.

The gross weight and the volume that you enter in the material master have special significance for packing. When you create a handling unit (HU), the system automatically copies the packaging material's master data and uses the gross weight and volume as the packaging material's tare weight and tare volume.

> The tare weight and tare volume refer to the gross weight and gross volume of the packaging material. In the case of a container, the tare weight is the weight of the unloaded container (the total weight less the weight of the goods and packaging materials that are packed in the container).

Structure

If you choose the *Sales: General/Plant Data* view in the material master data of the packaging material, you can maintain the following data on the *Packaging material data* section of the screen:

- Packaging material type

   The packaging material type is a grouping of packaging materials with several control parameters, which is defined in Customizing for packing and which controls the following:

   - Sorting in the handling unit display, so that the packaging materials can be displayed in order of size, for example.

   - An output determination procedure in which handling unit outputs can be defined

   - A packaging material category, which subdivides the packaging materials For example, in handling units with a packaging material category of means of transport, it dictates that additional fields, such as *Driver* and *Alternate driver* are available for input.

   - A plant determination rule that defines, in delivery processing, the plant from which the packaging material is to be debited if delivery items are created from handling units in the delivery.

   - Whether delivery items are to be generated for the packaging material and if so, under which conditions

   - Number assignment for handling units

   - Whether the packaging material's tare weight is variable

      If this indicator is blank, it means that when the total weight of a handling unit changes, the loading weight of the handling unit is determined by taking the total weight less the packaging material's tare weight.

      If this indicator is selected, it means that when the total weight of a handling unit changes, the tare weight of the handling unit is determined by taking the total weight less the loading weight.

- Material group packaging-material

   The material group packaging material is a grouping parameter that can be used to group materials that need similar packaging materials. For example, material group 005 can group small parts that are to be packed in small packages.

      You can maintain the material group packaging material for all materials that you want to pack. In other words, this field can be maintained for all materials. All other fields given here can only be maintained for packing materials (material type VERP).

- Allowed packing weight

   In this field, you can enter a maximum total weight for a handling unit. If the allowed weight for packing is reached, a system message to this effect appears and further packing operations are carried out using a new handling unit, if necessary.

- Allowed packing volume

Packaging Materials

In this field, you can enter a maximum loading volume for a handling unit. If the allowed volume for packing is reached, a system message to this effect appears and further packing operations are carried out in a new handling unit, if necessary.

- Stackability factor

    The stackability factor indicates how many items of packaging material, such as pallets, can be stacked on top of one another. It is not a control and is therefore for information purposes only.

- Filling level

    The filling level is the percentage to which a handling unit should be filled. It is not a control and is therefore for information purposes only.

- Excess weight tolerance

    In this field, you can enter a percentage tolerance limit, up to which the allowed packing weight of a handling unit can be exceeded.

- Excess volume tolerance

    In this field, you can enter a percentage tolerance limit, up to which the allowed packing volume of a handling unit can be exceeded.

- Closed

    This field allows you to control whether the total volume will be changed or remain the same during packing.

    When packing an **open** pallet, the total volume changes.

    When packing a **closed** box, the total volume does not change.

Integration

Packaging materials are special types of materials that can be used for packing or for transporting goods. During packing, you must always specify a packaging material so that handling units [Page 10] can be created.

Control Parameters

Definition

You can use control parameters to make settings in the SAP System for the packing and handling unit (HU) functions.

Use

1. In order for you to implement the **packing function**, your system administrator must maintain the following parameters for packing in the Implementation Guide (IMG):

   - Define Number Ranges for Handling Units [Ext.]

   - Define Packaging Material Types [Ext.]

   - Define Allowed Packaging Materials [Ext.]

   - Define Material Group for Packaging Material [Ext.]

     If you want to use the additional fields that are available for customer-defined modifications of the packing function, choose the Use Handling Unit Supplements [Ext.] activity.

2. You can also maintain the following control parameters for **packing in delivery processing**:

   - Packing Control by Item Category [Ext.]

   - Define Requirements for Packing in the Delivery [Ext.]

3. If you want to use the HU function in other processes besides delivery processing, you must ensure unique identification of handling units [Page 18].

Packing Instruction

Use

A packing instruction serves as a template for the creation of a handling unit. In a packing instruction, you define the materials and packaging materials to be packed in a handling unit.

This enables you to reproduce specific customer packaging requirements in the system. You can also automate the packing process by creating a proposal for a handling unit, based on a packing instruction.

Features

- **Materials**
  The packing instruction specifies which materials in which quantities are to be packed in one handling unit.

- **Dimensions, weight and volume**
  The dimensions, weight and volume of the handling unit are entered in the packing instruction. You can copy these entries to the HU proposal.

  ⚠ The system copies the dimensions from the material master record and uses these values to calculate the weight and volume for the HU in the packing instruction. You now have the option of changing the calculated values. If you change the weight and volume data, the system copies them to the HU proposal as fixed values, without checking them. If you do not change the values, the system calculates the weight and volume entries for the HU proposal dynamically.

- **Documents and short texts**
  The packing instruction can be linked to documents in the Document Management System (DMS), enabling you to provide packing personnel with a detailed description of the packing procedure. Shorter descriptions can be entered as text items in the packing instruction.

- **Items not relevant for HU**
  Any item that you want to appear in the HU proposal but not in the final HU can be flagged as "Not relevant for HU". You use this flag, for example, when a material is only relevant for packing information and not for the HU itself, but its consumption must be mapped in the system.

- **User-defined fields**
  On the *Administrative data* tab page in the packing instruction, there are 5 user-defined fields, which also appear in the HU proposal and later in the HU. These fields are also included in the print program for the HU label, so that a certain value in a certain field triggers a certain action, for example, an asterisk on the printed label.

- **Multi-level packing instructions**
  There are two types of packing instructions: single-level, which describe only one packing level, and multi-level, which describe several packing levels ("nested" handling units). Multi-level packing instructions, therefore, contain subordinate packing instructions. If you want to create handling units with labels (identified HUs) for each packing level, you require one subordinate packing instruction per packing level.

- **Status management**
  You assign a packing status check profile to a packing instruction. In this check profile, you assign packing statuses to the possible ways in which an HU proposal can vary from the packing instruction. For each individual way that an HU proposal can vary from a packing instruction, you can define whether handling unit creation is permitted with this variance (variance from the target quantity, for example).

Unique Identification of Handling Units

Use

Since a handling unit is a physical unit of packaging materials (load carrier / packaging material) and the goods contained therein, each handling unit must be clearly identifiable. This unique identification is made by using an identification number. The uniqueness of this identification number can be guaranteed within one client by using a number range object. You can only ensure that the identification number is unique system-wide if you assign an SSCC18 [Page 199].

Prerequisites

If you want to use the HU function outside of delivery processing, you must make the following settings in the Implementation Guide (IMG) for *Handling Unit Management* in the External Identification [Ext.] section:

1. To ensure unique number assignment, select the Set Unique Number Assignment for HU Identification [Ext.] activity and set the *HU ID unique* indicator.

2. To set the type of number assignment, choose the Define Number Assignment for Each Packaging Material Type [Ext.] activity.

3. To set number assignment for HU identification by using a number range interval, choose the Number Range Maintenance for HU Identification [Ext.] activity.

4. If you want to ensure a unique identification system-wide, use the activities in the SSCC Generation Acc. to EAN128 [Ext.] section.

> In contrast to the number range object for handling units, make sure that the SSCC number is 18 characters long. If you activate system-wide SSCC number assignment, you must execute the Define Number Ranges [Ext.] activity, which can be found under *Storage Units →Master Data* in the Implementation Guide (IMG) for *Warehouse Management*. Then, set the length of the SU numbers to 18 characters in the *Conversion exit for storage unit number* step of this activity.

Example

If you want to process or display a specific handling unit, you can only select that particular handling unit if its identification only appears once in the system. If you allow the same handling unit identification to be assigned several times, the system cannot determine which handling unit you want to process. In such a case, scanner-based processing would not be possible.

Handling Unit Management Within Logistics

Purpose

The following process chain provides an example of how Handling Unit Management can be set up for integrated implementation in the relevant SAP modules.

Prerequisites

So that you can execute the packing functions using handling units, your system administration must first maintain all the packaging-relevant parameters in the Implementation Guide for Handling Unit Management (**see also:** Control parameters [Page 15]).

Process Flow

Sales and Distribution

- You receive a sales order for certain materials. If you have a special agreement with the customer as to the packaging in which this material is to be delivered, you can reflect this agreement by using existing (or creating) packing instructions and a corresponding packing-instruction determination record. You can use this agreement at any point during packing. If the agreement is limited to this particular order, the information is created in the order in the form of a packing proposal. This agreement is then also available during packing in repetitive manufacturing and in the delivery.

- An availability check is run for the order items. If the system determines that the sales order cannot be filled by using the warehouse stock currently available, a requirement is created for production (in the case of in-house production) or for purchasing (in the case of external procurement).

Production

- A manufacturing order (such as a work order) is created for the respective material on the basis of the order requirement.

- The raw material required for production is reserved (if it is in stock).

Purchasing

- If the raw material is not available in sufficient quantities, or if the material required for the sales order needs to be acquired externally, purchase orders are created from the requirements generated for material procurement.

Goods receipt

- The vendor notifies the goods recipient of the delivery of the goods by using a shipping notification that also contains the packaging data. The shipping notification generates an inbound delivery that includes the packing information from the shipping notification. If there is no EDI notification, the inbound delivery must be created and packed manually for the purchase order. The handling units are put away and the inbound delivery is posted for goods receipt.

Handling Unit Management Within Logistics

Quality Management

- If the packing data is known in the inbound delivery, an inspection lot is created for these handling units and the stock is posted to quality inspection stock upon goods receipt.

- If the handling units have been put away in HU-managed storage locations, the handling units can be re-transferred since the stock is still managed through the handling unit.

Warehouse Management

- Handling units with raw materials are provided in time for production in accordance with the production requirement.

Quality inspection

- As soon as the quality inspection is complete, the stock in the handling units is posted to unrestricted-use stock or to scrap materials, depending on the usage decision.

Inventory Management

- If the production storage location is not HU-managed, the goods issue of the raw material takes place through an explicit stock posting or through the verification from production.

- If the production storage location is HU-managed, the goods issue takes place either after successful staging of the materials or through explicit specification of the handling unit.

Production

- The production process is executed and the raw materials are used.

- The handling units that result from this step are planned.

- As a last step, the material that was produced is packed, either in production or after production. The handling units that are created in this way are confirmed as *implemented.* If there was no planning step, the handling units are created directly as *implemented* handling units.

Quality Management

- If the status of the handling unit changes from *planned* to *implemented* (or changes during creation of *implemented* handling units from production), an inspection lot is created for the handling units.

Inventory Management

- The handling units are posted for goods receipt after verification from production (or in a separate step). Quality Management decides whether the handling unit is to be posted to unrestricted-use stock, inspection stock, or quality-inspection blocked stock.

Shipping

- An outbound delivery is created from the sales order

Warehouse Management

- Transfer orders are created for the materials to be delivered and the handling units are picked from stock. If only partial quantities of existing handling units are required, handling units are created for the picked materials.

- The picked handling units are confirmed to the delivery.

Shipping

- The handling units that were picked can be repacked in the delivery. If there is a packaging proposal in the sales order, the delivery can be packed automatically in accordance with this proposal.

- Goods issue is posted for the handling units.

- The customer is informed through EDI about this delivery.
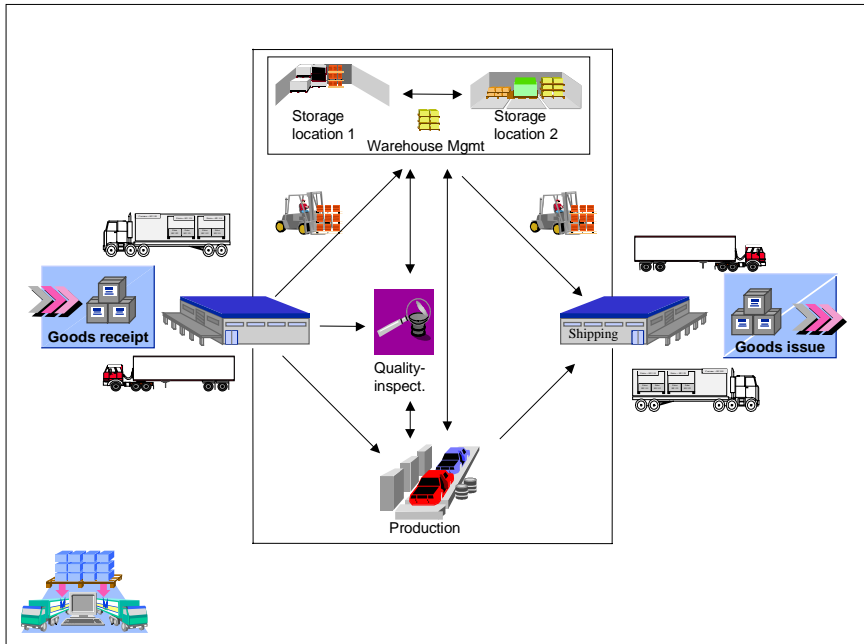
Illustration: Goods movements with handling units

Packing

Use

Packing is an independent function within logistics. You can create <u>handling units [Page 10]</u> and assign material items at any point in the packing dialog by entering a <u>packaging material [Page 12]</u>.

You can pack the handling units you created into other handling units, and so on, forming as many packing levels as you like (multi-level packing).

Features

You can use packaging materials and auxiliary packaging materials to create handling units. You can also assign the following material items to handling units:

- Reservation items

- Finished products from work orders

- Finished products from repetitive manufacturing

- Delivery items

- Material items without document reference

Overviews That Are Relevant for Packing

There are different overviews available during packing in which the necessary information is presented. You can use the following overviews to edit handling units:

- Tab overview

    This overview displays all functions that are relevant for packing for each sub-view. Automatic packing in the background is available in this overview. You can select this overview in any of the following sub-views:

    - Pack material
    You can use this overview to pack materials into handling units, delete handling units, or empty handling units. You can go directly to an existing handling unit and edit it by entering its ID and then selecting the detailed view for that handling unit.

    - Pack HUs
    You can use this overview to pack handling units in other handling units (10 crates onto one pallet, for example), empty and delete handling units, and assign handling units for processing. You can also access a detailed display of the handling units.

    - Packing proposal
    You can use this overview to pack materials and handling units by using previously-defined packing instructions or manually-defined packing proposals.

    - Single entry
    You can use this overview to pack one material per activity with a specific quantity or you can pack one handling unit into another handling unit. This overview is intended primarily for batch activities.

        Since all function modules for the packing function are available to you, you should avoid using batch input.

    - Total content
    You can use this overview to display a total overview of all the handling units with the corresponding hierarchy levels. All functions except generation of new items can be executed from this overview. You can also access a detailed display of the handling units.

    - General header data
    You can use this overview to display the delivery header data, deadlines, and the routes within document processing. When you pack without object reference, this tab contains general header data that is used as default values for creating handling units. For example, you could use this screen to define whether you want to plan handling units, generate handling units that already exist (whose contents was not yet posted to goods receipt) or generate handling units that exist and are already in the warehouse (whose contents was posted to goods receipt).

        In the *Pack material* sub-view, all materials that are to be packed appear in the lower half of the screen and all handling units that can be packed into appear in the upper half of the screen. If you would like to go to the hierarchy layout, choose *Goto →General overview*.

- Hierarchy layout

Overviews That Are Relevant for Packing

The general overview clearly displays all materials, packaging materials and handling units that were already assembled. You can use this overview to pack, unpack and repack intuitively, for example. All changes to the contents of individual handling units appear immediately. If you want to go to the tab layout, either select *Goto →All data → Pack material* or *Goto →All data →Pack HUs*. The respective partial overview appears. In addition, you can display all available detailed views by selecting *Goto →Detailed HU data →(Detailed view of your choice)*.

Working with Handling Units

Creating Empty Handling Units

To be able to pack materials, you must first create an empty handling unit. In a second step, you can then assign materials to this handling unit; the materials are then packed.

1. In the packing dialog [Ext.], select the *Pack material* or *Pack HUs* tab.

2. In the *All existing HUs (available for packing)* section, enter an allowed packaging material into the *Pack. matl* field (see also Displaying allowed packaging materials [Page 43]).

   If you work with external identification numbers, enter these in the *Handling unit* field.

   If you only enter one packaging material, the handling unit number is assigned internally according to the settings in Customizing.

   During packing within delivery processing, you can also enter a customer's packaging material (in the outbound delivery) or a vendor's packaging material (in the inbound delivery) in the *CustPackMat.* field as an alternative to the packaging material.

Pack

Use

If you want to pack a particular quantity of a material or a handling unit into another handling unit, use the *Pack* function.

Features

Using the *Pack* function, you have different options for packing materials or handling units that already exist. In the *Pack materials* overview, you can pack a particular quantity of a material into a handling unit; in the *Pack HUs* overview, you can pack handling units into other handling units. You can use the following packing functions for packing:

- Packing (see below)

- Changing packing quantities in handling units (see below)

- Packing handling units (see below)

- Packing per partial quantity [Page 29]

- Packing if full [Page 30]

- New HU per x HUs [Page 31]

Depending on which function you use for packing, the *Partial qty* and *Total quantity* input fields have certain effects on the quantity to be packed.

Activities

To pack materials using the *Pack* function, proceed as follows:

1. In the packing dialog [Ext.], select the item that you want to pack in the *Material to be packed* (or *Material that is packed*) section of the screen and enter the quantity to be packed in the *Partial qty* field*.*

2. Select the handling unit into which you want to pack the material and choose *Edit →Pack → Pack.*

The system sends you either a success message or notifies you of problems, such as the weight or volume limit was reached and not everything could be packed.

Changing packing quantities in handling units

1. In the packing dialog [Ext.], select the handling unit in question and choose *Goto →Detailed HU data →Contents.* The header data of the selected handling unit is also displayed.

2. Change the quantity accordingly in the *Packed quantity* field of the handling unit concerned.

> The packing quantities can no longer be changed in the delivery once goods issue is posted.

Pack

Packing handling units

If you want to reflect packing levels, such as a material that is packed in a box, which is in turn packed into a create or onto a pallet, then you must pack these handling units in one another.

1. In the packing dialog [Ext.], select the *Pack HUs* tab.

2. In the *All HUs that can be packed* section, select those handling units that you would like to pack and in the *All existing HUs (available for packing)* section, select the handling unit that you would like to pack and choose *Edit →Pack →Pack.*

The system sends you either a success message or notifies you of problems, such as the weight or volume limit was reached and not everything could be packed.

> If you have selected several handling units for packing, then the handling unit that is highest in the list is packed first. If not all items to be packed fit in this handling unit, the packing operation is automatically continued with the following selected handling units.

If you want to pack a specific constant number of handling units into a higher-level handling unit, then choose the New HU per x HUs [Page 31] function.

When packing handling units, a maximum of 999999 packing levels is possible. For information on reflecting packing levels in handling units, see Editing detailed data for handling units [Page 40].

Packing per Partial Quantity

If you are packing a delivery item completely, but want to distribute the quantity in equal amounts over several handling units, proceed as follows:

1. In the packing dialog [Ext.], select the *Pack material* tab.

2. In the *All existing HUs (available for packing)* section of the screen, create a handling unit with the desired properties, or use a handling unit that has already been created (for further information about creating handling units, see Creating Empty Handling Units [Page 26]).

3. In the *Material to be packed* or *already packed* section of the screen, enter the total quantity you want to pack for the item to be packed in the *Total quantity* field. In the *Partial quantity* field, enter the quantity that is to be packed into one handling unit, and select this item.

4. In the *All existing HUs (available for packing)* part of the screen, select the desired handling unit and then choose *per part. qty* (or use the following menu path: *Edit →Pack →New HU for partial qty of material*).

    The system will then continue to create new handling units, using the partial quantity you have defined as the content of these HUs, until the total quantity of the selected item is packed. This simplifies entry, if, for example, you want to pack 100 pieces of a material in 50 boxes with 2 pieces each.

Packing If Full

If you want to pack items completely, but do not know in advance how many handling units you require, proceed as follows:

5. In the packing dialog [Ext.], select the *Pack material* or *Pack HUs* tab.

6. In the *All existing HUs (available for packing)* section of the screen, create a handling unit with the desired properties (weight and volume restrictions), or use a handling unit that has already been created (for further information about creating handling units, see Creating Empty Handling Units [Page 26].

7. In the *Material to be packed* (or *All HUs that can be packed*) section of the screen, select the items that you want to pack and enter the total quantity to be packed for the material in question in the *Total quantity* field.

8. In the *All existing HUs (available for packing)* part of the screen, select the desired handling units and then choose *if full* (or use the following menu path: *Edit →Pack →New HU if full*).

   The system will then continue to create new handling units, adhering to the weight and volume limits, until the total quantity of the selected items is packed.

New HU per x HUs

If you want to pack a specific constant number of handling units into a higher-level handling unit, proceed as follows:

1. In the packing dialog [Ext.], select the *Pack HUs* tab.

2. Choose the *New HU per x HUs* function (or use the menu path *Edit →Pack →New HU per number of HUs*).

3. In the dialog screen in the *HU to be created* section, enter either a packaging material or a customer packaging material for the higher-level handling unit. This higher-level handling unit is automatically created when this function is executed.

4. In the *PackMat.of HUs to be packed* section, enter the packaging material of the handling unit to be packed and the number of handling units that are to be packed into/onto new HUs.

5. The system creates a new higher-level handling unit according to the amount entered until there are no more unpacked handling units of the packaging material that you entered.

When packing handling units, a maximum of 999999 packing levels is possible. For information on reflecting packing levels in handling units, see Overviews That Are Relevant for Packing [Page 23].

Single Entry

Use

You can use a special single-entry screen to manually create new handling units or manually pack individual items in existing handling units.

➡️

>   This screen is also useful for using batch input to complete packing data.

Procedure

1. Select the **Single entry** tab in the packing dialog [Ext.].

2. In the *Handling unit* section of the screen, enter the data of the handling unit into which materials or other handling units are to be packed. If this handling unit already exists in the system, simply enter its external handling-unit ID.

3. Enter the objects that are to be packed in the *Handling unit contents* section of the screen. If a delivery item is to be packed, you can enter either the delivery item or the material that is to be packed. If handling units are to be packed, you must enter their external IDs.

Unpacking

If you want to unpack materials or handling units from a handling unit, proceed as follows:

1. In the packing dialog [Ext.], select the *Ttl content* tab.

   All handling units and the materials packed in them appear in this overview, along with their respective hierarchical levels.

2. Select the items you want to unpack and choose *Edit →Unpack.*

The selected items are unpacked from the respective handling units and reappear as items to be packed.

> You have used the packing function to pack the same partial quantity of a material in four boxes, which, in turn, were packed onto a pallet. If you want to take a handling unit (box) off the pallet, select that box and choose *Unpack*. The box is taken off the pallet, but the contents of the box remain the same. For more information about emptying handling units, see Emptying Handling Units [Page 34].

Emptying Handling Units

In contrast to unpacking, you can also empty handling units (HUs). To do so, proceed as follows:

1.　In the packing dialog [Ext.], select the *Pack material* or *Pack HUs* tab.

2.　Select the handling unit that you want to empty completely, and choose *HU →Empty*.

> The handling unit is emptied. The items that were emptied out of the handling unit reappear in the overview of items that are to be packed.
>
> You have used the packing function to pack the same partial quantity of a material in four boxes, which, in turn, were packed onto a pallet. If you select one of the handling unit boxes and choose *Empty*, the contents are removed from the box (the box is emptied). The box is still packed on the pallet HU, however. For more information about unpacking handling units, see Unpacking [Page 33].

Deleting Handling Units

If you want to delete a handling unit completely, proceed as follows:

1. In the packing dialog [Ext.], select the *Pack material* or *Pack HUs* tab.

2. Select the handling unit to be deleted and choose *HU →Delete.*

> During deletion, the handling unit concerned is completely emptied and removed from all higher-level handling units.

Deleting Assignments

Just as you can assign handling units to a delivery, it may be necessary to remove or delete this assignment. This can be appropriate, for example, if you find that a certain handling unit is to be delivered with a later delivery than the one that it was originally planned for delivery with. In such a case, you only need to remove the link to the delivery, not delete the entire handling unit. That way, all the information about the handling unit itself is retained.

1. In the packing dialog [Ext.] for the delivery, select the *Pack material* or *Pack HUs* tab page.

2. Select the handling unit whose assignment you want to delete, and choose *HU →Delete assignment*.

This function is only available during delivery processing.

Finding Handling Units

Depending on the tab you have selected, only a certain number of handling units are displayed in the packing dialog. You can use the *Find* function to display certain handling units directly by entering the external identification number.

1. In the packing dialog [Ext.], select the *Pack material* or *Pack HUs* tab.

2. Select *HU →Find* and enter the desired handling-unit identification.

The handling unit is found and appears in the first line, already selected for further activities.

Assigning New Numbers for Handling Units

Use

If, for example, you are going to deliver handling units worldwide, unique number assignment for identification of the handling units is necessary, and it is also a good idea to assign SSCC18 numbers (**see also** EAN128 [Page 199]).

Prerequisites

In the Customizing settings for the packaging material type, you must maintain the *Handling unit type* field.

1. In Customizing, choose *Logistics General →Handling Unit Management →External Identification →Define Number Assignment for Each Packaging Material Type.*

2. Maintain the *HU type for EAN128* field for the relevant packaging material type.

Procedure

1. In the packing dialog [Ext.]*,* select the *Pack material* tab.

2. Select the handling unit for which you want to assign an SSCC18.

3. Choose *Extras →SSCC number assignment.*

Result

A new SSCC18 number is generated and automatically assigned to the handling unit.

Entering and Selecting Serial Numbers

Use

You can use serial numbers to clearly distinguish individual objects from one another. Serial numbers allow you to follow up easily on individual goods-movements objects such as the sale of certain goods to a customer. For each packed item, you can select serial numbers in the packing dialog [Ext.], provided the master data of the respective materials is maintained accordingly. A dialog box for serial-number maintenance appears, where you can make the required entries.

For more information about serial numbers, see Serial Numbers in Handling Units [Page 190].

Prerequisites

The serial number profile that allows serialization in handling units must be entered in the appropriate material master record.

For more information, see Entering a Serial Number Profile in the Material Master Record [Ext.] and Creating Master Records for Serial Numbers [Ext.].

Procedure

To select serial numbers that already exist in the system, proceed as follows:

1. Pack [Page 27] the material item to which you want to assign a serial number into a handling unit.

2. Go to the *Ttl content* tab page and select the material to which you want to assign a serial number and choose *Extras →Serial numbers.*

   A dialog box appears.

3. Choose *Select serial numbers.*

   The *Serial Number Selection* screen appears.

4. Enter the desired selection criteria and choose *Program →Execute.*

   The *Serial Number List* screen appears, where the selected serial numbers are listed.

5. Select the serial numbers you want to copy, and then select *Choose.*

Result

The serial numbers you have selected are copied into the dialog box and assigned to the handling unit items.

Editing Detailed Data for Handling Units

You can use the detailed data to change individual information items in the handling-unit header and item data. To access the detailed data of a handling unit, select the handling unit concerned and choose the following menu paths:

- *Goto →Detailed HU data →Detailed view / volume*

- *Goto →Detailed HU data →General details*

- *Goto →Detailed HU data →Auxiliary packaging material details*

- *Goto →Detailed HU data →Additional data*

- *Goto →Detailed HU data →Means of transport data*

- *Extras →Messages*

- *Goto →Detailed HU data →Contents*

- *Goto →Detailed HU data →History*

If the handling unit is in the warehouse, the function bar will include a link to the storage unit.

In addition to detailed HU data, an overview of all handling units appears in a hierarchical display. You can place the cursor on a handling unit in this hierarchical display and the detailed view of that handling unit appears.

You can maintain the following details:

- **Weight/Volume/Dimensions**

    In this overview, weight, volume, and dimensions data appears (examples include tare weight, tare volume, allowed weight and allowed volume). Here you can change the tare weight and tare volume determined from the material master for the handling unit. Furthermore, you can adjust the loading weight and loading volume, and also maintain the respective tolerance values.

    You would use this overview if the handling unit was weighed and measured before loading, for example. You can then maintain the data that differs from the planned data.

- **General data**

    In the upper section of this overview, you see the general data about the packaging materials (packaging material type and packaging material category).

    You can also change the plant and the storage location of the packaging material here.

    This makes sense, for example, if a handling unit is to be assigned to a delivery later (or if the handling unit was created in the delivery) and the plant and storage location are known for the item generation in the delivery. In this case, a delivery item can be generated for the packaging material. It is then possible to execute inventory management and billing for the packaging material.

In the lower section of this overview, you see the general data about the handling unit.

The handling unit's movement status appears here. You can use the *StatusDetail* function to display detailed information about the system status of the handling unit. If you use the *Status profile* function, you can change the user status, provided the packaging material type has a user status profile assigned to it.

In the *HU storage number* field, the system displays the warehouse in which the handling unit is located. This entry refers to the material contained in the handling unit, rather than the plant and the storage location of the packaging material. The system also shows whether the handling unit is in an HU-managed storage location and whether a corresponding storage unit exists. Handling units that are not at an HU-managed storage location and were put away using the *Pre-packed HU* function will have a storage status.

In addition, the system displays the current assignments of handling units to objects.

In the *Contents* field, you can maintain an arbitrary text for this handling unit.

- **Packaging material data**

    You can maintain any auxiliary packaging materials used for each handling unit. These auxiliary packaging materials can be entered separately for each handling unit. For the most part, you can depict the actual packaging of a handling unit by using auxiliary packaging materials since auxiliary packaging materials include interim layers, lids, and protective plastic covering, which are part of the handling unit's packaging.

- **Additional data**

    In this overview, you can maintain additional data for arbitrary handling-unit groups in the *Additional customer data* section.

    In the second section of this overview, you will find information about packing instructions that may have been used for packing.

    In the lower section of the overview, the sales data appears (shipping point, sales organization, distribution channel, and item category). Here you can also maintain customers' packaging materials, if they exist.

- **Means-of-transport data**

    This overview displays data relevant for the means of transport in transportation processing, provided the packaging material is a transportation material. You can maintain data such as the driver, passenger, travel time, distance, specific load data, and the country for the means of transport in this overview.

- **Messages (Outputs)**

    This includes data concerning the printing and sending of outputs relevant to packing. It is possible, for example, to print a specific output for the handling-unit header (output 0001) that you can use to generate labels for the physical handling units.

- **Contents**

    In this overview, data about the contents of the selected handling unit appears.

    There is also information here on the packed quantity and on the packing levels, which are represented by numbers. For example, the entry 2 in the *Hierarchy* field means that the item concerned has been packed in two levels (the item is packed in packaging, which in turn has been packed again).

Editing Detailed Data for Handling Units

To access the item data of an individual handling unit, select the handling unit concerned and choose *Goto →Detailed HU data →Contents.*

Display Allowed Packaging Materials

To display the allowed packaging materials, proceed as follows:

1. Select a material item in the *Materials to be packed/Packed materials* section of the *Processing Handling Units for Outbound Delivery* screen.

2. Select *Choice of allowed pack. mat.*

    The allowed packaging materials appear in a dialog box. Select a packaging material from this dialog box in order to copy it into the screen.

    In order for this feature to work properly, you must first maintain the *Matl grp pack. matls* field for the item that is to be packed. You can do this in the packaging material data in the material master record. You must also maintain the allowed packaging materials for each packaging material group in the Implementation Guide (IMG) for Handling Unit Management (or Logistics Execution). See also Defining Allowed Packaging Materials [Ext.].

If you want to display a packaging material's material master data that is relevant for packing, select the corresponding handling unit and select *Environment →Packaging materials*. On the view selection screen, choose *Sales: General/Plant Data* and enter the organizational levels. The data relevant for packing appears in the material master record for the packaging material in the *Packaging material data* section of the screen.

Automatic Packing

Use

Automatic packing allows you to use packing proposals to create handling units automatically in the background.

The proposal includes both the packaging material and the content per handling unit.

> For a delivery with 3 items, the packing proposal might propose that the first item is distributed in equal amounts onto two pallets and the second and third items are packed together in a container.

Integration

The packing proposal is automatically carried out during the following functions:

- Generating handling units automatically in the background [Page 46]

- Packing automatically when creating deliveries [Page 91]

The automatic packing function also supports the effects of packing instruction determination, packing proposals generated by packing instructions, and customer-specific generation of packing proposals using Business Add-Ins (without using packing instructions). The automatic packing function also supports multi-level packing.

> Filling the User Exit

1. In the first packing phase, delivery items are packed during automatic packing with the New HU if full [Page 30] function in an allowed packaging material [Page 43] (such as a crate).

2. In the second packing phase, each crate is packed onto a suitable packaging material (such as a pallet).

The automatic packing function also supports automatic packing using packing instructions.

> The system automatically determines the packing instructions for the materials to be packed and then the material is packed according to the packing instructions that were found.
>
> The packing instruction that was found may also be multi-level, which is why packing instruction determination is only carried out once during automatic packing.

Automatic packing also supports the PACKMODI enhancement.

Prerequisites

Either the user exits are filled in with data or you have set the packing instruction determination for the material that is to be packed.

Features

During automatic packing, the system determines packing proposals for the material to be packed, which it uses to create handling units.

The packaging proposal is defined either through several user exits or through packing instructions and the respective determination records.

Packing using user exits

You can process customer functions by using the *Project management* transaction in the SAP enhancements. In this case, you need the **PACKMODI** SAP enhancement.

Packing with packing instructions

To create packing proposals using the packing instructions, maintain the following data:

- Create a packing instruction [Page 63].

- In the Customizing section for packing instructions, configure the data required for packing-instruction determination [Page 69].

- Define a packing-instruction determination record [Page 70] for the material to be packed and, if necessary, further characteristics (ship-to party, shipping point).

Generating Handling Units Automatically in the Background

Procedure

- If you want to pack **all** delivery items that have not yet been packed,
  select *Extras →Automatic packing* in the packing dialog [Ext.] [Ext.].

  > When you use this function, you do not need to select items individually. All material items and handling units that have not yet been packed are made available in the automatic packing function [Page 44].

- If you only want to pack **certain** items,
  select *Extras →Sel. item autom.pack.* in the packing dialog [Ext.].

  > If you use this function, you must select the items and handling units to be packed. Then only the unpacked items that were **selected** are made available in the automatic packing function [Page 44].

During automatic creation of handling units in the background, the program automatically searches in both cases for the respective packing proposals for the items to be packed.

Result

The handling units that were created then appear on the screen. If not all the items are packed or if errors have occurred during creation of handling units from the packing proposals found, the system displays an error log in a special mode.

Packing Proposal

Use

In the packing transaction, you can create HU proposals based on packing instructions by entering specific standard values such as the material to be packed, the plant where packing is carried out, the ship-to party and the quantity to be packed. The system starts packing instruction determination based on the values entered and packs the materials as described in the packing instruction it determines. For more information, see Create a Handling Unit Proposal Based on a Packing Instruction [Page 49].

Alternatively, you can create an HU proposal manually in the packing transaction. For more information, see Create a Handling Unit Proposal Manually [Page 51].

You create actual handling units by saving the handling unit proposals. You can modify the proposals as required before saving them.

There are several ways in which you can access the packing transaction. The transaction is integrated in delivery, goods receipt, shipping, repetitive manufacturing and discrete production.

Features

In the packing transaction, you can:

- Create HU proposals (automatically from packing instructions or manually by entering items). You create an HU proposal manually if you do not want to pack according to packing instructions. You build a hierarchy of load carrier, auxiliary packing materials, if required, and the materials to be packed. For more information, see Hierarchical Display in the Packing Transaction [Page 48].

- Select alternative packing instructions on which to base HU proposals

- Delete HU proposals (that is, unpack materials)

- Unpack nested HU proposals

- Repack unpacked materials and unpacked HU proposals

- Check HU proposals. To do this, the system simulates handling unit creation. The system cannot create handling units from HU proposals with the status "Faulty".

- Display handling units that the system is going to create from the proposals

- Recalculate weights and volumes of a handling unit. This is important if the measurements in the proposal have been modified manually in the packing transaction and now have to be reset to the values from the packing instruction or material master

- Create handling units

Hierarchical Display in the Packing Transaction

The packing transaction reproduces nested HU proposals [Page 56] in the form of a hierarchy.

The *Lvl 1* field in the table specifies the number of HUs on the highest packing level that are being created from the HU proposal. The system marks with an asterisk the items that are assigned to this HU proposal, that is, are either used on the highest packing level (packaging materials) or are packed on the highest level (packed goods or sub-HU).

If the item is a load carrier, the field *Lvl 2* specifies the number of subordinate HUs on the second packing level, per main HU. For all other item categories, the system uses an asterisk to show which items are packed in or on the load carrier of this subordinate HU.

All further packing levels are displayed in the same way.

Level 1	Level 2	Material
1		Euro-pallet
*		Intermediate layer
*		Pallet cover
*	10	Box
	*	Lid
	*	Finished product

This example of a nested handling unit shows an HU with load carrier "Euro-pallet" on the highest packing level. The intermediate layer, the pallet cover and the ten boxes are directly assigned to this HU.

Ten sub-HUs (the boxes) are shown on the second packing level, to which in turn lids and finished products are assigned.

Create an HU Proposal Based on a Packing Instruction

Use

You can use packing instructions to create HU proposals [Page 56] for the quantity to be packed. The system uses a determination record to determine a packing instruction (see Packing Instruction Determination [Page 69]).

Prerequisites

- You have created a packing instruction.

- You have made the settings required for packing instruction determination in Customizing for Packing Instructions.

- You have defined a determination record for the material to be packed and, if necessary, further characteristics such as ship-to party.

- You have accessed the packing transaction in the various applications and made the settings required for the creation of HU proposals.

Procedure

The materials to be packed are displayed in the packing transaction for packing with packing instructions.

1. Choose *Expand packing instruction.*

2. The system starts packing instruction determination.

   You can also start packing instruction determination manually, by choosing *Packing instr. selectn*. The system displays the possible packing instructions.

3. Select a packing instruction, and choose *Continue*.

4. The system carries out the following activities on determining a packing instruction:

   The system explodes the quantity to be packed according to the packing instructions. The resulting HUs are then displayed in hierarchical form. For more information, see Hierarchical Display in the Packing Transaction [Page 48].

5. The system displays both the packed and the unpacked quantity. Some materials may not have been packed if, for example, the packing status for the packing instruction does not allow all the materials to be packed, since the packing instruction would then be violated.

   As a rule, the system only creates HU proposals with packing status "Packing instruction respected" or "Tolerated variance from packing instruction". By choosing *Packing instruction selection*, you can set the desired status, thus defining, for example, that HU proposals should be created even if they have packing status "Packing instruction violated".

6. The system calculates the quantity of items per main HU proposal (*Quantity/HU*) and the total quantity per (possibly nested) HU proposal (*Total quantity*).

7. The system displays the packing instruction that it determined and used to create the HU proposal.

Create an HU Proposal Based on a Packing Instruction

8. The system assigns a packing status, according to the packing status check profile specified in the packing instruction. If the HU proposal does not comply with the packing instruction, you can display the reason for this by clicking on the traffic light.

9. The system simultaneously recalculates the weights and volumes (unless you have set the "Manual maintenance" indicator in the packing instruction).

10. Make any changes necessary to your HU proposal. See also Changing the HU Proposal [Page 53].

Result

You can now save your HU proposal, thus creating an HU. If an HU proposal is faulty (red light), no handling units can be created from it.

Create an HU Proposal Manually

Prerequisites

- When creating a handling unit proposal manually, you must enter the complete HU data. Enter the items in order of load carrier, packaging materials and then packed goods, so that the system can automatically build the hierarchy.

- The system can determine the item category from the *Packaging material type* in the material master, under *Sales: General/Plant Data*: If this field is empty, or not ready for input, the item is a packed goods item. If the item is packaging material, this field is filled. In this case, the system checks in Customizing for Shipping, under *Packing →Define Packaging Material Types,* whether the *Packaging material category* of the corresponding packaging material type is load carrier or auxiliary packaging material. (If there is no material with the specified name, the system assigns item category I).

- You have accessed the packing transaction in the various areas and, if necessary, made the settings required for the manual creation of HU proposals.

Procedure

Manual quick entry allows you to easily create an HU proposal in the packing transaction, if no appropriate packing instruction exists or you do not want to pack automatically.

1. Enter the quantity for the load carrier in the first row of the table under *Quantity/HU*, and the corresponding material number under *Material.* Proceed in the same way for all other items, observing the order of entry described above.

2. Choose *Continue.*

   The system builds the hierarchy and fills in the fields in the table, such as the *Item category*. The system takes the measurements from the material master record. The materials to be packed are put in a separate row.

3. Modify the HU proposal if necessary.

4. Save.

This example describes how the system builds the hierarchy in case of manual quick entry.

Enter the following data:

Quantity/HU	Material
3	Pallet
1	Pallet cover
10	Box
5	Packed goods

The system creates the following HU from these entries:

Level 1	Level 2	Quantity/HU	Material	Item category
3		3	Pallet	A

Create an HU Proposal Manually

*		1	Pallet cover	B
*	10	10	Box	A
	*	5	Packed goods	C

Changing the HU Proposal

Use

Before creating an actual handling unit by saving your HU proposal, you can modify it to suit your requirements.

Prerequisites

You have created an HU proposal, either automatically or manually.

Features

You have the following options for modifying an existing HU proposal:

- Delete all HU proposals

  You can delete all HU proposals by choosing *Delete all HU proposals.* All the materials are then unpacked again.

- Delete one HU proposal

  Alternatively, you can delete a specific HU proposal (or subordinate HU proposal) by selecting it and choosing *Delete selected HU proposal.*

- Unpack an HU proposal

  Select a load carrier and choose *Unpack HU proposal.* The selected HUs are unpacked from the main HU. You can only unpack complete HUs, no individual materials.

- Recalculate weights and volumes of a handling unit

  You may wish to do this if you modify the entries for weight and volume, and then want to undo the modifications. The system uses the data from the packing instruction or from the material master to recalculate the weights and volumes. To carry out recalculation, choose *Recalculate weights* or *Recalculate volumes*.

- Moving HU proposals in the hierarchy

  You can move HU proposals up or down levels in the HU hierarchy by selecting a load carrier and choosing *Level up* or *Level down*. The corresponding HUs are then moved up or down a hierarchy level.

You can also:

- Change the quantity/HU for a material or an auxiliary packaging material
- Change the number of sub-HUs in a main HU (quantity on level 1, quantity on level 2, and so on)

  You cannot change the quantity of the load carrier. Each HU must have one load carrier only.

  Changing the quantity of a material/auxiliary packaging material has the following effects:

  – if you reduce the quantity, the system displays the difference between the quantity to be packed and the packed quantity as unpacked material.

Changing the HU Proposal

- – if you increase the quantity, the system checks the packed quantity against the quantity to be packed, and tells you what quantity can actually be packed.

- – if the HU proposals were made according to a packing instruction, quantity modifications affect the packing status (according to the settings made for the check profile in Customizing).

- • You can replace the load carrier, auxiliary packaging materials and materials by overwriting the material number and changing the item category if necessary.

- • You can enter a different packing instruction.

  These modifications affect the packing status (according to the check profile settings).

- • You can change the loading weight/volume and the packaging weight/volume manually.

  These values are then copied to the handling units when you save.

Activities

1. To select an HU proposal, place your cursor in an HU proposal row and choose *Select HU proposals*.

2. The system selects this HU proposal and all corresponding subordinate HU proposals.

   If you place the cursor in the row for a sub-HU, the system only selects this sub-HU (and any corresponding sub-HUs).

3. You can now delete the selected HU proposal if required.

Packing Status Check Profile

Definition

The packing status check profile determines the packing status of a handling unit proposal [Page 56] and also of the subsequent handling unit [Page 10].

Use

In the check profile, you assign a packing status to each of the possible ways in which an HU proposal can vary from the packing instruction. For example, an HU proposal that falls short of the target quantity is assigned status "Packing instruction violated" (red light), if you have defined in the check profile that this variance causes an error.

A check profile can be assigned to each packing instruction. When you create an HU proposal with this packing instruction, the system assigns the proposal a packing status, according to the settings in the check profile.

The packing status of an HU proposal is calculated from the individual packing statuses of its sub-HU proposals, the sub-HU with the lowest packing status determining the status of the proposal as a whole.

An HU proposal that fully respects the packing instruction is assigned status "Packing instruction respected" (green light). If you create an HU from an HU proposal, it also inherits the status of the HU proposal.

For example, a partial HU has the status "Tolerated variance from packing instruction" (yellow light) because it falls short of the target quantity (if you specify in the check profile that this variance can be tolerated).

An HU proposal has the status "Packing instruction violated" (red light) if, for example, it contains a material other than the one specified in the packing instruction (again, the corresponding setting must be made in the check profile). The system cannot create handling units from HU proposals with the status "Packing instruction violated".

Structure

The packing status check profile is made up of the possible ways in which an HU proposal can vary from the packing instruction. You assign a packing status to each of these variances.

Handling Unit Proposal

Definition

Handling unit (HU) proposals are preliminary handling units that form the basis for creation of actual handling units, and serve as information for packing personnel. You create HU proposals in the packing transaction, either manually by entering all the required data, or automatically, based on a packing instruction. You can change a proposal as many times as required and check it before you create the handling unit. When you save the HU proposal, the appropriate amount of handling units are created.

When you create an HU proposal from a packing instruction, the system checks the packing status check profile and assigns a packing status to the proposal accordingly. This packing status is later inherited by the handling unit. However, if an HU proposal has the status "Packing instruction violated", you cannot convert it into a handling unit.

Structure

The HU proposal has the same structure as the handling unit [Page 10], except that it can also contain texts or documents. For more information, see Texts in the Packing Instruction [Page 65].

Check an HU Proposal

Prerequisites

You have created HU proposals in repetitive or discrete manufacturing and want to create handling units from these proposals, or simply check to make sure that you can create handling units [Page 10] from these proposals.

Procedure

1. Select the HU proposal that you want to check.

   If you want to check the complete content of the table control, select none of the HU proposals.

2. Choose *Check HU proposal*.

   The system checks to see if there are any HU proposals from which no handling units can be created (packing status "Packing instruction violated").

   If this is the case, the system terminates the transaction.

   If handling units can be created from all the proposals, the system confirms this.

Simulate Handling Unit Creation

Prerequisites

You have created HU proposals in repetitive or discrete manufacturing and want to create handling units from these proposals, or simply check to make sure that it is possible to create handling units from these proposals.

Procedure

1. Select the HU proposals, from which you want to create handling units, and select *Handling units →Simulate HU creation.*

   ⚠️If you want to simulate the complete content of the table, do not select any of the HU proposals.

   Unless one of the handling units is faulty, the system displays the standard packing transaction with the simulated handling units. A number is displayed for each handling unit. The system also shows which materials and packaging materials belong directly to a handling unit.

   If one of the handling units is faulty, the system terminates the transaction.

   ⚠️The numbers displayed here are not the same as the numbers that the system assigns later when the handling units are actually created.

2. Choose *Back* to get back to the packing transaction for packing with packing instructions.

Packing with Packing Instructions

Use

Customers often specify precisely the quantity in which their goods should be packed in a specific combination of packaging materials to enable their goods receipt process to run smoothly. These requirements for specific packing procedures often cause considerable costs for the vendor of the goods concerned.

Packing instructions enable the vendor to automate the packing process. Depending on specific characteristics, the system creates proposals for handling units based on the previously defined packing instructions. Based on this proposal, the vendor can pack the materials according to customer requirements, and then create the HU in the system, by confirming the proposal.

The vendor can even pack goods ready for shipping and in keeping with customer requirements, as a part of the production process.

Integration

Packing with packing instructions can be used in both repetitive and discrete manufacturing and anywhere in the system that has packing functions (such as the delivery, the shipping notification, and so on).

Features

- With packing instructions, you can carry out preliminary packing, or actually pack materials ready for shipping, from production.

- Packing instructions can also be used to pack a material in shipping.

- The system can create HU proposals from packing instructions that are defined in the outline agreement and specify the amount of materials that are to be packed in a specific way in specific packaging materials.

- The system determines packing instructions based on various characteristics, such as material, ship-to party, and so on.

- You can create a handling unit in the system on the basis of this HU proposal.

Packing with Packing Instructions

Packing Instruction / Handling Unit

Load Carrier

Aux. Packing Material

Aux. Packing Material

Sub-Packing Instruction / Sub-HU

Load Carrier

Aux. Packing Material

Packed Goods

Packing Instruction

Use

A packing instruction serves as a template for the creation of a handling unit. In a packing instruction, you define the materials and packaging materials to be packed in a handling unit.

This enables you to reproduce specific customer packaging requirements in the system. You can also automate the packing process by creating a proposal for a handling unit, based on a packing instruction.

Features

- **Materials**
  The packing instruction specifies which materials in which quantities are to be packed in one handling unit.

- **Dimensions, weight and volume**
  The dimensions, weight and volume of the handling unit are entered in the packing instruction. You can copy these entries to the HU proposal.

  ⚠The system copies the dimensions from the material master record and uses these values to calculate the weight and volume for the HU in the packing instruction. You now have the option of changing the calculated values. If you change the weight and volume data, the system copies them to the HU proposal as fixed values, without checking them. If you do not change the values, the system calculates the weight and volume entries for the HU proposal dynamically.

- **Documents and short texts**
  The packing instruction can be linked to documents in the Document Management System (DMS), enabling you to provide packing personnel with a detailed description of the packing procedure. Shorter descriptions can be entered as text items in the packing instruction.

- **Items not relevant for HU**
  Any item that you want to appear in the HU proposal but not in the final HU can be flagged as "Not relevant for HU". You use this flag, for example, when a material is only relevant for packing information and not for the HU itself, but its consumption must be mapped in the system.

- **User-defined fields**
  On the *Administrative data* tab page in the packing instruction, there are 5 user-defined fields, which also appear in the HU proposal and later in the HU. These fields are also included in the print program for the HU label, so that a certain value in a certain field triggers a certain action, for example, an asterisk on the printed label.

- **Multi-level packing instructions**
  There are two types of packing instructions: single-level, which describe only one packing level, and multi-level, which describe several packing levels ("nested" handling units). Multi-level packing instructions, therefore, contain subordinate packing instructions. If you want to create handling units with labels (identified HUs) for each packing level, you require one subordinate packing instruction per packing level.

Packing Instruction

- **Status management**
  You assign a packing status check profile to a packing instruction. In this check profile, you assign packing statuses to the possible ways in which an HU proposal can vary from the packing instruction. For each individual way that an HU proposal can vary from a packing instruction, you can define whether handling unit creation is permitted with this variance (variance from the target quantity, for example).

Create a Packing Instruction

Use

This procedure describes how to create both single and multi-level packing instructions. Multi-level packing instructions can be created in one procedure. You create the subordinate packing instructions directly from the main packing instruction by entering the name and item type of the subordinate packing instruction and branching straight to the initial screen for creation.

It is therefore not necessary to create a subordinate packing instruction beforehand.

Procedure

1. Select *Logistics →Production →Master data →Packing instructions.*

   The system displays the screen *Master Data for Packing With Packing Instructions.*

2. Select *Packing instructions →Create packing instruction.*

   You branch to the *Components* tab page on the *Create Packing Instruction* screen.

3. Enter the name of the packing instruction you want to create and choose *Enter.*

   The *Create Packing Instruction: Components* screen appears.

4. Enter the items for your packing instruction.

5. An item can be a packaging material, an item of packed goods, a subordinate packing instruction, or a text item. You can enter all the components of the HU in this way. Please note that:

   – The items should be entered in the following order: load carrier, auxiliary packing material, packed goods/subordinate packing instruction. The first item is always the load carrier. Text items do not affect the hierarchy and can be entered anywhere below the load carrier.

   – For each item you must enter a material number and a target quantity and, if appropriate, a subordinate packing instruction. The system determines the item category automatically. For more information, see Create an HU Proposal Based on a Packing Instruction [Page 49].

   – If required, enter a minimum quantity and a rounding quantity.

      An appropriate indicator is assigned to the load carrier.

      For a subordinate packing instruction, enter the item category and the name of the packing instruction and choose *Enter*. The system asks if you want to create this packing instruction.

      By choosing *Yes*, you branch to the initial screen for creating packing instructions, in which you can create your subordinate packing instruction in the same way.

      After saving your data you branch back to the main packing instruction.

6. Now enter the *Administrative data*, *Measurements, Short texts* and *Uses.*

   – Enter an inspection profile on the *Administrative data* tab page. In the check profile, you specify whether a handling unit can be created under specific circumstances or not. The

Create a Packing Instruction

system checks the <u>check profile [Page 55]</u> when creating the HU proposal.

–   If necessary, the measurements specified in the packing instruction can be changed for this particular HU in the *Measurements* tab page.

–   On the tab page *Uses*, the system displays the packing instructions (main packing instructions), in which the packing instruction in question is used as a subordinate packing instruction. This is the case if you are creating the packing instruction from a higher-level packing instruction, as subordinate to it.

7. Save.

Packing instructions can only be saved if they have no errors that prevent handling unit creation. The system checks that a handling unit can actually be created from the packing instruction. For example, if the maximum loading weight is exceeded, a handling unit cannot be created.

Texts in the Packing Instruction

Use

The packing instruction serves not only as a template for creating handling units, but also as information for packing personnel. For this reason, you can include textual (and graphical) elements in the packing instruction.

Integration

You include texts in the packing instruction in the *Change* or *Create Packing Instruction* transaction, either by entering them at item level or by linking to them at header level. Text items are relevant for the packing instruction and the handling unit proposal, but are not copied to the actual handling unit.

Features

- Link to documents in the Document Management System (DMS)

  This function allows you to enter a verbal and/or graphical description of a packing instruction. For example, a detailed description of the complete packing procedure for the packing instruction as a whole.

- Text items in the packing instruction

  Text items can be used to:

  - describe item-specific packing procedures for packing personnel. For example, instructions such as "Use separating layer" or "Always pack material in pairs".

  - give information on packing materials which, for some reason, have no material master in the system.

  Text items can be maintained in several languages, the system displaying only those text items maintained in the user's logon language. If text items exist, but have not been maintained in the logon language, the user receives a warning for each such item when accessing the packing instruction.

Activities

You create a document that is relevant for the whole packing instruction in the DMS and include it in your packing instruction by setting a link at header level. All functions of the DMS are available to you. The document can contain text, scanned documents, graphics or video sequences. For more information, see the documentation on *CA - Document Management*.

You create text items in the packing instruction table of items (components tab page), simply by entering the appropriate item category and automatically branching to the SAP editor.

Texts in the Packing Instruction

Enter a Text Item in a Packing Instruction

Use

Allows you to enter texts at item level in a packing instruction. The system copies these texts to the HU proposal for the information of packing personnel. However, text items are not copied to the actual handling unit.

Procedure

You can enter text items either when creating or when changing a packing instruction. In the *Components* tab page in the *Create Packing Instruction* or *Change Packing Instruction* screen, proceed as follows:

1. Select the item row above which you want to insert your text item and choose *Text*.
    or
    In a new row, enter item category 'T' (text item).

2. The system displays the SAP Editor.

3. Enter your text (for more information, see BC - Word-Processing in the SAPscript Editor [Ext.].)

4. Choose *Back*.

5. The first 40 figures of the first line of text are displayed in the table as *Short text*.

    If you leave the first line blank in the SAP Editor, no short text is displayed in the table.

    Change the text at any time by simply double-clicking anywhere on the appropriate row.

6. If required, create different language versions of the text by placing the cursor on the appropriate row and choosing *Text item: maintain language*.

Result

You have created text items in the packing instruction.

Any text items maintained in different languages are displayed in the packing instruction and HU proposal only if the logon language corresponds. For example, if you have logged on in English and enter an additional language version for Spanish, the system only displays this version when a user logs on in Spanish.

Link a Document to a Packing Instruction

Use

You link a document to a packing instruction at header level. This enables you to include textual or graphical items that are relevant for the packing instruction as a whole, such as detailed packing descriptions.

Prerequisites

- You have created a document in the Document Management System (DMS). For more information, see the documentation for *CA - Document Management*.

- You have assigned to this document a document type that is defined in Customizing for the DMS as a document that can be linked to the packing instruction. The document type PAC is shipped as standard for this purpose.

Procedure

1. Starting from the *Change* or *Create Packing Instruction* screen, choose the *Documents* tab page.

2. The system displays a table, in which any documents already linked to the packing instruction are listed.

3. Place the cursor on an empty row of the table, and use the possible entries pushbutton to find your document in the DMS.

4. The system displays your document in the table on the *Documents* tab page.

5. Save.

Result

The document is linked to the packing instruction, and can be displayed or printed using the pushbuttons below the table.

Packing Instruction Determination

Use

This function enables the system to find a packing instruction by specific characteristics. The condition technique is applied for this.

You define a packing instruction that refers to specific characteristics, such as material and ship-to party. If you now want to pack this specific material for this specific ship-to party, the system can find the pre-defined packing instruction and use it to create one or more HU proposals that exactly fit the requirements of the customer. Packing instruction determination thus automates the packing process.

Integration

The system starts packing instruction determination when you enter a quanitiy of a material to be packed and choose *Pack automatically*.

Prerequisites

- You have created a packing instruction for packing with packing instructions.

- You have made the settings for packing instruction determination in Customizing.

- Customizing for packing instruction determination is preset in the standard system. However, you can extend the settings in the customer name range. You need the following for packing instruction determination:

    - condition table

    - access sequence

    - determination type

    - determination procedure.

- You have also defined determination records. See also the section Creating Determination Records for Packing Instructions [Page 70].

Features

For more detailed information on the condition technique, see the sections under CA - Message Control [Ext.]. Packing instruction determination is based on the same principle.

Creating Determination Records

Prerequisites

You have fulfilled the prerequisites for the condition technique. For more information, see
Packing Instruction Determination [Page 69] .

Procedure

1. Choose *Logistics →Central Functions →Handling Unit Management →Master data →Packing
    instruction (PI) →Create.*

    The system displays the screen *Packing Instruction - Create DetermRecords: Init Scrn.*

2. Enter the appropriate determination type, and choose *Enter*.

3. Select one of the proposed key combinations, for which you want to create a condition
    record. You can set the key combinations individually in Customizing.

4. Choose *Continue*.

    The *Create PackInstr: Fast Entry* screen appears.

5. Depending on the key combination you select, you make the mandatory entries and assign
    them to a packing instruction and if necessary also one or more alternative packing
    instructions.

    For example, if you selected the key combination *Customer/material*, the mandatory
    entries are the customer and the material.

    You can display the details of the packing instruction you select by choosing *Packing
    instruction*.

6. Save your condition record.

Pack at a Packing Station

Use

For the most part, the general packing dialog is used by packing specialists that are not involved in the physical packing process. The packing station dialog is another way of creating and processing both handling units linked to deliveries and handling units without document reference.

This dialog was created mainly for the user that physically packs materials at a packing station in the warehouse. It supports both keyboard entries and scanned entries (assuming the necessary information is available in barcode format). You can also use a scale that is connected to the system to transmit the exact weight to the SAP System.

Prerequisites

If you want to implement packing at the packing station, you must make the following settings in the Implementation Guide (IMG) in the appropriate section (either Logistics Execution or Handling Unit Management).

Use the Set Profile for Packing Station [Ext.] IMG activity to set a packing station profile for each computer so that you can configure the packing process differently for individual packing stations..

Features

The packing station allows you to reflect material packing in the system. This function offers you the following options:

- Creating and changing handling units with reference to a delivery (inbound and outbound delivery)

    You can record in the system what quantities of which delivery items are packed in a handling unit.

- Creating handling units without object reference

    This options lets you pack materials (in handling units) that you want to return to the warehouse (put away), for example.

- Printing labels for individual handling units

    When a handling unit is completely packed, you can immediately print a label that includes its handling unit number, for example.

- Updating the handling unit's weight

    If existing handling units are weighed, the packing station uses a connection to an external scale to offer you an easy way of updating a handling unit's total weight.

Packing Deliveries at a Packing Station

Use

The packing station dialog is suitable for recording which delivery items in which handling units were actually delivered to the ship-to party (or to you by the vendor) in the system. The delivery specialist's packing proposals can also be updated and new handling units can be assembled for deliveries.

Procedure

You can call up the packing station dialog from the SAP menu as follows:

- For **outbound deliveries**, start at shipping [Ext.] and select *Pack →Packing Station*.

- For **inbound deliveries**, start at inbound delivery [Ext.] and select *Pack →Packing station*.

- For **Handling Unit Management,** start at the packing dialog [Ext.] and select *Processing Handling Units →Packing Station*.

Unless there is a packing station profile maintained for your terminal ID, the initial screen for the packing station appears.

1. Select a packing station profile that you could use to pack deliveries, if that is what you plan to pack.

2. Enter the delivery that you want to pack.

    You are now in the packing station dialog.

3. You can make the following entries in the *Handling unit* field, which is located in the top section of the screen (*HU into which items will be packed*):

    − If you want to create a new handling unit, enter a packaging material.

    − Enter an existing handling unit into which you want to pack materials.

       Select the *Pack material* tab in the lower section of the screen (*To be packed*). The delivery items that are available to be packed appear.

4. Enter the material number of the delivery item that you want to pack in the *Material/Handling unit* field.

       You can also enter the EAN number in this field instead of the material number. This is especially useful if a scanner is connected to the computer (at the packing station), since it enables you to scan handling units during the packing process.

5. After confirming the material, enter the quantity that is to be packed in the *Qty* field. If you want to unpack, enter a negative quantity in this field.

    After you confirm the quantity, the system packs the corresponding delivery item into the handling unit you selected.

You can refer to the hierarchical overview on the left-hand side of the screen at any time to see how many delivery items are packed into which handling units.

Packing handling units

If you want to pack one handling unit into another handling unit, create a new "higher-level" handling unit (by entering a packaging material) and enter the identification of the handling unit that is to be packed in the *Material/Handling unit* field.

If you enter the identification of the handling unit that you just packed in this field once again, the system unpacks that handling unit.

Pack Non-Assigned Handling Units

Use

It is possible to create handling units without reference to a document. These "non-assigned handling units" are implemented whenever the physical creation of an HU is planned (in production, for example), or when an HU already exists physically but is not yet entered in the system (in the warehouse, for example).

> From the system's point of view, each handling unit exists physically as soon as it has a status other than *Planned.*

When creating a non-assigned handling unit, you must specify the material items and the packaging, and also assign them to one another. A multi-level packaging hierarchy can also occur.

Repacking makes it possible to remove materials and handling units from a handling unit, and to assign them to another handling unit. The HU hierarchies and combinations can be changed as often as necessary. Furthermore, it is possible to automatically generate handling units according to the specification of material, quantity, and type of packing proposal [Page 47] (packing instruction, for example).

Features

When you create non-assigned handling units, there is a distinction between creating *planned* handling units and *assembling* handling units that physically exist (Status: *Implemented* or *in the warehouse,* for example). *Planned* handling units generally have no inventory management information and are used in production, for example. In production, handling units can be created without object reference by using packing orders, and then set to the status *In the warehouse* during the backflushing of handling units in repetitive manufacturing [Page 100].

To set planned handling units to the *In the warehouse* status, these must be posted as goods receipt.

Handling units can only be created in the warehouse at packing locations. This process involves making posting changes to HU-managed storage locations for materials that were packed. The handling units created here are then handling units that include inventory management information.

You can use any available materials and packaging to assemble handling units manually. In the packing dialog [Ext.], you can specify materials and packaging and then assign them to each other by selecting them accordingly. In contrast to the creation of handling units with document reference, further (header) data, such as plant, storage location and stock category, must be specified in advance. The warehouse number is determined from the plant and storage location. If you have implemented Warehouse Management (WM), you must also specify both the storage type and the storage bin for repacking.

When you create material items, you must specify the material number, source plant, source storage location, destination storage location, the quantity, the unit of measure, and, if you have implemented WM, also the storage type and the storage bin. The plant and storage location must match the destination warehouse number (which is determined from the plant and destination storage location). When you create non-assigned handling units in production, you only need to

specify the plant. The system reads material-specific data such as base unit of measure, weight, and volume from the material master.

If you create handling units during backflushing (confirmation) to production, the material information is copied from the production data.

Creating packaging takes place either manually, by specifying a packaging material [Page 12] in the dialog, or by using packing instructions [Page 61].

If you are dealing with handling units with inventory management information (for example, in the warehouse), a posting change for the material that was used is made from the item storage location to the destination storage location. For WM-managed storage locations, a corresponding storage unit is also created automatically.

If the material involved is managed by using serial numbers, the material must be serialized completely for the creation of handling units with inventory management information in an HU-managed storage location. If the number of serial numbers does not match the material quantity, you will not be able to save data.

If you are dealing with a material with batch requirements, the material must always be assigned to a batch when creating handling units. The only exception here is when the handling unit has not yet been posted for goods receipt.

In the case of planned handling units, the assignment of batches and serial numbers is required by goods receipt, at the latest. If not all serial numbers are assigned, it is not possible to post a handling unit for goods receipt.

Activities

In the packing dialog [Ext.], create a new handling unit and process it as described in the Packing [Page 27] section.

Goods Movements with Handling Units

Use

You can use this new function to post goods movements for handling units (HUs) without object reference by entering handling units directly. You can still post goods movements for handling units or materials by creating deliveries, as well.

Features

You can process goods movements postings for handling units without needing to know their exact content. You need only enter the handling unit number and the posting activity and the system can automatically determine the materials that the HU contains and post the goods movement that is suitable for the stock category of the HU items.

You can create transfer orders or deliveries as goods movement requests (for stock transfers to another storage location, for example) by entering handling units or materials.

A list of all deliveries that were created appears when the delivery note is created. You can use this list to go directly to the delivery in question and change data right in the delivery dialog. You can go to the display of the material document if the material document was created directly.

The system allows you to make in-process goods movement requests. The physical process in the warehouse is completed before stock is posted in the system, giving you more flexibility and security for bookkeeping purposes.

For hybrids (simultaneous posting of materials and handling units), you can use the *Handling units* tab to enter several handling units for one process. If you then choose the *Material* tab, the handling units you specified previously will be expanded and all the materials that the handling units contain appear on the screen. Then you can also enter other materials for this posting activity.

> If you want to process **hybrids** (handling units and additional materials) or **exclusively** materials, please note that you cannot generate a material document directly. In these cases, you must create deliveries so that you can carry out all subsequent processes such as picking or posting goods movements.

Posting Goods Movements for HUs and Materials

To post goods movements for handling units (HUs), proceed as follows:

1. From the SAP menu, select *Logistics →Central Functions →Handling Unit Management → Goods Movement of Handling Units →Posting General Goods Movements (with HU)*.

2. If you want to post goods movements for handling units, choose the *Handling units* tab.

3. Enter the reason for the goods movement (if applicable), the (destination) plant, (destination) storage location and the handling unit, for which you want to post the goods movement in the upper section of this screen.

4. You now have the following options:

   − If you entered the wrong handling unit, you can select it and then use *Delete HU* to remove it from the selection list that appears in the lower half of the screen.

   − If you want to post goods movement for a handling unit by creating a delivery, choose *Create delivery*. The system then creates a delivery and you can go directly to delivery processing.

      Please note that you must always create a delivery for goods movements that include both handling units and individual materials.

   − If you want to post goods issue directly for the handling units you specified, choose *Post goods movement*. The system then creates a material document for this goods movement.

      If you want to check which materials the handling unit contains, select the *Material* tab before posting the goods movement.

To post goods movements for materials, proceed as follows:

1. From the SAP menu, select *Logistics →Central Functions →Handling Unit Management → Goods Movement of Handling Units →Posting General Goods Movements (with HU)*.

2. If you want to post goods movements for materials, choose the *Material* tab.

3. Enter the following data on the upper half of the *SOURCE material entry* tab:

   − The process that you want to post

   − The material that you want to move

   − The plant at which the material is located

   − The storage location at which the material is located

   − The quantity that you want to move

   − Other entries such as batch, valuation type or cost center, depending on the movement type

4. If it is necessary to do so for the process, go to the *TARGET mat. entry* tab and enter the necessary target data such as destination plant and destination storage location.

5. You now have the following options:

Posting Goods Movements for HUs and Materials

 − If you entered the wrong material, for example, you can select it and then use *Delete* to remove it from the selection list that appears in the lower half of the screen.

 − If you want to post goods movement for the material, select *Create delivery*. The system then creates a delivery and you can go directly to delivery processing.

Please note that you must always create a delivery for goods movements for materials.

If you want to post goods movement for both handling units and materials simultaneously in one process, proceed as follows:

1. Enter the desired handling units as described above (posting goods movements for handling units) and then select the *Material* tab.

2. Enter the desired materials as described above (posting goods movements for materials).

3. Choose *Create delivery*.

Depending on the process, the system creates one or more deliveries, which you can process by selecting *Change delivery*.

Please note that you must always create a delivery for goods movements that include both handling units and individual materials.

Result

The system creates either a material document or one or more deliveries, depending on the goods movement process.

Reversing Goods Movements for HUs

Use

Goods movement reversal of material documents can be used anytime material documents were posted with reference to handling units. Specifically, the usual reversal process is not possible in HU-managed storage locations.

Prerequisites

Handling units that were involved in goods movement postings may not be changed after the material posting. This includes repacking as well as assignment to a document.

The entire material quantity must be packed in handling units.

Procedure

To reverse goods movements for handling units (HUs), proceed as follows:

1. From the SAP menu, select *Logistics* →*Central Functions* →*Handling Unit Management* → *Goods Movement of Handling Units* →*Reversal of Goods Movements for HU.*

    − If you want to reverse entire material documents, select the *Material docum.* tab.

    − If you want to search for the material document in question using handling units or if you only want to reverse individual material document items, select the *Handling units* tab.

2. Enter the material document number (or the handling unit number) or use input help to find it.

    You can use the *Simulate* function to check whether it is possible to reverse a certain material document.

    If you have selected handling units by using the *Handling unit* tab, you can use *Read HUs* to display data such as weight and volume for the handling units selected.

    If you want to be sure that you reversed the right material document, you can select *Display matl document* to display the corresponding material document.

3. When you select *Program* →*Execute*, the system checks whether the material document can be reversed; if so, the system reverses the material document.

    ➡️

    You can either reverse the entire material document or only one material document item. If you want to reverse only one material document item, you must specify all handling units that were posted with this item. These handling units must not contain any other items that refer to other material document items.

    ⚠️

    Reversal documents cannot be reversed. It is also not possible to reverse a material document that was posted before the material document that was just reversed. For handling units, only the document that was posted most recently can be reversed.

Reversing Goods Movements for HUs

Result

The material document that was selected (or the material document with which a handling unit was last posted) is reversed and a reversal document is created.

Packing for Inbound and Outbound Deliveries

Use

Packing delivery items is carried out right in the delivery itself. From the overview screen, choose *Edit →Pack* in order to access the packing screen.

Features

The following functions are available during packing:

- Packing delivery items [Page 85] in handling units (HUs) and allocating individual items to several handling units.

  In addition to the standard packing of delivery items in handling units, you have the option of automatically packing a specific quantity into several different handling units.

- Multi-level packing

  You can pack handling units in one another. In this case, packing is multi-level. The number of possible packing levels is 999999.

- Unpacking [Page 33] items that were already packed

  Items that have already been packed can be unpacked again. This is also the case for handling units that were packed in multiple levels.

- Responses to exceeding weight or volume

  If the weight or volume limit is reached when packing items in handling units, then only the maximum packable partial quantity [Page 29] is packed. If you have selected another handling unit that has space for packing, the remaining quantities are packed into that handling unit.

- Deleting [Page 35] handling units

  Handling units can be deleted in the delivery. First, the handling unit that is to be deleted is unpacked and then it is removed from any higher-level handling units (if applicable) before it is actually deleted.

- Emptying [Page 34] handling units

  Handling units can be emptied out. Unlike unpacking, where only selected items are removed from the HU, here the handling unit in question is emptied completely.

- Handling unit single entry [Page 32]

  You can enter HUs and HU contents manually by using the single entry function.

- Changing packing quantities [Page 27]

  Changing the packing quantities is possible in various overviews. However, the packing quantities can no longer be changed after goods issue has been posted. In Customizing for packing, you can specify further conditions under which packing is not to be possible.

- Creating delivery items from handling units

  Delivery items can be created from handling units. In this way, it is possible to keep inventory for packaging materials and also to include packaging material in the invoice.

Packing for Inbound and Outbound Deliveries

> To accomplish this, the system must generate delivery items for packaging materials, which must be set for the delivery type in Customizing, and the packaging material type must suggest delivery item generation as a default.

- Displaying the Allowed packaging materials [Page 43]

  You can display a list of all allowed packaging materials for an item to be packed, as long as the material group *Packaging material* is maintained in the packaging data in the material master for the material concerned.

- Checking for allowed packaging materials

  A check is carried out to make sure that the packaging material is intended for packing a certain material. Customizing for packing is used to control which packaging materials are allowed for packing.

- Packing proposals in sales orders [Page 90] and scheduling agreements

  It is possible to enter packing proposals in sales orders and scheduling agreements. These specifications automatically lead to a packing proposal in the delivery if a special data transfer routine is maintained in Customizing for copying control between the sales documents and the delivery. The packing proposal can be changed in the delivery. It is also possible to pack the delivery according to the packing proposal in the preceding document by using the *Use proposal* function in delivery processing.

  Packing and decentralized Warehouse Management

  If you are working with decentralized Warehouse Management [Ext.], packing takes place in several steps.

  a) The packing proposal that was determined in the central system is reported to the decentralized system.

  b) The packing proposal can be copied or changed in the decentralized system, depending on the actual packing process.

  c) With confirmation of the delivery to the central system, the original packing proposal is deleted and is replaced by the actual packing from the decentralized system.

  Automatic packing and batch split

  For a batch split in the delivery, you can set the item category in Customizing to indicate whether the entire batch quantity or only an individual batch item is to be packed.

  If you enter " " in the *Pack batch main item* field and no split items are available, then no items are proposed for packing. If the delivery item contains an HU-managed storage location, this delivery item must be packed at the split level. In this case, the indicator (pack batch main item) is overridden.

  ➡

  If a packing proposal has been defined in the order for materials that are handled in batches, and if automatic batch determination is not carried out when a delivery is created, then this delivery is **not** automatically packed.

  You must then pack this delivery manually (see also Automatic packing in the delivery [Page 89]).

Example for packing with batch split, taking the *Batch main item* indicator into consideration:

Item	Material	Delivery qty.	Accum.batch qty	Batch main item	Result
10	Mat1	10 pcs			Nothing packed
10	Mat1	10 pcs		X	10 pcs
10	Mat1	0 pcs	10	X	10 pcs
900001	Mat1	4 pcs		X	Batch 1 not packed
900002	Mat1	6 pcs		X	Batch 2 not packed
10	Mat1	0 pcs	10		Not packed
900001	Mat1	4 pcs			Batch 1 = 4 pcs
900002	Mat1	6 pcs			Batch 2 = 6 pcs

- Creating packing data from

  It is possible to copy packaging data from subsystems to the delivery.

- Cross-delivery

  In shipment processing you can pack in the following ways:

  – Delivery items that have not been packed in the delivery and which are not required to be packed in the delivery can be packed.

  – Highest-level handling units in the delivery can be packed in shipment handling-units.

  Since the packing depends on the shipment, different packing methods can be used in a follow-up shipment with the same deliveries. If a delivery HU is packed in a shipment HU, the entire contents of the handling unit in the delivery can no longer be changed. No storage units are created for shipment HUs.

  The following diagram shows how handling units are packed in the delivery.

Packing for Inbound and Outbound Deliveries

Delivery

Box 1   Box 2   Box 3   Box 4

Pallet 1   Pallet 2

Container 1
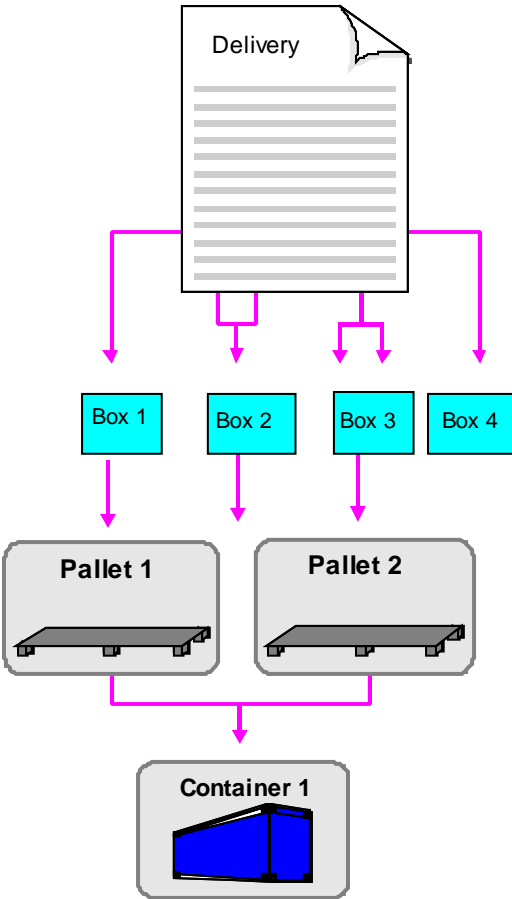
Packing Delivery Items

To pack delivery items into handling units (HUs), proceed as follows:

1. Choose *Edit →Pack* in the quantities overview of the delivery.

2. Create the handling units that you will need on the *All existing HUs (available for packing)* screen. You can also access handling units that were created previously (Non-Assigned Handling Units [Page 74]). For more information about creating handling units, see Working with Handling Units [Page 25].

3. In the *Material to be packed* (or *All HUs that can be packed*) section of the screen, select the items that you want to pack. Also select the handling units into which the materials are to be packed in the *All existing HUs* section of the screen. Then, select *Pack*. (See also: Packing If Full [Page 30], New HU per x HUs [Page 31] and Packing per Partial Quantity [Page 29].)

    The system sends you either a success message or notifies you of problems, if the weight or volume limit was reached and not all the items could be packed, for instance.

    ➡

    If you have selected several handling units for packing, then the selected handling unit that is highest in the list is packed first. If not all items to be packed fit in this handling unit, the packing operation is automatically continued with the following selected handling units.

    If only a partial quantity of a delivery item is to be packed, you must specify this in the *Partial qty* field for the corresponding item in the *Material to be packed* (or *All HUs that can be packed*) section of the screen.

    The weight of the packaging is not added to the total weight of the delivery.

The following illustration shows one delivery item and the partial quantity of another delivery item being packed into a handling unit.

Packing Delivery Items

Deliveries that have not yet been packed

Ship-to party: K1   Delivery: 80000327

X	M1	10 pcs
	M3	20 kg
X	M4 40	50 pcs

fill

Handling unit

M1   10 pcs
M4   40 pcs
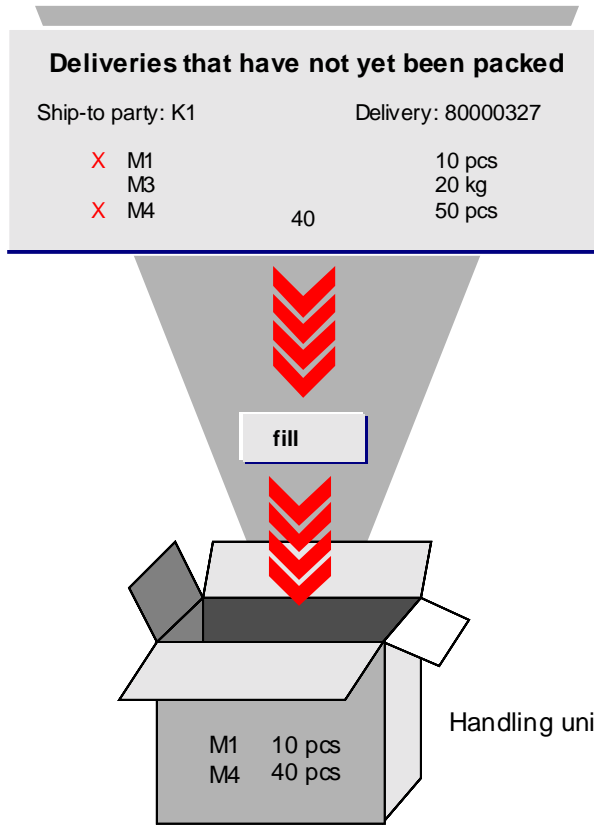
Generation of Delivery Items for Packaging Materials

Purpose

You can automatically generate separate delivery items with defined quantities for packaging materials. This is especially important if you:

- Manage packaging materials in Inventory Management

- Pick packaging materials in the warehouse

- Charge customers for packaging materials

- Make packaging materials available to customers as returnable packaging, which you also manage

Prerequisites

For this automatic generation to take place, you must make the following settings in the Implementation Guide (IMG):

- In the *Logistics Execution →Shipping →Delivery section*, use the Define Item Category Determination in Deliveries [Ext.] activity to set up an item category assignment for the delivery type, an item category group for the packaging material, and make usage-indicator settings for **PACK**.

- In the *Logistics Execution →Shipping →Packing* section, use the Define Packaging Material Types [Ext.] activity to set the plant determination rule for packaging material types.

If the system recognizes the plant and the item category in the handling unit, it generates a delivery item for the packaging material automatically.

Process Flow

1. Maintain the corresponding item category group [Ext.] for the packaging material in the material master record.

2. The system determines an item category according to the item category determination settings. For example, the system determines item category **HUPM** for item category group **VERP** in a sales order delivery.

3. Depending on the Customizing settings of the item category that was determined, the delivery item is relevant for picking, billing or stock and is transferred into the corresponding document (goods issue document or billing document, for example).

> ➡

> **Processing of Returnable Packaging**

> The system processes returnable packaging (item category **TAL**) by automatically recording a posting change (into the customer's special stock, for instance) as it posts goods issue. These items are not transferred to billing documents.

> Subsequent processing of the returnable packaging occurs via sales order type `Ret. Packaging Pickup(AT)` and completes the process with a `Returns delivery(LR)` delivery type.

Generation of Delivery Items for Packaging Materials

If the customer is to keep the packaging materials, you can bill them to the customer by using the `Ret. Packaging Issue (RPI)` sales order type.

Generating Delivery Items for Packaging Materials

Delivery 80000637

10   **Material 1**   **100 PC**

20   **Pallet**   **5 PC**

Packing:
Material 1 in packaging material "pallet"

System generates a separate item for the packaging material

VERP   **LEIH**   ⟵   **Item category group for packaging materials**

Invoicing the packaging material

Returnable packaging processing
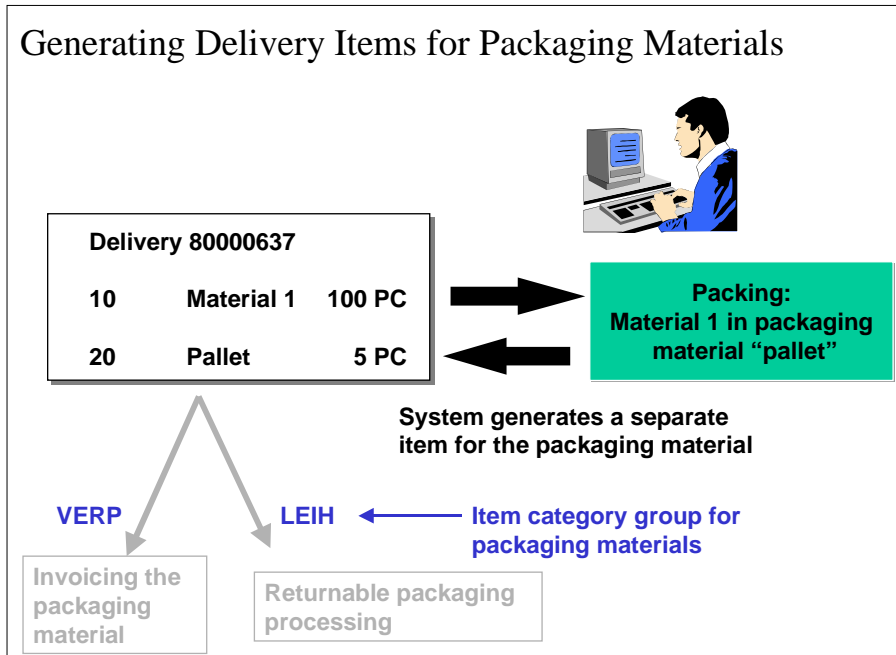
Automatic Packing in the Delivery

Automatic Packing Through Order Proposal

Use

You can define a packing proposal in the order. You can define, for example, how the individual delivery items for the delivery are to be packed. This information is then copied into the delivery, where it can be changed during delivery processing, if desired.

Prerequisites

So that packing proposals can be copied automatically from an order into a delivery as that delivery is created, you must enter a copy condition for handling units in Customizing as follows:

1. Choose the Customizing activity Specify Copy Control for Deliveries [Ext.] under *Logistics Execution →Shipping →Copying Control.*

2. Position the cursor on the delivery type `LF` and the sales document type `OR`.

3. Choose the details view and make your changes. For example, you could enter `001-SchedAgrmnt` ➠ `Dlv` in the *Data transfer HU* field. Save your changes.

Procedure

To ensure that the system copies the packing proposal into the delivery, proceed as follows:

1. Create a sales order [Ext.] and enter the individual order items.

2. Choose *Extras →Packing proposal* in order to enter the packing information into the order.

3. Use the Choice of allowed pack.mat. [Page 43] function to create an appropriate packaging material and pack [Page 27] the material.

4. Save the sales order.

5. Create an outbound delivery [Ext.] with reference to this sales order.

> If you have not maintained any settings in the Customizing application, you can always **manually** copy a packing proposal defined in the order into the outbound delivery.
>
> To do so, choose *Extras →Use proposal* in the packing dialog [Ext.].

Result

If you have made the settings as described above under prerequisites, the packing proposal is **automatically** copied from a standard order **during creation of a delivery**. The delivery then creates a handling unit from this packing proposal if the delivery items can be packed.

Packing Automatically when Creating Deliveries

Use

For each delivery type, you can define whether the automatic packing [Page 44] function is to be called up during delivery creation. With this option, all the material items of the delivery are automatically packed during delivery creation via the Create handling units automatically in the background [Page 46] function.

Prerequisites

If you want the automatic packing proposal to be called up during delivery creation, change the parameter settings for the delivery type in Customizing as follows:

1. In the *Logistics Execution →Shipping →Deliveries* section of Customizing, select the Define delivery types [Ext.] activity.

2. Position the cursor on one of the delivery types, such as delivery type `LF-Delivery.`

3. Choose *Details* and select the *Autom. packing* field.

Procedure

If you have completed the settings as described above, the system will automatically create handling units and pack all material items (for which it can determine packing proposals) when Creating deliveries [Ext.].

Pack Using External Systems

Use

The delivery interface [Ext.] makes it possible to pack deliveries by using external systems.

Integration

The following diagram illustrates the implementation of packing-specific segments in the delivery interface:

```
Delivery header                              Handling Units
                                             (E1EDL37)
        ├── Controls
                                                     ├── Controls
        ├── Partners                                 │   (E1EDL39)

        ├── .................                        ├── HU header description
                                                     │   (E1EDL38)
        ├── Routes
                                                     ├── ...............
        ├── ............
                                                     └── HU item
        ├── Delivery items                               (E1EDL44)
                                                             └── HU serial number
        ├── Handling units                                       (E1EDL46)

        └── Repacking HUs
```
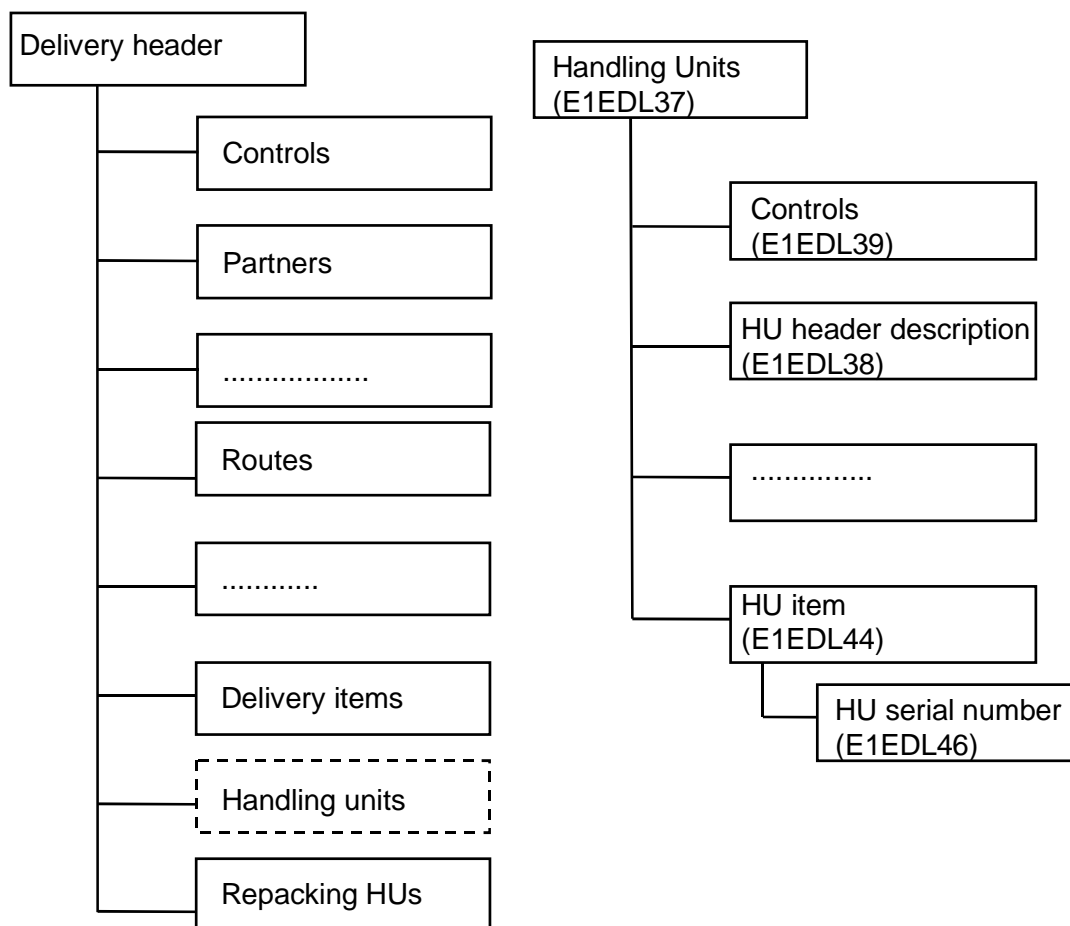
Features

Outgoing messages contain the complete structure; that is, all the fields in the individual segments are supplied with data.

In the case of incoming messages, only the handling unit segment and the repacking handling unit segments are relevant for handling units (HUs). In the handling unit segment, only a few fields pertaining to handling unit creation are relevant.

The more important segments and fields include the following:

E1EDL37	Handling unit header	
Segment field		**Table field**
EXIDV	External handling unit identifier	VEKP-EXIDV
EXIDA	Type of external HU identification	VEKP-EXIDA
TARAG	Tare weight of the handling unit	VEKP-TARAG
GWEIT	Unit of weight (tare)	VEKP-GEWEI
BRGEW	Total weight	VEKP-BRGEW
NTGEW	Net weight	VEKP-NTGEW
MAGEW	Allowed weight of the handling unit	VEKP-MAGEW
GWEIM	Unit of weight	VEKP-GEWEI_MAX
BTVOL	Total volume of the handling unit	VEKP-BTVOL
NTVOL	Loading volume of the handling unit	VEKP-NTVOL
MAVOL	Allowed loading volume	VEKP-MAVOL
VOLEM	Unit of volume	VEKP-VOLEH_MAX
TAVOL	Tare volume of the handling unit	VEKP-TAVOL
VOLET	Unit of volume (tare)	VEKP-VOLEH
VEGR1	Handling unit group 1	VEKP-VEGR1
VEGR2	Handling unit group 2	VEKP-VEGR2
VEGR3	Handling unit group 3	VEKP-VEGR3
VEGR4	Handling unit group 4	VEKP-VEGR4
VEGR5	Handling unit group 5	VEKP-VEGR5
VHILM	Packaging materials	VEKP-VHILM
LAENG	Length	VEKP-LAENG
BREIT	Width	VEKP-BREIT
HOEHE	Height	VEKP-HOEHE
MEABM	Unit for length/width/height	VEKP-MEABM
INHALT	Description of the handling unit	VEKP-INHALT
EXIDV2	Second external identification	VEKP-EXIDV2
E1EDL44	Handling unit item	

Pack Using External Systems

Segment field		Table field
VBELN	Sales document number	VEPO-VBELN
VELIN	Handling unit contents	VEPO-VELIN
POSNR	Item number of the sales document	VEPO-POSNR
EXIDV	External identification	VEKP-EXIDV
VEMNG	Delivery item quantity	VEPO-VEMNG
VEMEH	Base unit of measure for the packed quantity	VEPO-VEMEH
E1EDL54	**Repacking handling units**	
SOURCEHU	External HU identification of the source HU	HUM_REPACK-SOURCEHU
DESTHU	External HU identification of the destination HU	HUM_REPACK-DESTHU
PACKHU	Handling unit that is to be packed	HUM_REPACK-PACKHU
PACK_QTY	Base quantity that is packed in the HU item	HUM_REPACK-PACK_QTY
BASE_UOM	Base unit of measure	HUM_REPACK-BASE_UOM
DELIV_NUMB	Delivery	HUM_REPACK-DELIV_NUMB
DELIV_ITEM	Delivery item	HUM_REPACK-DELIV_ITEM

You have the following options in this segment:

1. Packing verification (only for creating handling units)

    When you verify handling units, you must always transfer the (external) identification and the packaging material.

    E1EDL37-EXIDV

    E1EDL37-VHILM

    If a handling unit is to be created, no contents data (items) needs to be transmitted. If you pack a delivery item, the item number and the packed quantity must be transmitted. If there is a batch split, use its own (external) item number.

    E1EDL44-POSNR

    E1EDL44-VEMNG

    If a handling unit is to be verified to a handling unit (multi-level packing), the (external) identification of the lower-level handling unit must be specified.

    E1EDL44-EXIDV

2. Repacking handling units in the delivery

Fill in all segment fields of segment E1EDL54.

Example

Figure 1 (below) illustrates a packing hierarchy with several handling units. It represents a container with three pallets, each of which have a certain number of various materials packed on them. Consult the list following this illustration to learn how to send these packing hierarchies via the delivery interface with the packing segments.
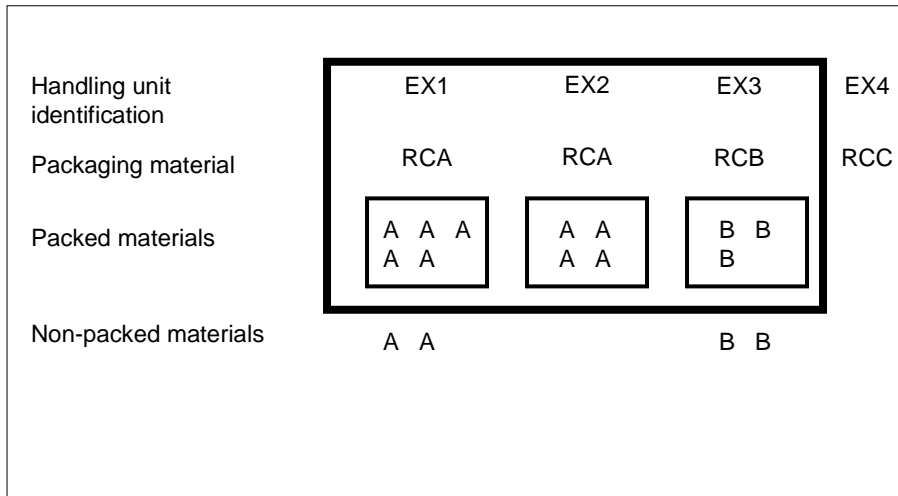
	POSNR	KDMTA	LFIMG	VRKME
E1EDL24	1	A	11	PC
E1EDL24	2	B	5	PC
	EXIDV	**VHILM**		
E1EDL37	EX1	RCA		
	POSNR	**VEMNG**	**EXIDV**	**VEMEH**
E1EDL44	1	5		PC
	EXIDV	**VHILM**		
E1EDL37	EX2	RCA		
	POSNR	**VEMNG**	**EXIDV**	**VEMEH**
E1EDL44	1	4		PC
	EXIDV	**VHILM**		
E1EDL37	EX3	RCB		
	POSNR	**VEMNG**	**EXIDV**	**VEMEH**

Pack Using External Systems

E1EDL44	2	3		PC
	EXIDV	**VHILM**		
E1EDL37	EX4	RCC		
	POSNR	**VEMNG**	**EXIDV**	**VEMEH**
E1EDL44			EX1	
E1EDL37	EX4	RCC		
	POSNR	**VEMNG**	**EXIDV**	**VEMEH**
E1EDL44			EX2	
E1EDL37	EX4	RCC		
	POSNR	**VEMNG**	**EXIDV**	**VEMEH**
E1EDL44			EX3	

Packing Deliveries in Shipments

To pack several deliveries for a shipment at once, proceed as follows:

1. Create a shipment document or change an existing shipment document. To do so, start at the initial shipment [Ext.] menu.

   The initial screen for processing shipments appears. You can create or edit shipments here.

2. Select *Shipment →Create* or *Shipment →Change*.

   The *Change Shipment* screen appears.

3. In the shipment document, choose *Goto →Means of transport and packaging matl.*

   If the items in these deliveries have not been fully packed, the deliveries of the shipment will be displayed in the *Materials to be packed* section of the screen with the individual items.

   If packing has already taken place in the delivery, the individual handling units are displayed and you can pack these further if necessary.

4. Pack the desired delivery items or handling units. To pack in shipment documents, proceed exactly as with packing delivery items [Page 85].

For more information, see Delivery item generation in the shipment [Ext.].

Handling Units in Repetitive Manufacturing

Possible Applications

You can create handling units in repetitive manufacturing using a packaging proposal. For more information, see the sections Packing Proposal [Page 47] and Packing According to the Packing Instructions [Page 59].

Using the packing instructions, you can specify which quantities of materials are to packed, how they are to be packed, and which packaging material is to be used. From these packing instructions, you first create HU proposals [Page 56], and then from these proposals you create the handling units.

The system determines packing instructions using the condition technique.

As an alternative to automatic packing using packing instructions, you can pack the handling units manually in the packing dialog. For more information on this topic, refer to the chapters Creating a Proposal for a Handling Unit Through the Packing Proposal [Page 49] and Entering a Proposal for a Handling Unit Manually [Page 51].

Packing in Repetitive Manufacturing

Use

You can use the packing transaction functions in Repetitive Manufacturing.

Features

You can:

- Work with HU proposals
- Pack automatically with packing instructions
- Pack manually in the packing transaction
- Create handling units

Activities

1. Starting from the Repetitive Manufacturing menu, choose *Backflush →HU management → Packing in Repetitive Manufacturing.*

    You branch to the *Packing in Repetitive Manufacturing* screen.

2. Enter a material and a plant. If necessary, also enter the storage location and batch.

3. Enter the shipping data for packing instruction determination (depending on the criteria for which you created your condition record) and enter a quantity to be packed.

4. Choose *Continue*.

    The system displays the material as not yet packed in the first row of the table control.

5. Proceed as specified in the section Creating a HU Proposal using the Packing Instruction [Page 49] .

    For manual fast entry, enter the material you want to pack, the plant and the quantity to be packed. Then proceed as specified in the section Creating a HU Proposal Manually [Page 51] .

You create an HU proposal manually if no packing instruction exists for the material, or you do not want to pack automatically.

Backflushing Handling Units in Repetitive Manufacturing

Purpose

For handling units created in the packing transaction via Repetitive Manufacturing, you have the option of backflushing, that is, posting goods receipt of the contained materials and goods issue of the components, in one transaction.

Prerequisites

You have created handling units in production that only contain one material. Only handling units with no more than one material can be backflushed.

Process Flow

1. Starting from the Repetitive Manufacturing section of the main menu, choose *Backflush →HU management →GR for Handling Units.*

2. The *HU Backflush in Repetitive Manufacturing* screen appears.

3. To select the handling units that you want to backflush, choose *Select HUs from list*.

   If you know the number of the handling unit you want to backflush, you do not need to select via the HU list; simply enter the number.

4. The handling-unit selection list appears. For more information, see the Handling Unit Monitor [Page 207] section.

5. Enter the selection criteria and choose *Execute*.

6. The system displays a list of the handling units that correspond to the criteria you entered.

7. To copy handling units that are to be backflushed in the backflush dialog, select them and choose *Copy HUs.*

8. The *HU Backflush in Repetitive Manufacturing* screen reappears, in which the system displays the HUs you just selected as *Handling units to be backflushed.*

   Alternatively, you can copy saved HUs directly from the packing transaction for automatic packing with packing instructions, by choosing *Subsequent functions →Repetitive Manufacturing backflush*. The *HU Backflush in Repetitive Manufacturing* screen appears. The handling units that you have saved since the last time the packing transaction was accessed are displayed here as *Handling units to be backflushed*.

9. The system assigns each handling unit a status (symbol) with regard to backflushing.

10. To display the meaning of each symbol, choose *Goto →Display legend.*

11. If necessary, display the handling units again in the standard packing transaction, by choosing *HU Monitor*.

12. With the *Define backflush process* function, you specify whether you want to backflush in make-to-order or make-to-stock repetitive manufacturing. You can also specify here whether the materials are to be posted in aggregate or per handling unit.

13. To add to HU data, such as plant, make the necessary entries in the *Default data* section and choose *Copy default data*.

14. The system copies the default data for all HUs.

15. If necessary, display the postings that the system is going to carry out by choosing *Change parameters*. This takes you to the *Quantities to Backflush* screen, where the system displays the materials to be backflushed in aggregated form (without reference to HUs). Each row corresponds to one subsequent posting.

   ➡️

   You can use the *Change parameters* function to change the Repetitive Manufacturing profile settings, for example.

16. Use *Create backflush* or *Back* to return to the backflushing transaction.

17. To backflush the HUs displayed, choose *Save*.

   ➡️

   The system always backflushes all of the handling units that are displayed.

   ⚠️

   Packaging materials are not transfer posted. The transfer posting of that part of the handling unit can be carried out beforehand, during staging.

Scrap backflush

You can backflush scrap by choosing *Scrap backflush*. You backflush the scrap for the material, independently of the handling unit. You can switch between scrap and HU backflush as required. Scrap quantities are displayed in the same list as the handling units and are later posted together with the HU backflush.

Handling Units in Production Orders

Purpose

In the area of production orders you can use handling units [Page 10] (HUs) in the following cases:

- Goods issues for the withdrawal of components.

  For production orders with many components you can make the logistical processes considerably simpler. You can withdraw components that are already being managed in HUs or first create the HU when the components are picked.

- Goods receipts for materials produced.

  If you use make-to-stock production you can handle partial quantities of stock individually with differently packaged handling units (for example: packaging variations for different customer groups).

Using handling units serves to optimize logistical processes and does not influence the flow of capital in an organization. This means that all goods movements continue to be posted to the relevant production orders.

If you use handling units, they offer you the following advantages:

- Carrying out goods movements is made simpler.

- Material flows become clearer and can be monitored or traced more easily.

- Products can be individually packaged, even in make-to-stock production.

Integration

Depending on your organizational structure you can work with or without warehouse management integration.

Features

The following processes and functions are available:

- Material staging of the components with warehouse management integration

- Material staging of the components without warehouse management integration

- Packing the material produced

- Post goods issue with HU

- Post goods receipt with HU

- Post partial goods issue with HU

- Cancel goods movements with HU

Material Staging of Components with WM

Use

You use this function if you want to carry out material staging of production order components with handling units in conjunction with warehouse management (WM).

The general procedure is as follows: You create a production order and release it. For requirements coverage, WM creates a pick request from which you can create a transfer order. The execution of the transfer order results in the components that are managed in HUs at the storage location, being withdrawn and made available for production. Finally you post the goods issue. Depending on your organizational structure you can either use an outbound delivery or a transfer requirement as a picking document.

For more information, refer to the Warehouse Management [Ext.] component.

Prerequisites

The following conditions must be fulfilled:

- The issue storage location must be HU and WM-managed.

- The components must not require backflushing [Ext.].

You have the following controlling options:

- In the production scheduling profile (Customizing for *Shop Floor Control*, under *Master data →Define production scheduling profile*) you decide with the *GR via delivery* indicator, whether the goods issue should be posted via the delivery or the production order.

- You can decide how the pick document is created (using outbound delivery or transfer requirement). You make this setting in Customizing, under *Logistics Execution →Warehouse Management →Interfaces →Define Production* (*General* area, indicator *L*). For more information, refer to the Implementation Guide (IMG) under Define Production [Ext.].

Features

The individual steps vary according to the picking document selected. You can select the following as picking documents:

- The outbound delivery (see Material Staging via Outbound Delivery [Page 105])

    If you work with the outbound delivery as the pick request, you can specify that the goods issue is posted automatically when the transfer order is confirmed. You make this setting in Customizing under *Logistics Execution →Warehouse Management →Interfaces →Shipping Define Shipping Control* (Activity *Define Shipping Control at the Movement Type Level*). In the standard system the movement type 319 (*Replenishment for production*) is used for replenishment of production. Set the field Copy WM quantity to the value 2 (*Copy WM quantity as delivery quantity and post GR/GI*) for this movement type.

- The transfer requirement (see Material Staging via Transfer Requirement [Page 111])

See also:

Picking HUs for Production [Page 175]

Material Staging of Components with WM

Material Staging of Components with WM

Material Staging via Outbound Delivery

Purpose

In this process you can group the components from a production order in a handling unit. You pack the components and supply the production supply area with WM/PP material staging.

For more information about WM/PP material staging, refer to the Warehouse Management [Ext.] component.

Prerequisites

In Customizing for Warehouse Management you have selected the delivery as the picking document (see prerequisites in Material Staging of Components with WM [Page 103]).

Process Flow

1. You create a production order.

    For more information, refer to the Production Orders [Ext.] component.

2. Create the outbound delivery.

    For more information, see Setting up the Interface between PP and WM [Ext.] and Material Staging Process Flow [Ext.].

3. You create the transfer order for the outbound delivery (see Create Transfer Order for Delivery [Page 106]).

4. You confirm the removal and transfer of the transfer order (see Confirm Transfer Order [Page 107]).

5. You post the goods issue to the handling unit. You have the following options:

    – Goods issue with reference to outbound delivery (see Post Goods Issue with HU via Outbound Delivery [Page 108]).

    – Goods issue with reference to production order (see Post Goods Issue with HU via Production Order [Page 109]).

    You set which picking document you want to use as a reference, in the production scheduling profile (see prerequisites in Material Staging of Components with WM [Page 103]).

See also:

Picking HUs for Production [Page 173]

Create Transfer Order for Outbound Delivery

Prerequisites

You can use this procedure when you use an outbound delivery as a picking document (see prerequisites in Material Staging of Components with WM [Page 103]).

Procedure

1. Choose *Logistics →Logistics Execution →Outbound Process →Goods Issue for Outbound Process →Picking →Create Transfer Order →Single Document.*

2. Make all necessary entries and save your transfer order.

See also:

Creating a Transfer Order for a Delivery [Ext.]

Goods Issue for a Delivery [Ext.]

Confirm Transfer Order

1. Choose *Logistics →Logistics Execution →Outbound Process →Goods Issue for Outbound Process →Picking →Confirm Transfer Order →Single Document →In One Step.*

2. Make all necessary entries and confirm the pick and the transfer of the transfer order.

See also:

Confirmation of Transfer Orders [Ext.]

Confirming a Transfer Order for a Delivery [Ext.]

Post Goods Issue with HU via an Outbound Delivery

Prerequisites

If material staging occurs via outbound delivery, you can either post the goods issue with reference to the delivery or to the production order (see prerequisites in Material Staging of Components with WM [Page 103]).

You should use this procedure if you want to post with reference to an outbound delivery.

Procedure

1. Choose *Logistics →Logistics Execution →Outbound Process →Goods Issue for Outbound Process →Delivery→Change →Single Document.*

2. Enter the number of the delivery.

3. Choose *Post Goods issue.*

    ➡

    You can specify that the goods issue is posted when the transfer order is confirmed (see Material Staging of Components with WM [Page 103]).

See also:

Change Outbound Deliveries [Ext.]

Post Goods Issue with HU via Production Order

Prerequisites

You should use this procedure if you:

- Want to post via outbound delivery with reference to the production order when you are staging material.

    If material staging occurs via outbound delivery, you can either post the goods issue with reference to the delivery or to the production order (see prerequisites in Material Staging of Components with WM [Page 103]).

- Are using Material Staging via Transfer Requirement [Page 111].

- Are using Material Staging of Components without WM [Page 113]

Procedure

You can:

- Post the goods issues for the complete quantity

- Post partial goods issues

Posting Goods Issues for the Complete Quantity

1. Choose *Logistics →Production →Production Control →Goods Movements →Material Staging →Goods Issue with HU*, or *Logistics →Central Functions →Handling Unit Management → Goods Movement for Handling Units →Goods Issue for Work Order*, or *Logistics →Material Management →Inventory Management →Goods Movement →Goods Movement for Handling Units →Goods Issue for Work Order*.

2. Enter the order number and choose *Propose HU.*

3. To post complete goods issues, choose 🖫.

Posting Partial Goods Issues

1. Choose *Logistics →Production →Production Control →Goods Movements →Material Staging →Goods Issue with HU*, or *Logistics →Central Functions →Handling Unit Management → Goods Movement for Handling Units →Goods Issue for Work Order*, or *Logistics →Material Management →Inventory Management →Goods Movement →Goods Movement for Handling Units →Goods Issue for Work Order*.

2. Enter the order number and choose *Propose HU.*

3. Select a HU and choose 📦.

4. Change the quantity and choose ✅.

    To change another item, continue as in step 3.

5. To post the goods issues, choose 🖫.

Post Goods Issue with HU via Production Order

You can decide per plant and order type whether partial goods issues are allowed. You do this in Customizing under *Logistics General →Handling Unit Management →Basics →Production →Production Supply →Set partial GI Indicator.*

Material Staging via Transfer Requirement

Purpose

In this process you can group the components from a production order in a handling unit. You stage the components and supply the production supply area with WM/PP material staging.

For more information about WM/PP material staging, refer to the Warehouse Management [Ext.] component.

Prerequisites

In Customizing for Warehouse Management you have selected the transfer requirement as the picking document (see prerequisites in Material Staging of Components with WM [Page 103]).

Process Flow

1. You create a production order.

    For more information, refer to the Production Orders [Ext.] component.

2. Generate a transfer requirement.

    For more information, see Setting up the Interface between PP and WM [Ext.] and Material Staging Process Flow [Ext.].

3. You create the transfer order for the transfer requirement (see Create Transfer Order for Transfer Requirement [Page 112]).

4. You confirm the removal and transfer of the transfer order (see Confirm Transfer Order [Page 107]).

5. You post the goods issue to the handling unit with reference to the production order (see Post Goods Issue with HU via Production Order [Page 109]).

Create Transfer Order for Transfer Requirement

1. Choose *Logistics →Logistics Execution →Goods Issue Process →Goods Issue for Miscellaneous Operations →Picking →Create Transfer Order →For Transfer Requirement.*

2. Make all necessary entries and save your transfer order.

For more information, see Create Transport Order Manually for Picking [Ext.].

See also:

Warehouse Management [Ext.]

Material Staging of Components without WMI

Purpose

In this process you can group the components from a production order in handling units. You pack the material and post the goods issue with reference to these handling units. You do not use any WM functions.

Prerequisites

The following prerequisites must be fulfilled, so the process can run:

- The component must not be relevant for WM.

- If in Customizing HUs are required at plant level (under *Logistics General →Handling Unit Management →Basics →Production →Production Supply →Set HU Requirement in Staging Area),* then the withdrawal storage location must be HU managed (set up in Customizing under Logistics General →*Handling Unit Management →Basics →Material management →?Inventory Management → HU Requirement for Storage Locations and Default Values for Deliveries*). If there is no HU requirement at plant level, then the storage location cannot be HU managed either.

- The components must not require backflushing [Ext.].

Process Flow

1. You create a production order.

   For more information, refer to the Production Orders [Ext.] component.

2. You create a handling unit for the order components (see Picking with HU [Page 114]).

3. You post the goods issue to the handling unit (see Post Goods Issue with HU [Page 115]).

See also:

Picking HUs for Production [Page 175]

Picking with HU

1. Choose *Logistics →Production →Production Control →Goods Movements →Material Staging →Picking with HU* or *Logistics →Central Functions →Handling Unit Management → Processing Handling Units →Work Order – Components.*

2. Enter the order number and choose 🗸.

3. Choose the *Open reservations* tab page.

4. Select one or more items and choose 🗗 *Copy*.

    The system goes to the *Materials* tab page. The copied reservations appear as material items.

    ➡

    You can change the material items (quantity, quantity unit, storage location) before you create the HU

5. Enter the packaging material [Page 12].

6. Select one or more items and choose 🗐 *Pack*.

7. Choose 💾.

    ➡

    You can see which packaging material is used on the *HU hierarchy* tab page.

Reassigning

On the Assign HU tab page, you can assign the order HUs for the same material (choose 🗗 *Assign),* if such an assignment is not prohibited in Customizing. Here you have the following options:

-   You reassign an HU that is already assigned to another order. A goods issue has already been posted for the other order. However the material was not used completely.

-   You assign a free HU. A free HU is an existing HU for the same material that has not yet been assigned to an order.

For reassigned HUs or assigned free HUs you can specify whether partial goods issues are allowed (choose 📦) or not (choose 📦).

You can determine for each plant and order type how the system should react to the assignment (*Assignment allowed, Assignment of HU allowed with warning, Assignment of HU not allowed -> Error message*). You do this in Customizing under *Logistics General →Handling Unit Management →Basics →Production →Production Supply →Set partial GI Indicator.*

See also:

Packing [Page 22]

Post Goods Issue with HU

Use

You should use this procedure if you:

- Want to post via outbound delivery with reference to the production order when you are staging material.

  If material staging occurs via outbound delivery, you can either post the goods issue with reference to the delivery or to the production order (see prerequisites in Material Staging of Components with WM [Page 103]).

- Are using Material Staging via Transfer Requirement [Page 111].

- Are using Material Staging of Components without WM [Page 113]

Procedure

You can:

- Post the goods issues for the complete quantity

- Post partial goods issues

Posting Goods Issues for the Complete Quantity

3. Choose *Logistics →Production →Production Control →Goods Movements →Material Staging →Goods Issue with HU*, or *Logistics →Central Functions →Handling Unit Management → Goods Movement for Handling Units →Goods Issue for Work Order*, or *Logistics →Material Management →Inventory Management →Goods Movement →Goods Movement for Handling Units →Goods Issue for Work Order.*

4. Enter the order number and choose *Propose HU.*

4. Choose 🖫.

Posting Partial Goods Issues

3. Choose *Logistics →Production →Production Control →Goods Movements →Material Staging →Goods Issue with HU*, or *Logistics →Central Functions →Handling Unit Management → Goods Movement for Handling Units →Goods Issue for Work Order*, or *Logistics →Material Management →Inventory Management →Goods Movement →Goods Movement for Handling Units →Goods Issue for Work Order.*

4. Enter the order number and choose *Propose HU.*

6. Select a HU and choose 📦.

7. Change the quantity and choose ✅.

   To change another item, continue as in step 3.

8. Choose 🖫.

Post Goods Issue with HU

You can decide per plant and order type whether partial goods issues are allowed. You do this in Customizing under *Logistics General →Handling Unit Management →Basics →Production →Production Supply →Set partial GI Indicator.*

Packing the Material Produced

Purpose

In this process you can group the material produced from a production order in handling units. You pack the material and post the goods receipt with reference to the handling unit or to the order. Doing this means that material can be divided between several handling units.

You can use this process, for instance, if you want to pack products individually in make-to-stock production. To do this you use various packing instructions during packing [Page 22], for partial quantities of the material produced.

Prerequisites

The following conditions must be fulfilled:

- The storage location must be HU managed (set up in Customizing under *Logistics General* →*Handling Unit Management* →*Basics* →*Material management* →*Inventory Management* → *HU Requirement for Storage Locations and Default Values for Deliveries*)

- No automatic goods receipt [Ext.] must be required for the material produced (this is set in the control key for the operation or in the production scheduling profile).

Process Flow

1. You create a production order and produce the material.

    For more information, refer to the Production Orders [Ext.] component.

2. You pack the material produced for the production order (see Pack Material [Page 118]).

3. You post the goods receipt of the material produced (see Post Goods Receipt with HU [Page 119]).

See also:

Packing Dialog [Ext.]

Packing Instruction [Page 61]

Automatic Packing [Page 44]

Packing [Page 22]

Packing Material

1. Choose *Logistics* →*Production* →*Production Control* →*Goods Movements* →*Material Staging* →*Pack Material* or *Logistics* →*Central Functions* →*Handling Unit Management* →*Processing Handling Units* **###** *Work Order – Finished Product.*

2. Enter the order number and choose ✅.

3. The following options are available for packing:

   – Choose *Handling Units* →*Pack automatically (see* Automatic Packing [Page 44]).

   – Make the necessary entries for packing (see Packing [Page 22]).

4. Choose 💾.

See also:

Packing Dialog [Ext.]

Packing Instruction [Page 61]

Post goods receipt with HU

1. Choose *Logistics →Production →Production Control →Goods Movements →Material Staging →Goods Issue with HU*, or *Logistics →Central Functions →Handling Unit Management → Goods Movement for Handling Units →Goods Issue for Work Order*, or *Logistics →Material Management →Inventory Management →Goods Movement →Goods Movement for Handling Units →Goods Receipt for Work Order*.

2. There are the following ways of determining the handling unit:

   – Enter the HU.

   – Enter the order number and choose *Propose HU*.

3. To post the goods movements, choose 💾.

Canceling Goods Movements for HU

Use

You use this procedure to cancel goods movements that were posted with reference to a HU.

Procedure

1. Choose *Logistics →Central Functions →Handling Unit Management →Goods Movement of Handling Units →Reversal of Goods Movements for HU* or *Logistics →Materials Management →Inventory Management →Goods Movement →Goods movements of Handling Units →Reversal of Goods Movements for HU*.

2. You have the following options for identifying the goods movements that you want to reverse:

    − Enter the data for the material document (*Material document* tab page).

    − Select the Handling Units (*Handling Units* tab page).

3. Choose ⏺.

Handling Units in Process Manufacturing

Production Supply

Purpose

This function shows the physical material flow from the central warehouse to, for example, the production lines and work centers. It can be used in both process manufacturing (process orders) as well as in discrete manufacturing (production orders).

You can use handling units (HUs) to organize the production supply. HUs enable raw materials to be directed to production more easily. If a material is backflushed, the HU loses its inventory management information.

Features

Various production flows from the central warehouse to the production line(s) are possible for production supply.
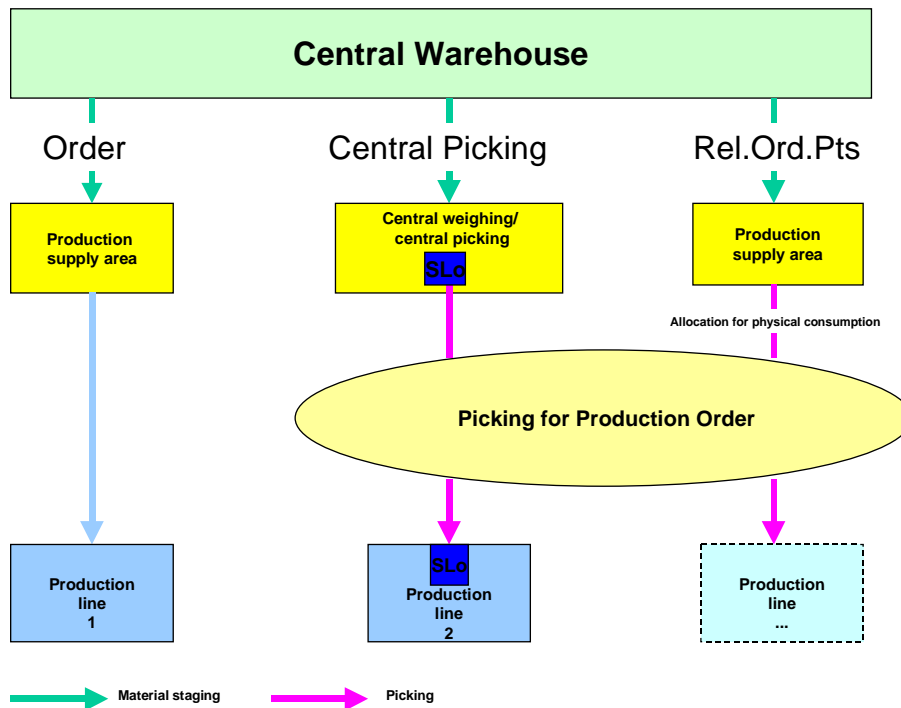
Picking with WM

- Picking via WM for Release Order Parts [Page 133]

Picking without WM

- Picking via Central Picked Items Locations [Page 124]

The whole picking process can be divided into 2 main steps:

- Staging:

Describes the withdrawal of the components from central storage

- Picking:

Describes the packaging of the input components for the production line

When picking pick parts with WM integration, both steps are combined because the components are staged or picked directly from central storage for the production line.

For information on picking with production orders, see:

Handling Units for Production Orders [Page 102] [Page 102]

HUs for Order

Choose *Logistics -> Central Functions -> Handling Unit Management -> Display Handling Units -> For Process Order* to display all information available on the HUs for a production order.

When you enter the production order number, a list of all HUs assigned to the order appears. By selecting an HU, you find information on the following:

- Warehouse

- Status

- Usage

- Contents (material list)

- History

- Picking with date, time, employee, external picking location

Picking via Central Picked Items Locations

Use

This form of production supply is a mixture of material-related and order-related picking.

It involves a special form of 2-step picking [Ext.], which takes place independent of a WM integration. Withdrawal takes place by way of an MM stock transfer. The picking function is used for division among the process orders or production orders.

The material required for production is transferred from the central warehouse to the central picking location (for example, central weighing). This central picking location is an independent storage location that is neither HU-managed, nor WM-managed.

Here the materials are picked for the production order. This means the materials are weighed, counted, or measured. Finally, they are packed in handling units [Page 10] (HU) and brought to the production line.

Prerequisites

Process manufacturing

- In process manufacturing, picking is controlled via the standard process instructions that must be defined in the master recipe.

- Several processors cannot call up the PI sheet at the same time.

  This is why it is a good idea to have the picking for the process orders take place using separate PI sheets. For the actual production activity, a second PI sheet is generated for each.

Discrete manufacturing (production orders)

For information on picking with production orders, see:

Handling Units for Production Orders [Page 102] [Page 102]

Features

The following functions are available:

- Manual Picking with Process Orders [Page 127]
- Automatic Picking with Process Orders [Page 131]

According to 2-step picking, the operation is divided into

- Withdrawal
- Division

1. **Withdrawal**

Order-related withdrawal:

An order-related withdrawal can only be made if the central warehouse is HU-managed.

a)   The material is withdrawn in complete HUs. This allows more to be withdrawn than is necessary for a production order.

70 kilograms of fat is required for a production order. However, fat is only stored in handling units of 100 kilograms.

The fat is therefore withdrawn in a handling unit of 100 kilograms for the order.

b)   A transfer posting to the central picking location is made for the HUs using an MM stock transfer. The HUs are unpacked automatically.

The HUs must be disassembled because the central picking location is not HU-managed as a rule.

Material-related withdrawal:

A material-related withdrawal can be made both for HU-managed central warehouses as well as for warehouses that are not HU-managed.

a)   The materials for **several** production orders are withdrawn in respect to one time frame. They can be packed in complete HUs if the central warehouse is HU-managed.

b)   A transfer posting to the central picking location is made for the materials using an MM stock transfer. HUs are automatically disassembled.

The HUs must be disassembled because the central picking location is not HU-managed as a rule.

The central picking location is generally not an HU-managed storage location. This is necessary so that HUs can be disassembled without them having to be assigned to a new HU right away. The assignment to a pick-HU takes place in a separate step. This is not possible for HU-managed storage locations.

If the inspection of the picked quantities is only to be carried out via HUs, the HUs must be posted to an HU-managed storage location during the generation of a central picking location. This can be, for example, the production storage location directly on the production line (storage location of the components in the process order or production order).

This is the only way to guarantee that no materials can be posted independent of an HU before production.

The storage location of the central picking location is the partner storage location of the HU-managed production storage location.

2. **Distribution**

During the distribution process, the total quantity of the materials is distributed among the individual production orders and brought to the production lines.

a)   The exact material quantity that is required is measured.

Picking via Central Picked Items Locations

b)   The measured material quantity for a production order is packed as a pick-HU and brought to the production line.

HUs for Order

Choose *Logistics -> Central Functions -> Handling Unit Management -> Display Handling Units -> For Process Order* to display all information available on the HUs for a production order.

When you enter the production order number, a list of all HUs assigned to the order appears. By selecting an HU, you find information on the following:

− Warehouse

− Status

− Usage

− Contents (material list)

− History

− Picking with date, time, employee, external picking location

Manual Picking with Process Orders

Use

You can use this function to manually enter packed handling units [Page 10] (HU).

It allows you to:

- Pack each batch of a material in one or several HUs

- Pack several batches of a material or several materials in an HU

- Pack packed HUs into other HUs

Prerequisites

1. You can use the standard process instruction category MI_HUSTG, which must be assigned to the master recipe, to carry out manual picking. This involves a dynamic function call [Ext.].

   The process instruction MI_HUSTG for manual picking is not to be changed, but rather to be copied as it is.

For more information, see

- Master Recipes [Ext.]

- Process Instructions [Ext.]

- PI Sheets [Ext.]

Features

1. **The dialog box for manual picking is divided up in the following sections:**

   - Materials

     Here you enter the materials, batches, and quantities to be picked for the process order. The system checks if the batches entered fulfill the required selection criteria. The system uses the selection criteria defined for batch determination.

   - Open reservations

     The components that are assigned to the process order but not yet picked are listed here.

   - Assign HU

     Here you can assign HUs without a reference to an object ("free" HUs) to the process order.

     For more information, see Packing without Object Reference [Page 74].

Manual Picking with Process Orders

- Container Hierarchy

Here you form nested HUs in which you pack HUs in other superior HUs (for example, on a pallet).

2. Checking manual picking

You can display the number of components for which a quantity has already been picked without calling up the manual picking function again. To do this, the standard process instruction category MI_HUSTC must be defined in the master recipe. This is done from the PI sheet.

The standard process instruction category contains the following characteristics:

Characteristic	Characteristic value
PPPI_FUNCTION_NAME	COMI_CHECK_PICKING_COMPLETE
PPPI_BUTTON_TEXT	Check picking
PPP_FUNCTION_DURING_DISPLAY	Allowed/not allowed
PPPI_EXPORT_PARAMTER	I_AUFNR
PPPI_PROCESS_ORDER	

3. Transfer of the data from the batch record (EBR - Electronic Batch Record)

Data is passed from picking to the batch record automatically as soon as you exit picking by choosing *Save*. The messages are sent to message destination PI01 by the standard process message category PI_HUREC.

The following characteristics are transferred:

Characteristic	Characteristic value
PPPI_HU_ID_NO	Internal HU number
PPPI_HU_EXT_ID_NO	External HU number
PPPI_MATERIAL	Material number
PPPI_BATCH	Batch number
PPPI_MATERIAL_QUANTITY	Material quantity
PPPI_UNIT_OF_MEASURE	Unit of measure

For more information, see Structure and Contents of the Batch Record [Ext.].

Picking HUs Manually (Process Order)

Use

For the production supply, you can pick ingredients manually in handling units [Page 10] (HUs). This includes:

- Manual packing of ingredients in HUs

- Entering of the generated HUs

- Packing of HUs in superior HUs.

Picking is carried out using the reservation items of the process order.

Procedure

1. Choose *Picking* in the PI sheet.

    The *Picking for Production Order* screen appears.

2. Enter the measured and packed materials for the process order.

    Enter the following:

    - Material

    - Reservation item number

    - Quantity and unit of the material

    - Operation

    - HU number

    You can check which materials are assigned to the process order but not yet picked on the *Open Reservations* tab page.

    Operation column:

    A material can be assigned to an operation or phase in the master recipe to ensure correct sequencing during production. If a material is not assigned to a phase, the system automatically assigns to the first phase of the process order. During picking, the material can be:

    - Assigned to any phase

    - Not assigned to a phase

3. Packing the material:

    a. Select the material.

    b. Choose a *Packaging Material Type*.

    c. Choose *Pack*.

    d. The reservation item is automatically assigned an HU number.

Picking HUs Manually (Process Order)

⇨

The HU number can be assigned independently if an external number range assignment has been maintained in Customizing. The HU number must then correspond to this number range.

4. Packing HUs in superior HUs for picking (for example, on a pallet):

   a. Choose *Container hierarchy*.

   b. Select the HUs to be packed.

   c. Choose a *Packaging Material Type*.

   d. Choose *Pack*.

5. Completing manual picking

   a. Choose *Save*.

      The PI sheet appears.

      The system confirms that picking was successfully carried out with **y** *(yes)*.

      If picking was not successfully carried out, an error message appears.

   b. Execute a digital signature if the system requires one.

      The picking data is transferred to the batch record. You can use the message monitor to check whether the messages have been processed correctly. This is necessary if the system does not send the messages automatically.

      For more information, see R/3 Integration Using Process Messages [Ext.]

      ⇨

      Manual picking can be called up again after completion.

      It is a good idea to pick parts of the materials at different times during production. For example, the materials for the first phase(s) can be completely picked, and the rest of the materials can be partially picked.

Automatic Picking for Process Orders

Use

You can use this function if the picking of materials for a process order is managed through an external weighing system. This means that the materials required for the process order are weighed, filled, or measured.

The messages from the external weighing system are transferred to the R/3 System via the PI-PCS interface.

Integration

Prerequisites

1. The weighing system must be specified as the control recipe destination so that information can be separated from the process order for the weighing system. It receives all materials, quantities, and batches (if known) that must be picked via its own control recipe with the standard process instruction MAT_INFO.

2. The standard process message category PI_HUSTG with process message destination PI50 is used to transfer the messages to the R/3 System. The characteristics listed below describe the information that must be confirmed as import parameters from the external system to the process message destination.

Characteristic	Description	Required
PPPI_BATCH	Batch	
PPPI_EVENT_DATE	Date of event	
PPPI_EVENT_TIME	Time of event	
PPPI_HU_CREATED_BY	HU was created by:	
PPPI_HU_EXT_PACKAGING	External handling unit identification	
PPPI_HU_EXT_PACKAGING_TO_PACK	External handling unit identification	
PPPI_HU_EXT_PICKING_BIN_NO	External picking bin	Req.
PPPI_HU_EXT_STAGING_NO	External staging number	
PPPI_HU_PACKING_MATERIAL	Packaging material	
PPPI_HU_SPECIAL_STOCK_IND	Special stock indicator	
PPPI_MATERIAL	Material number	
PPPI_MATERIAL_QUANTITY	Material quantity	
PPPI_OPERATION	Operation number	
PPPI_PLANT_OF_BATCH	Plant of batch	
PPPI_PROCESS_ORDER	Process order	Req.

Automatic Picking for Process Orders

Characteristic	Description	Required
PPPI_RESERVATION_ITEM	Item number of the reservation	Req.
PPPI_STORAGE_LOCATION	Storage location	
PPPI_UNIT_OF_MEASURE	Unit of measure	

If an HU number is not specified as the export parameter, external weighing systems automatically use the weigh number as the HU number.

For more information, see

- R/3 Integration Using Process Messages [Ext.]

Features

Transfer of Data from Automatic Staging to the Batch Record (EBR - Electronic Batch Record)

The standard process instruction category PI_HUREC, which transfers messages to message destination PI01, is used to pass data from automatic picking.

The following characteristics are transferred:

Characteristic	Description
PPPI_HU_ID_NO	Internal HU number
PPPI_HU_EXT_ID_NO	External HU number
PPPI_MATERIAL	Material number
PPPI_BATCH	Batch number
PPPI_MATERIAL_QUANTITY	Material quantity
PPPI_UNIT_OF_MEASURE	Unit of measure

Activities

You can use the message monitor to check whether the messages have been processed correctly.

Picking with WM for Release Order Parts

Use

This function describes order-independent picking of components with WM integration.

For more detailed information on picking release order parts, see:

Goods Issue for the Production Supply Area [Ext.]

Release Order Parts [Ext.]

Material Staging Process [Ext.]

The picking operation is divided into WM staging of release order parts to an HU-managed production supply area [Ext.] [Ext.] (PSA) and picking of HUs for the production line. HUs are assigned to the process order during the picking process.

Prerequisite

- The central storage location is HU-managed.

- The PSA is HU-managed.

Activities

Staging release order parts for the PSA with WM:

1. Choose *Production-Process -> Process Order -> Tools -> WM Material Staging -> For Release Ord. Part*.

    Enter a plant and an HU-managed production supply area.

2. Choose *Enter*.

    For further procedures on material staging for release order parts with WM, see:

    - Release order parts [Ext.] [Ext.]

    - Material staging process [Ext.] [Ext.]

Picking release order parts for the production line.

1. Call up the PI sheet for the process order.

2. Choose *Picking*.

    The *Picking for Production Order* dialog box appears.

3. Choose the *Assign HU* tab page*.*

4. Enter the number of the HU and choose *Assign*.

    The system checks whether the material, quantity, and batch of the component(s) contained in the HU are allowed.

5. Choose *Save*.

Picking with WM for Release Order Parts

Picking with WM for Release Order Parts

Material Identification

Use

You can use this function to identify and verify the ingredients at the production line.

Prerequisites

The ingredients were staged in handling units [Page 10] (HUs).

Features

Material identification is managed in the PI sheet by way of dynamic function calls [Ext.] and includes the:

- Completeness check [Page 138]

- Sequence check [Page 141]

- Automatic goods issue posting (GI-posting) after the completeness check or sequence check

- Automatic transfer of data from material identification to the batch record

- Check for completeness of picking

1. **Completeness Check**

    You can check:

    − Complete quantities already picked at this time

        All *picked* HUs must be staged.

    − Start quantities

        At the beginning of production, at least one unit of measure of each component must be available, irrespective of the whole staged quantity.

    Depending on how it was defined in the master recipe [Ext.], the completeness check can take place for:

    − The whole process order

    − An operation or phase

        The system can then trigger an automatic goods issue posting (GI-posting) or the user can post a separate goods issue [Page 144] at a later time.

2. **Sequence Check**

    The sequence check implies that a completeness check has already been carried out.

    Depending on how it was defined in the master recipe, the sequence check can be carried out for:

    − The whole process order

Material Identification

–　An operation or phase

The system can then trigger an automatic goods issue posting (GI-posting) or the user can post a separate goods issue at a later time.

The completeness check and sequence check can be used independently of each other or they can be combined. The completeness check must take place before the sequence check.

The system can display the picked HUs that have not yet been checked. To allow for this, you set the characteristic PPPI_DISPLAY_REQUIRED_HU in the standard process instruction category MI_HUCMP for the completeness check or MI_HUSEQ for the sequence check.

The resulting inspection will then be displayed both in the current dialog as well as by a symbol in picking.

3.　**Goods Issue Posting**

After material identification is complete, an automatic goods issue posting (GI-posting) can be triggered, or a separate goods issue posting can be made by the user at a later time.

If an automatic goods issue is posted, a message is sent to message destination PI51. The actual goods issue posting takes place when sending.

4.　**Transfer of the Data to the Batch Record (EBR - Electronic Batch Record)**

Data is passed from material identification to the batch record automatically when you exit by choosing *Save*. At this point, the standard process message category PI_HUREC is used to pass messages to message destination PI01.

The following characteristics are transferred:

Characteristic	Description
PPPI_HU_ID_NO	Internal HU number
PPPI_HU_EXT_ID_NO	External HU number
PPPI_HU_PREREQ_FOR_GOODS_ISSUE	Prerequisite for GI posting: Completeness or sequence check
PPPI_HU_IDENT_LEVEL	Inspection level
PPPI_OPERATION	Operation
PPPI_PHASE	Phase
PPPI_HU_POST_GOODS_ISSUE	Automatic GI posting: yes/no
PPPI_HU_KIND_OF_COMPLETNESS	Check for: Complete quantity or start quantity

For more information, see Structure and Contents of a Batch Record [Ext.] [Ext.].

5. Completeness Check for Picking

You can display the number of components for which a quantity has already been picked without calling up the manual picking function again.

To do this, choose *Identification* →*Check picking* on the completeness or sequence checks screens.

The number of picked or non-picked HUs is displayed under *Check picking*.

HUs for Order

You can display all available information about the HUs for a production order by choosing *Logistics -> Central Functions -> Handling Unit Management -> Display Handling Units -> For Process Order*.

After you have entered the production order number, a list appears with all HUs that are assigned to the order. You can select an HU for information about the:

- Warehouse

- Status

- Use

- Contents (material list)

- History

- Picking with date, time, employee, external picking location

Carrying Out Completeness Checks

Use

You carry out a completeness check to check whether the handling units [Page 10] (HUs) that were picked for the process order are staged at the production line.

Depending on whether the completeness check for the process order or operation/phase was created in the master recipe [Ext.], you can

- Carry out a completeness check for the whole process order at the beginning of the production

- Carry out a completeness check at the beginning of an operation or phase

You can carry out the completeness check for:

- Complete quantities

  All HUs that were picked for the process order are checked.

- Start quantities

  For each material to be used, at least one unit of measure must be available. All picked HUs do not have to be checked. One partial quantity per material is enough for the start quantity.

Goods issue posting

Since the identification is carried out directly before the actual use of the material, the material consumption can also be posted as goods issue at this time. In this case, the system carries out the GI posting automatically at the end of the sequence check if no separate goods issue posting [Page 144] is maintained in the master recipe.

The goods issue posting of the components is carried out at HU level. The quantity of all materials with all batches that are filled in HUs is posted as a goods issue.

A partial good issue posting of an HU is not possible. Only the complete HU can be posted as goods issue. In the case of an error, the complete HU is refused.

An independent goods issue document is created for each HU.

Prerequisites

1. The standard process instruction category MI_HUCMP is maintained in the master recipe.

   The following parameters are variable:

Characteristic	Characteristic value	Options
PPPI_BUTTON_TEXT	Completeness check	Standard text that appears on the pushbutton of the PI sheet

PPPI_EXPORT_PARAMETER PPPI HU POST GOODS ISSUE	I_CONS	Direct GI posting: yes/no
PPPI_EXPORT_PARAMETER PPPI_HU_DISPLAY_REQUIRED_HU	I_SHOW	Display staged HUs: yes/no
PPPI_EXPORT_PARAMETER PPPI_HU_IDENT_LEVEL	I_CHECK	Inspection level: Order, operation, phase
PPPI_EXPORT_PARAMETER PPPI_HU_KIND_OF_COMPLETENESS	I_COMPL	Inspection of: Complete quantity or start quantity
PPPI_EXPORT_PARAMETER PPPI_HU_GET_ALLOWED_VALUES	I_VALREQ	Activation of F4 help to display picked HUs

The following parameters are not variable and are copied:

Characteristic	Characteristic value	Options
PPPI_FUNCTION_NAME	COMI_MATERIAL_COMPLETE_CHECK	Name of the function module
PPPI_EXPORT_PARAMETER PPPI_RESERVATION	I_RSNUM	Reservation number is copied
PPPI_EXPORT_PARAMETER PPPI_OPERATION	I_VORNR	Operation number is copied
PPPI_EXPORT_PARAMETER PPPI_PHASE	I_PHASE	Phase number is copied
PPPI_EXPORT_PARAMETER PPPI_PROCESS_ORDER	I_AUFNR	Order number is copied
PPPI_INPUT_REQUEST	Identification OK	Status message for material identification carried out successfully: yes/no
PPPI_IMPORT_PARAMETER PPPI_STRING_VARIABLE	E_FLAG VHUMI_IDENT_TEXT_&0100&	
PPPI_STRING_VARIABLE PPPI_IMPORT_PARAMETER	VHUMI_IDENT_FLAG_&0120& E_TEXT	

1. The materials required for production were picked.

    2. The HUs that are to be identified have not yet been posted as a goods issue.

    The can be the case, for example, if a completeness check with an automatic goods issue posting took place before the sequence check.

Carrying Out Completeness Checks

Procedure

1. Choose *Completeness Check* in the PI sheet.

   The *Material Identification*: *Completeness* screen appears

   If maintained accordingly in the process instructions, the HUs for the process order or operation/phase are displayed.

2. Enter the identification number for the picked HUs.

a. If your terminal has a barcode scanner connected to it, you can enter it in this way. The barcode scanner dialog does not take place in the R/3 System.

b. The system uses a symbol to inform you whether the identification number you entered is correct.

3. Ending the completeness check:

✎ If all picked HUs were entered correctly, you can exit the completeness check by choosing *Save*.

      The completeness check is confirmed as successful in the PI sheet.

✎ If the completeness check cannot be completed successfully, an error message appears as well as a corresponding note in the PI sheet.

      The completeness check is complete when all of the picked HUs for a process order or operation/phase have been identified.

4. Automatic GI posting, if maintained in the master recipe:

   The system automatically posts the consumption of the components for the process order or operation/phase as a goods issue.

   Messages are sent to the process message destination PI51. Use the message monitor to check whether the messages were processed correctly.

5. The data from the completeness check and the goods issue posting are transferred to the batch record. Use the message monitor to check whether the messages were processed correctly.

   For more information on sending messages, see:

   Separate Goods Issue Posting [Page 144]

Carrying Out Sequence Checks

Use

For various types of production, it is necessary to check the sequence of the components to be used for an operation or phase. If the components were picked as handling units [Page 10] (HUs), material identification takes place at HU level.

Depending on whether the sequence check for the process order or operation/phase was created in the master recipe [Ext.], you can

- Carry out a sequence check for the whole process order at the beginning of the production

- Carry out a sequence check at the beginning of an operation or phase

> Since the sequence check implies a completeness check has already been carried out, it is a good idea to carry out a sequence check for a whole order if it is the only form of identification.

The sequence check refers to the sequence of the materials in the material list of the process order. Here the materials are assigned to an operation or a phase.

Goods issue posting

Since identification is carried out directly before the actual use of the material, the material consumption can also be posted as a goods issue at this time. In this case, the system carries out the GI posting automatically at the end of the sequence check if no separate goods issue posting [Page 144]is maintained in the master recipe.

The goods issue posting of the components is carried out at HU level. The quantity of all materials with all batches that are filled in HUs is posted as a goods issue.

A partial good issue posting of an HU is not possible. Only the complete HU can be posted as goods issue. In the case of an error, the complete HU is refused.

An independent goods issue document is created for each HU.

Prerequisites

1. The process instruction category MI_HUSQU is created in the master recipe.

   The following characteristics are variable:

Characteristic	Characteristic value	Options
PPPI_BUTTON_TEXT	Sequence check	Standard text that appears on the pushbutton of the PI sheet
PPPI_EXPORT_PARAMETER PPPI_HU_DISPLAY_REQUIRED_HU	I_SHOW	Display picked HUs yes/ no

Carrying Out Sequence Checks

PPPI_EXPORT_PARAMETER PPPI_HU_POST_GOODS_ISSUE	I_CONS	GI posting yes/ no
PPPI_EXPORT_PARAMETER PPPI_HU_IDENT_LEVEL	I_CHECK	Inspection level: Order Operation Phase
PPPI_EXPORT_PARAMETER PPPI_HU_GET_ALLOWED_VALUES	I_VALREQ	Activation of F4 help to display picked HUs

The following parameters are not variable and are copied:

Characteristic	Characteristic value	
PPPI_FUNCTION_NAME	COMI_MATERIAL_SEQUENCE_CHECK	Name of the function module
PPPI_EXPORT_PARAMETER PPPI_PHASE	I_PHASE	Phase number is copied
PPPI_EXPORT_PARAMETER PPPI_OPERATION	I_VORNR	Operation number is copied
PPPI_EXPORT_PARAMETER PPPI_RESERVATION	I_RSNUM	Reservation number is copied
PPPI_EXPORT_PARAMETER PPPI_PROCESS_ORDER	I_AUFNR	Order number is copied
PPPI_INPUT_REQUEST	Sequence check OK:	Status message for material identification carried out successfully: yes/no
PPPI_IMPORT_PARAMETER PPPI_STRING_VARIABLE	E_TEXT VHUMI_IDENT_TEXT_&0100&	
PPPI_IMPORT_PARAMETER PPPI_STRING_VARIABLE	E_FLAG VHUMI_SEQU_FLAG_&0100&	

2. The materials required for production were picked.

3. The HUs that are to be identified have not yet been posted as a goods issue.

This can be the case, for example, if a completeness check with an automatic goods issue posted took place before the sequence check.

Procedure

1. In the PI sheet, call up the *Sequence check*.

   The *Material Identification: Sequence* screen appears.

2. Enter the HUs to which the required material was assigned in the correct sequence.

a. This sequence refers to the material list of the process order.

If your terminal has a barcode scanner connected to it, you can enter it in this way. The barcode scanner dialog does not take place in the R/3 System.

b. The system uses a symbol to inform you whether the identification number you entered is correct.

3. Ending the sequence check:

– If all picked HUs were entered in the correct sequence, you can exit the sequence check by choosing *Save*.

The sequence check is confirmed as successful in the PI sheet.

– If the sequence check cannot be completed successfully, an error message appears as well as a corresponding note in the PI sheet.

4. Automatic GI posting, if maintained in the master recipe:

The system automatically posts the consumption of the components for the process order or operation/phase as a goods issue. Messages are sent to process message destination PI51. You can use the message monitor to check whether the messages have been processed correctly.

5. The data from the completeness check and the goods issue posting are transferred to the batch record. You can use the message monitor to check whether the messages have been processed correctly.

For more information on sending messages, see:

Separate Goods Issue Posting [Page 144].

Separate Goods Issue Posting

Use

The consumption of the components in a production process should be posted as a goods issue as soon as possible to ensure that material stock levels are transparent.

If components of a process order or production order are picked as handling units (HUs), it is a good idea to also process the goods issue posting (GI-posting) by way of HUs.

If the GI-posting is to take place separately from material identification [Page 135] [Page 135] or no material identification is to take place, the separate GI-posting can be used as a dynamic function call [Ext.].

The consumption posting of the components is carried out at HU level. Here you can post goods issues for

- The complete quantity of all materials with all batches that were packed in HUs

- Partial quantities of the materials that were packed in HUs

An individual goods issue document is created for each HU.

For more information about partial goods issue postings, see Partial Goods Issue Posting with HU [Page 148] [Page 148].

Integration

Prerequisites

1. The standard process instruction category MI_HUCNS is maintained in the master recipe [Ext.].

The following parameters are variable:

Characteristic	Characteristic value	Options
PPPI_BUTTON_TEXT	GI posting	Standard text that appears on the pushbutton of the PI sheet
PPPI_FUNCTION_DURING_DISPLAY		Function in the display allowed/not allowed
PPPI_EXPORT_PARAMETER PPPI_HU_IDENT_LEVEL	I_CHECK	Separate GI posting for order/operation/phase
PPPI_EXPORT_PARAMETER PPPI_HU_PREREQ_FOR_GOODS_ISSUE	I_VORAUS	Prerequisites: No prerequisites/ completeness check/ sequence check
PPPI_EXPORT_PARAMETER PPPI_HU_GET_ALLOWED_VALUES	I_VALREQ	Activation of F4 help to display picked HUs

The following parameters are not variable and are copied:

Characteristic	Characteristic value	Options
PPPI_FUNCTION_NAME	COMI_HU_CONSUMPTION	
PPPI_EXPORT_PARAMETER PPPI_PHASE	I_PHASE	Phase number is copied
PPPI_EXPORT_PARAMETER PPPI_PROCESS_ORDER	I_AUFNR	Order number is copied
PPPI_EXPORT_PARAMETER PPPI_RESERVATION	I_RSNUM	Reservation number is copied
PPPI_EXPORT_PARAMETER PPPI_OPERATION	I_VORNR	Operation number is copied
PPPI_INPUT_REQUEST	Consumption OK	Status message for carrying out good issue posting Successful: yes/no
PPPI_IMPORT_PARAMETER PPPI_STRING_VARIABLE	E_FLAG VHUMI_CONS_FLAG_&0050&	
PPPI_IMPORT_PARAMETER PPPI_STRING_VARIABLE	E_TEXT VHUMI_CONS_TEXT_&0050&	

Features

After the user has created the components or HUs, the system checks whether the components entered or the HUs were correctly picked [Page 124] and, if maintained in the master recipe, identified.

The system creates a message of the standard process message category PI_HUCNS, which transfers messages to the message destination PI51. When this message is sent, the actual GI posting is carried out.

This process message category is structured as follows:

Characteristic	Description	Required
PPPI_EVENT_DATE	Date of event	
PPPI_HU_CONS_DATE	Document date for posting	
PPPI_HU_EXT_ID_NO	External handling unit identification	
PPPI_HU_ID_NO	Internal handling unit number	
PPPI_PROCESS_ORDER	Process order	Req.
PPPI_RESERVATION	Reservation	Req.

The message category can also be used by external process control systems.

The standard process message category PI_HUREC allows the data above to be automatically sent to the batch record [Ext.] by way of the process message destination PI01.

For more information, see

Separate Goods Issue Posting

Process Message [Ext.]

Monitoring Process Messages [Ext.].

HUs for Order

        Choose *Logistics -> Central Functions -> Handling Unit Management -> Display Handling Units -> For Process Order* to display all information available on the HUs for a production order.

        After entering the production order number, a list of all HUs assigned to the order appears. When you select an HU, information appears on the following:

–   Warehouse

–   Status

–   Usage

–   Contents (material list)

–   History

–   Picking with date, time, employee, external picking location

Carrying Out Separate Goods Issue Posting

1. Choose *Separate Goods Issue* in the PI sheet.

   The *Separate Goods Issue Posting* screen appears.

2. Enter the identification numbers of the HUs that are to be posted as goods issue.

3. To end the activity, choose *Save.*

   Saving the goods issue posting triggers the creation of messages of message category PI_HUCNS, which are for carrying out the GI posting and for the entry in the batch record. Messages appear in the message monitor.

4. The HUs are not posted as goods issue until the messages in the message monitor are sent.

This can be done

− Automatically by the system

− Manually in a separate step

To send the messages manually, proceed as follows:

a. Choose *Logistics →Production process →Process management →Messages →Message monitor.*

   The *Process Message Monitor: Initial Screen* screen appears.

b. Enter the process order number.

   The *Process Message Monitor: Messages* screen appears.

c. To post the goods issue, choose the message you want to send and then choose *Edit → Send.*

Partial Goods Issue Posting with HU

Use

You can use this function to post partial quantities of a handling unit (HU) as a goods issue.

You can carry out partial goods issue posting for the following:

- All HUs that are created in central picking and are assigned to a manufacturing order

- Only free HUs that are assigned to a manufacturing order in central picking

> This function is mainly of importance if you want to assign free HUs to different manufacturing orders. These HUs can contain material quantities for several manufacturing orders. You can use partial goods issue posting to withdraw part of the contents of an order and then use the HU for another manufacturing order.

Integration

This function can be used both in process manufacturing as well as in discrete manufacturing.

Prerequisites

1. Handling units are used in production.

2. Customizing: **Partial-GI indicator**

   In Customizing you have specified whether a partial goods issue posting is allowed for all HUs.

   > The default value is defined for each order type. This means you can make various settings for different order types. It is usually a good idea to allow a partial GI posting for production orders, but not for process orders.

   You make the settings in Customizing by choosing *Handling Unit Management →Basics - > Production →Production Supply →Set Partial GI Indicator*:

   – Partial GI allowed:

   The partial GI is allowed for all HUs that are created for the manufacturing order.

   – Partial GI not allowed:

   The partial GI is only allowed for free HUs.

   During the picking process, you can decide whether or not a partial goods issue posting is allowed during the production process while assigning the free HUs to a manufacturing order.

3. Customizing for *The Partial GI Indicator*: **Reassign free HUs**

   In Customizing for the *Partial GI Indicator*, you can also define whether free HUs that are already assigned to an order can be reassigned to a different order.

   Furthermore, you can specify whether an error message, a warning, or no message at all is to appear when reassigning an HU to an order.

You make the required settings in Customizing by choosing *Handling Unit Management* →*Basics -> Production* →*Production Supply* →*Set Partial GI Indicator*.

Features

If the partial GI is allowed for the HU, you can

- Post parts of the HU good issue during the completeness check, sequence check or the separate GI posting

- Change the quantity to be posted manually. The HU maintains its status, and an HU with contents remaining can be used again.

- If the quantity is not entered, the complete contents of the HU is posted as a goods issue.

     If the ***Part. goods issue not allowed*** indicator is set for the HU, all of the contents of the HU are posted as a goods issue.

Functions on the *Partial GI* screen

- Previous/next HU

     Display of further HUs that were selected for the partial goods issue posting

- Superior/subordinate HU

     Display of the hierarchically lower HUs that are packed in an HU or display of the hierarchically higher HU.

- HU: No GI posting

     You choose the function button to set the content quantity of the selected HU to zero. A partial goods issue posting is not possible.

- HU content

     The content of the HU can be displayed for hierarchically packed HUs.

Activities

Picking for Manufacturing Orders

In the *Picking for Manufacturing Order* dialog box, you specify whether or not a partial goods issue posting is allowed in the rest of the production run while assigning a free HU to a manufacturing order. You proceed as follows:

1. On the *Assign HU* tab page, you assign a free HU to the manufacturing order.

2. Select the HU and specify whether or not a partial goods issue is allowed.

     HUs that are already assigned to another manufacturing order and were *only* picked can be copied to your current manufacturing order. If an HU has already been processed after being picked, it is not available for other orders until after a partial goods issue posting has been carried out.

Carrying out a partial goods issue

Partial Goods Issue Posting with HU

To post partial quantities of an HU as a good issue during material identification, proceed as follows:

1. Call the completeness check or the sequence check from the PI sheet if it contains an automatic goods issue posting.

    If your PI sheet contains a separate goods issue posting, call it up.

2. Enter and select the HU from which you want to post a goods issue for partial quantities.

3. Choose *Partial GI*.

    The *Partial GI* screen appears.

4. You can control the display of the HU for which a partial goods issue is to be booked using the following functions:

    – Previous/next HU

    – Superior/subordinate HU

5. Enter the quantity you want to post as a goods issue.

6. To carry out the good issue posting, exit the screen by choosing *Confirm*.

Material Reconciliation

Use

You use material reconciliation to analyze and verify ingredients at the end of a production process.

It allows you to compare the material quantity that actually flowed in with the planned quantity or the quantity of the material produced. Furthermore, other information about the ingredients can be displayed via the movement types.

Reconciliation of the ingredients can ensure that there are no discrepancies outside of the valid range in the relationship between the input and yield.

Integration

1. The goods movements for the production order, for example, all goods recipes with all returns and all reversals as well as all goods withdrawals with all returns and all reversals, are the basis for material reconciliation.

    You can define the goods movements that are to flow into material reconciliation. Movement types that you define yourself can also be used for reconciliation.

2. You can choose the components that are to be reconciliated. The components must be classified with reconciliation class 050. You can classify the components in the R/3 classification system.

    For more information, see Classification System [Ext.].

Features

Results Report for Material Reconciliation

Here you can find information about the following:

1. The parameter for the produced quantity (if defined):

    • Value of this parameter

    • The goods movements assigned to the parameter for the produced material

2. The individual components:

    • All goods movements assigned to a parameter and used in this production order

    • The values of the formula parameters used

    • The elements of the calculation according to the definition

    • The result of the formula calculation

    • Information about whether the result is within the defined interval

3. Miscellaneous:

    • The sum of the materials that are within and outside of the defined interval. This information is transferred back to the PI sheet if you call it up from there.

    • All parameter with movement types assigned to them that are used for a production order

Material Reconciliation

➡️

> If a material appears several times in the material list, all items for this material are reconciled at the same time. The classification of the first item of a material in the material list is chosen.

> Co-products are reconciled like ingredients.

Messages to the Batch Record (EBR)

If material reconciliation is called up from a PI sheet, a message is sent to the batch record each time it is called up.

This message contains the following information:

Number and material number of the materials that were reconciled incorrectly

- Name of the user

- Date, time

If the message does not reach the batch record (for example, because some of the goods movements for the order are not yet posted), call up material reconciliation by choosing:

Production-Process →Process Order →Tools →Process Data Document →Material Reconciliation →For Process Order

Batch usage with material reconciliation

You can use batch usage for a raw material, for example, to find out into which batch of the semi-finished or finished product this raw material flowed. Furthermore, you can display the material reconciliation for the raw material.

You can display parts of the batch usage separately if, for example, you want to trace the semi-finished and finished product further in the batch process. Position the cursor on the batch and choose *Material reconciliation →New expansion*.

Over *Documents* you can display all individual postings for a batch.

For more information about batch usage, see Batch Where-Used List [Ext.].

Prerequisites

1. To generate the required material documents, you must make the following settings in Customizing:

   a. Choose *Production Planning for Process Industries →Process Order →Master Data → Order →Define Order-Type Dependent Parameters*:

   b. On the detail screen, choose the *Implementations* tab page for the process order category.

   c. In the *Documentation of goods movements* group box, select:

      – ProdOrder

      – Planned goods issue

      – Unplanned GoodsIssue

2. In Customizing, you have made the following settings by choosing *Production Planning-Process Industries →Process Data Documentation →Material Reconciliation:*

    –   Create formula parameters

    –   Assign movement types to parameters

    –   Create formulas

3. Material reconciliation is carried out using the standard process instruction category RECON, which must be assigned to the master recipe. This involves a dynamic function call.
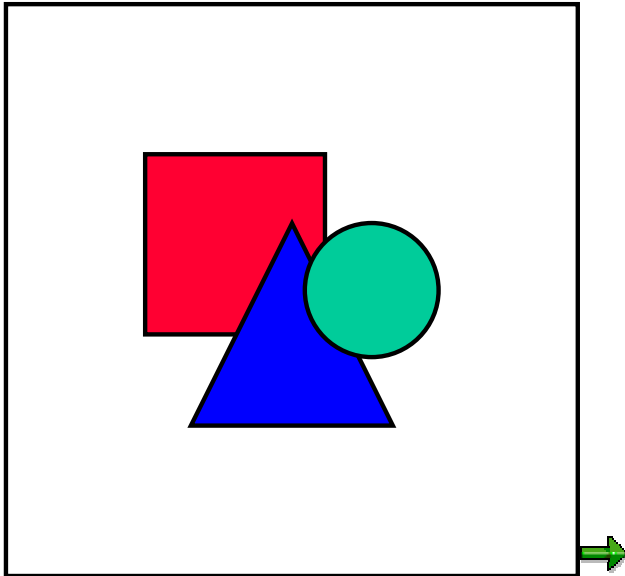
Do not change the process instruction category RECON for material reconciliation. It is to be used in the standard form in which it is delivered.

4. You have created a class of class type 050 (material reconciliation).

5. In the master recipe/process order, the components are classified with class type 050 for material reconciliation.

Activities

You can call up material reconciliation

•   From the PI sheet

•   By choosing *Production process →Process order→Tools →Process data documentation → Material reconciliation →For process order*

•   In combination with batch usage for raw material batches by choosing *Production Process → Process order →Tools →Process data documentation →Material reconciliation →Acc. batch usage.*

You can carry out material reconciliation at any time as long as at least one goods movement has been posted for the order.

Material Reconciliation

Creating a Class for Material Reconciliation

To carry out material reconciliation, you must classify the ingredients with a class of class type 050.

After you have created the class, assign the characteristics for material reconciliation to the class. The objects to be classified are to have these characteristics.

For more information, see classification system [Ext.].

Procedure

1. Choose *Logistics -> Central Functions -> Classification->master data -< classes*.

    The *Class* screen appears.

2. Choose *Create*.

    There is no naming convention, so you can enter a description that corresponds to your own company's standards.

3. Choose the *Characteristics* tab page*.*

4. Use the F4 help to assign the following characteristics to the reconciliation class:

    PPPI_MR_IF_USED: Relevance of the component for material reconciliation: yes/ no

    PPPI_MR_FORMULA: Formula for calculation

    PPPI_MR_RANGE_HIGH: Upper tolerance limit to which a deviation is valid in regard to the formula used

    PPPI_MR_RANGE_LOW: Lower tolerance limit to which a deviation is valid in regard to the formula used

Result

After you have created the class and the characteristic, classify the components that are to flow into material reconciliation and assign values to the characteristics.

Classifying Components for Material Reconciliation

Use

Material reconciliation can only be carried out if the components used are classified with a class of class type 050 for material reconciliation.

You carry out classification by assigning characteristics to the components. You then assign values to the characteristics according to your requirements.

> You can assign values to characteristics in the master recipe or in the process order. It makes sense to do this in the process order if, for example, a component is only to flow into material reconciliation for certain orders.

For more information, see Classification System [Ext.].

Prerequisites

1. You have created a class of class type 050.

2. You have assigned characteristics for material reconciliation to the class.

Procedure

To assign values to these characteristics in the <u>master recipe,</u> proceed as follows:

1. In the master recipe, choose the *Materials* tab page and then *Goto -> Bill of material*.

    The *Change Material BOM: General Item Overview* screen appears.

2. Select the material to which you want to assign values and choose *Extras →Batch classification*.

3. The *Change Material BOM: Classification* screen appears. Either enter the class name or use the F4 help to call up the reconciliation class.

4. Choose *Enter* an*d a*ssign values to the following characteristics:

    PPPI_MR_IF_USED: Relevance of component for material reconciliation: yes/ no

    PPPI_MR_FORMULA: Formula for calculation

    PPPI_MR_RANGE_HIGH: Upper tolerance limit to which a deviation is valid in regard to the formula used

    PPPI_MR_RANGE_LOW: Lower tolerance limit to which a deviation is valid in regard to the formula used

To assign values to these characteristics in the <u>process order,</u> proceed as follow:

1. Enter the process order and choose *Materials*.

    The *Change Process Order: Material List* screen appears.

2. Select the material to which you want to assign values.

3. Use the right mouse button to choose *Material reconciliation*.

    The *Change Process Order: Classification* screen appears.

If the component was already classified for reconciliation in the master recipe, the system suggests the reconciliation class and the value assignment.

4. Under *Values for class* either enter the class name or use the F4 help to call up the reconciliation class. Choose *Enter*.

5. Assign values to the characteristics:

   PPPI_MR_IF_USED: Relevance of the component for material reconciliation: yes/ no

   PPPI_MR_FORMULA: Formula for calculation

   PPPI_MR_RANGE_HIGH: Upper tolerance limit to which a deviation is valid in regard to the formula used

   PPPI_MR_RANGE_LOW: Lower tolerance limit to which a deviation is valid in regard to the formula used

   To change a value assignment that was made in the master recipe, choose *Value assignment -> Characteristic grouping -> Display/change*.

Handling Units in the Warehouse

Use

In Warehouse Management [Ext.] (WM), you can use handling units to process warehouse movements such as putaway, picking, or stock transfers. Furthermore, handling units can be created in the warehouse, labeled, and also picked for existing deliveries.

Features

If a handling unit [Page 10] (HU) is put away, it becomes a storage unit with the same number in the warehouse. Handling units are treated like storage units in the warehouse. Number assignment occurs via the storage unit. Inventory is kept at HU-managed storage locations. Handling units can also be put away in decentralized warehouses [Ext.].

The storage unit recognizes the sum of the materials and their related quantities. Handling units recognize packing hierarchies (resulting from nesting) and the serial numbers relating to them. If the stock is changed, it follows that both the storage unit and the handling unit are changed as well.

Now, you can also use handling units to manage serial numbers in the warehouse.

In Warehouse Management, inventory at HU-managed storage locations is generally managed by using storage units. This occurs regardless of whether Storage Unit Management is activated for a storage type. However, if a storage type has a putaway strategy, Storage Unit Management must be active in order to be able to put away handling units.

> Activate Storage Unit Management for all storage types in which you want to putaway handling units and that have putaway strategies. Leave Storage Unit Management deactivated for all other storage types, especially for interim storage areas.
>
> You can define for each warehouse number whether several users can pick the same material from the same storage bin at the same time, and if so, to what extent. If you use Handling Unit Management, it is necessary to use blocking logic B (Block material (shared) for maximum level of parallel proc.). See also: Define Control Parameters for Warehouse Number [Ext.].

Goods Receipt and Stock Putaway

Purpose

Goods receipt and stock putaway are two of the basic processes in a warehouse, and they take place when goods are delivered from a vendor or from production. The putaway process includes putting away goods in storage bins in the warehouse. You can use putaway strategies [Ext.] in the Warehouse Management (WM) system to find suitable storage bins easily.

Features

You have the following options for posting goods receipt:

- Goods receipt handling with reference to inbound deliveries [Page 160]

- Goods receipt posting [Ext.] for individual inbound deliveries

- Posting goods receipt in collective processing [Ext.] for several inbound deliveries at once.

- Goods receipt in collective processing [Ext.] for several inbound deliveries using background processing or manual steps

- Posting goods receipt for an entire shipment [Ext.]

- Goods receipt handling without reference to inbound deliveries [Page 162]

- Backflushing in repetitive manufacturing [Page 100]

- Posting goods receipt with handling units [Page 119]

- Goods receipt using inventory management [Page 188]

Goods Receipt Handling with Reference to Inbound Deliveries

Purpose

Handling units (HUs) are created in inbound deliveries. Handling unit generation is not intended to occur during transfer order processing. Storage units are generated from handling units during transfer order processing. The storage unit type is determined from the handling unit's packaging-material type and can be changed manually during putaway.

You can generate putaway transfer-orders for inbound deliveries or for handling units. If there is more than one handling unit in the inbound delivery, the putaway transfer-order is split up in such a way that one transfer order is always generated for each handling unit. Note that you can create transfer orders both before and after goods receipt is posted in inventory management.

Prerequisites

The inbound delivery is the basis for goods receipt handling in warehouse management. Transfer orders for putaway are created with reference to inbound deliveries. Distribution of delivery quantities into handling unit items and packing of the inbound delivery items must have been completed in the inbound delivery.

Process Flow

You can create transfer orders with reference to inbound deliveries as follows:

1. Enter the HU number

    The SAP System determines in the background which inbound delivery the handling unit is assigned to. The transfer order for putaway then updates that inbound delivery.

    This function is also supported when nested handling units that refer to several delivery items are involved.

    This type of transfer-order creation lends itself to scanning, since each handling unit can be processed individually.

2. Enter the inbound delivery number

    The SAP System determines the handling units that are to be put away, creates transfer orders, and determines the destination storage bins.

    This type of transfer-order creation is especially useful when you want to process several handling units at once.

Putaway before goods receipt posting

If you want to carry out a putaway transfer-order before goods receipt posting, the storage unit is at the transfer order's destination storage bin. A negative quant with the storage unit number is generated at the transfer order's source storage bin.

You can enter differences when the transfer order is confirmed. A difference confirmation is only possible for the source storage bin, however. This reduces the putaway quantity of the inbound delivery item.

Following confirmation, the quantity is available for use in the destination storage bin. In this case, the storage unit can be moved within the warehouse. You can only pick partial quantities or pick for a delivery after goods receipt has been posted successfully.

During goods receipt posting for the inbound delivery, negative quants in the goods receipt area are deleted and the system notes in the storage unit that partial picks are now possible.

Goods receipt posting can only occur for the entire inbound delivery.

Putaway after goods receipt posting

After handling units are created in the inbound delivery, goods receipt is posted for the inbound delivery. Storage units are created automatically for these handling units. The stock of these storage units is found in the interim storage bin that was determined in the inbound delivery. The inventory in these storage units is available for use. Partial picks are possible.

These storage units can either be put away individually with the *Create Transfer Order for Storage Unit* function or with the *Create Transfer order for Inbound Delivery* function. Both functions use the movement type in the inbound delivery to determine the transfer order's movement type.

You can enter differences when the transfer order is confirmed. However, it is **not** possible to confirm in the source storage bin, which would result in a reduction of the putaway quantity for the inbound delivery. The stock quantity in the handling unit is adjusted accordingly. A handling unit containing the difference quantity is automatically created in the difference storage bin. The *Clearing of Differences in Inventory Management* function passes on this difference to inventory management and deletes the difference HU.

Result

The goods are only available for picking after the transfer order has been confirmed and goods receipt has been posted.

Goods Receipt Handling without Reference to Inbound Deliveries

Purpose

If there is no inbound delivery, putaway occurs after the goods movement posting, at which point the system must recognize the handling unit (it must exist in the system). During posting, the system knows which handling units (HUs) must be posted for each posting line. In the Warehouse Management (WM) system, corresponding interim quants and storage units are created for these handling units, instead of transfer requirements.

Putting away handling units basically involves storage unit transports. Such transports are not meant to function as additions to existing stock. If you want to add the stock of a handling unit to an existing handling unit of this material, you can do so by manually creating a transfer order after goods receipt is posted for the inbound delivery.

Prerequisites

You can use the Define sequence of transfer order – goods receipt [Ext.] activity in Customizing to define whether you want to allow goods issue posting before putaway.

Process Flow

You can use Goods receipt posting of handling units for production orders [Page 117] to post handling units to the warehouse with or without reference to inbound deliveries. This posting automatically creates storage units for these handling units. The stock of these storage units is found in the interim storage bin that was determined in Customizing (see also Inventory Management [Ext.] and Generating interim storage bins [Ext.]). You can also use Customizing to activate direct transfer-order creation so that the putaway transfer-order is created in the background immediately following goods receipt posting. Otherwise, you can use the *Move storage unit* function to complete putaway.

Regardless of the Customizing settings that were made, transfer requirements are generally not created for handling units as goods receipt is posted.

> Missing parts processing during putaway of handling units is not supported at the moment.

Putting Away Handling Units Using Inbound Deliveries

Prerequisites

Before you can create a transfer order for stock putaway with reference to an inbound delivery, you must first have created the handling units in the inbound delivery and they must already be packed.

Procedure

1. To create transfer orders, start at <u>Inbound delivery [Ext.]</u> and select *Putaway →Create Transfer Order →For Inbound Delivery*.

   The initial screen for creating transfer orders for inbound deliveries appears.

2. Enter the warehouse number and the inbound delivery.

   The handling-unit overview screen appears.

   The handling units that were created, along with some additional data, are listed on the *Active worklist* tab page

   To process all items at once, proceed with the putaway activities without making any further selections.

   If you wish to put away certain items later, you can move the handling units containing those items from the *Active worklist* to *Inactive items* by selecting the lines concerned and then choosing *Inactive*.

   If you want to process inactive items and move them into the *Active worklist,* select the respective line and choose *Active.*

   The items listed for which a transfer order for an inbound delivery has already been created within the current processing transaction appear on the *Processed items* tab.

3. You have several putaway options available to you on the overview screen:

- *Save:* Putaway in the background and transfer order posting take place simultaneously.

- *Putaway background*: The transfer order is created in the background.

- *Putaway foreground:* During transfer order processing, the system displays the destination storage bin into which the handling unit is to be put away.

   Choose *Goto →Create trans. order*.

   The system determines the destination storage bin.

   You can call up the next item by choosing *Create*.

   Save your data.

   The transfer order number appears.

Putting Away Handling Units Using Inbound Deliveries

If you set the *Foregrnd/backgrnd* indicator in the *Control data* section of the initial screen, the system confirms the transfer orders immediately and determines the destination storage bins for the handling units.

Quality Inspection at Goods Receipt Using HUs

Purpose

You can decide if you want to have a quality inspection during the goods receipt process as you create handling units for the inbound delivery (see also Quality inspection for handling units [Page 193]).

Process Flow

If quality inspection is necessary, an inspection lot is created for the handling unit(s). The inspection lot number is transferred as the handling unit is put away in quants. The usage decision (repost to unrestricted-use stock, for example) creates a posting change delivery that contains the inspection lot.

A transfer order that selects the quants for the inspection lot number and makes the necessary posting changes is created in WM for this posting change delivery. The goods issue posting for the posting change delivery completes this process. This action adjusts the stock entries in inventory management and in the stock in interim storage in WM accordingly.

You can automate this process as follows:

1. Use output control (output WMTA) to activate direct transfer order creation for deliveries.

2. Activate immediate confirmation for the corresponding posting-change movement type in WM.

3. Define for this movement type in WM that the pick quantity is to be transferred with the confirmation to the delivery and that goods issue posting is to begin immediately.

Goods Movements

Use

For all other goods movements that refer to a handling unit (HU)-managed storage location, posting in inventory management does not occur immediately; a delivery is created instead. The system uses the movement type and the plants and storage locations involved to decide which type of delivery is required.

Features

For movements that result in an increase in inventory in the HU-managed storage location, an inbound delivery is created. When this inbound delivery is posted goods receipt, the inventory in inventory management is changed accordingly. Depending on your Customizing settings, this posting can occur before or after putaway in WM.

For movements that result in a decrease in inventory in the HU-managed storage location, an outbound delivery is created. Then, a transfer order is created for this outbound delivery. When this outbound delivery is posted goods issue, the inventory in inventory management is changed accordingly.

A posting change delivery is created for posting-change movement types (changing stock status from quality inspection to unrestricted-use, for example). Then, a transfer order is created for this posting-change delivery. Inventory management is changed accordingly when goods issue is posted for this posting-change delivery.

If there is also a change in storage locations during the posting change, the system checks whether both storage locations refer to the same warehouse numbers. In this case, a posting-change delivery is created. Otherwise, an inbound- or outbound delivery would be created.

> If the posting change involves moving the stock from one storage location to another and both storage locations refer to the same warehouse number but one of the storage locations is HU-managed, this action is not possible with a one-step movement type such as 311, since the stock must be unpacked and packed. Instead, use either the handling unit function (HU02) or two-step movement type such as 313 for this process.

Stock Transfers

Purpose

When a storage location is HU-managed, each stock transfer creates a delivery from one storage location to another. If the HU-managed storage location is the receiving storage location, the system creates an inbound delivery. If the HU-managed storage location is the issuing storage location, the system creates an outbound delivery. Subsequent processing in WM is controlled, as up to now, using transfer orders for the delivery.

If both storage locations are HU-managed, the handling units are copied into the inbound delivery and can be put away there also.

If, at the time of the stock transfer, both storage locations have HU **and** WM management, stock transfers can only be made using the two-step procedure. Therefore, as a rule, **all** stock transfers should take place using the two-step procedure.

Process Flow

Stock transfer with the two-step procedure:

1. First, an outbound delivery is created.

    After the handling unit has been confirmed to the delivery and the goods issue posting for the delivery has been executed, the material is posted to stock in transit in Inventory Management (IM), and the handling unit is given the status *In transit*.

2. The inbound delivery for the receiving storage location is created automatically.

    The stock putaway takes place in the receiving storage location with reference to this inbound delivery. The material is posted from stock in transit in the storage location stock of the receiving storage location when the goods movement posting for this inbound delivery takes place.

Posting Changes

Purpose

Posting changes in the warehouse can be executed as follows:

1. Select the handling unit by calling up the WM function *Posting Change in WM and IM*.

    Using this function, you execute a posting change for the storage bin stock, the quantity change in the handling unit, and for the material stocks, all in one step.

    The following options are available:

*   Quality inspection stock to unrestricted-use stock, and vice versa

*   Special stock to unrestricted-use stock, and vice versa

*   Consignment stock to the company's own stock, and vice versa

*   Sales order stock to the company's own stock, and vice versa

2. Creating posting change deliveries through posting changes that are initiated by Inventory Management or by a usage decision, and do not lead to a direct stock change.

    A transfer order is created for the posting change delivery. This transfer order selects the respective handling units and confirms these to the delivery. The confirmation of the transfer order leads to the goods movement posting with reference to the posting change delivery, and also initiates the posting change for the stocks involved. You can have the creation and confirmation of the transfer order as well as the goods issue posting executed in the background.

    The stock posting change in Warehouse Management always refers to a warehouse number.

Repack, Pack, Unpack

Repack

Repacking involves making transfer postings for material quantities from handling units into other handling units, where the total quantities per material that are unpacked and packed are identical. You can do this by using the *Create and Process Handling Units* function (transaction HU02).

This function triggers the system to create transfer orders in the background and use them to make stock adjustments that are necessary for Warehouse Management (WM). The handling units must exist in WM in storage types that are suitable for repacking. Such storage types have no putaway strategy, capacity check or storage unit management.

> Create your own storage type and storage bin for repacking and enter it in Customizing. When you define this storage type, refer to interim storage areas.

Pack

Packing involves transferring unpacked material quantities to packed material quantities. You can do this by using the *Create and Process Handling Units* function (transaction HU02).

During this process, you can either create handling units or increase the stock contained in existing handling units. A storage-location transfer posting into the HU-managed storage location occurs in inventory management. Stock is posted from the partner storage location of the HU-managed storage location.

Inventory in Warehouse Management is also adjusted accordingly. The postings in WM will occur in the storage type and storage bin that were entered in transaction HU02. Otherwise, determination of the interim storage bin occurs via Customizing. This is valid for both the inventory at the HU-managed storage location and for the inventory at the partner storage location, if it is also managed in WM.

Unpack

Unpacking involves transferring packed material quantities to unpacked material quantities. You can do this by using the *Create and Process Handling Units* function (transaction HU02).

During this process, you can either delete handling units or decrease the stock contained in existing handling units. A storage-location transfer posting from the HU-managed storage location into the inventory of the partner storage location occurs in inventory management. Inventory in Warehouse Management is also adjusted accordingly.

The postings in WM will occur in the storage type and storage bin that were entered in transaction HU02. Otherwise, determination of the interim storage bin occurs via Customizing. This is valid for both the inventory at the HU-managed storage location and for the inventory at the partner storage location, if it is also managed in WM.

Replenishment

Replenishment normally occurs in storage types that have putaway strategies. Therefore, it is necessary that the system recognizes the destination storage unit when the transfer order is created.

In complete stock picks, the source storage unit should become the destination storage unit. In partial picks, a pick handling-unit (HU) must have been created when the transfer order was created. The pick HU then becomes the destination storage unit for the transfer order.

Goods Issue and Picking

Use

Since all inventory is principally managed with handling units (HUs), it is necessary, even for pick transfer-orders, that the stock that is picked is repacked into a handling unit.

Features

During picking, if a complete stock pick is made, it is possible to leave the stock in the storage unit and post only the stock to another storage bin. In Customizing, you can define per storage type or movement type whether the system should transfer the entire handling unit in the confirmation transaction as a default.

However, for a partial pick, the partial quantity that was picked must be transfer-posted to a new handling unit. This handling unit is called a pick HU. The pick HU must be assigned to the transfer order before it is confirmed.

You can make this assignment either automatically during transfer-order creation (see also: Define control for automatic creation of pick HUs [Ext.]) by using the *Assign Pick-HU to Transfer Order* function (under *Outbound Process →Picking* in the main menu) or by using the *Pack* function on the initial screen for transfer order confirmation. There is also a corresponding IDoc available.

During a complete stock pick, you can inform the system as the transfer order is confirmed whether the stock is to remain in the original HU or whether the stock is to be posted to the pick HU. If a partial pick is made, a posting change is always made to the pick HU. At confirmation, the first pick HU that was assigned to the transfer order is always suggested as a default, but the user can change the pick HU manually.

During picking from nested handling units, you must inform the system either which (entire) handling units were picked or from which handling units items were picked. If an entire nested HU was picked, it can retain its structure and simultaneously become a pick HU. It can also retain its structure and become a lower-level HU of the pick HU.

During partial picks from nested HUs, either a lower-level HU can be transferred into the pick HU (thus becoming a lower-level HU of the pick HU) or the lower-level HU structure is lost and only the material quantity is transferred into the pick HU. A lower-level HU that was picked cannot become a separate pick HU.

If the material that is to be picked is a material that is managed with serial numbers, you must record the serial numbers of the partial picks from HUs (or lower-level HUs). If an entire HU (or lower-level HU) is transferred into the pick HU, it is not necessary to record the serial number(s).

If the entire quantity of a transfer order item cannot be packed in one pick-HU, you can distribute the quantity into several pick-HUs at confirmation. This causes new transfer order items to be created internally. Currently, this function is not supported for materials with active ingredients or for materials with a batch-specific material unit of measure.

Differences during confirmation

In two-step confirmation, it is currently not possible to create HUs with differences in the second step.

Differences for materials that are managed with serial numbers can only be confirmed in the source storage bin.

Goods Issue and Picking

If several picks are reported during confirmation, the delivery quantity must be adjusted to the pick quantity at confirmation.

If differences occur for picks from nested HUs, you must inform the system at confirmation in which lower-level HU the difference occurred.

Note that when the pick transfer-order is created, data is not yet updated in the transfer order's destination storage bin. The exception to this rule is when the transfer order's destination storage type has a putaway strategy or a capacity check, which is not recommended for picking.

Picking of Handling Units for Deliveries

Use

Picking generally takes place with reference to deliveries. The system determines the picking bins by using a material-related stock picking strategy.

Partial quantities (materials or lower-level HUs) are transferred to a picking container such as a cart or container tub. This picking container, in turn, represents a handling unit, the pick handling-unit (HU). Handling units and materials can be picked and packed in one step (pick-and-pack procedure).

It is also possible to repack material from a pick HU into an HU that is assigned to a delivery. In addition, an entire pick HU can be repacked into an HU that is assigned to a delivery (such as a crate that is going to a customer). You can have the pick HUs created automatically when you create a transfer order or you can create them manually and then assign them to a transfer order. You can use several pick HUs for each transfer order. As soon as the pick HUs are assigned to a transfer order, they are numbered consecutively within the transfer order.

Features

The following are examples of the picking options that are available:

- The outer HU, which corresponds to a complete storage unit, is picked in the Warehouse Management (WM) system, just as it was before.

- In the case of nested HUs, entire lower-level HUs can be picked into a pick HU.

- Material can be picked from an outer HU or from a lower-level HU into a pick HU.

    When confirming the transfer order, the person who is picking must specify which lower-level HUs or material quantities are to be picked from which HU, since this is not specified by the Warehouse Management system.

Picking for deliveries with handling units basically involves a pick-and-pack scenario. This means that after the transfer order is confirmed, the pick-HU (which is the original HU in the case of a complete stock pick) is always assigned to the delivery. The result is that the delivery is always packed completely after confirmation is complete.

If you use two-step confirmation, any posting changes for the inventory in the pick HU occur in the first confirmation step. Pick quantities and handling units are reported to the delivery in the second confirmation step.

You can pack more materials in the delivery following picking. If new handling units are created during packing, inventory in WM is adjusted in the background.

Handling units that are assigned to the delivery can be moved in the warehouse by using either the *Create Transfer Order for Storage Unit* or *Put Away/Transfer Handling Unit* function. It is not possible to pick handling units that are assigned to deliveries. If you post goods issue for deliveries, you delete handling units in WM, regardless of the storage bin the handling units are stored in when the goods issue posting takes place.

Picking of Handling Units for Deliveries

Confirmation of transfer orders

Transfer orders can be confirmed in two separate steps: In the first step, the withdrawal of the materials or the lower-level HUs is confirmed by the issuing source bin. In the second step, the completed transport (meaning the arrival and the availability) of the stock is confirmed at the destination bin.

As soon as the withdrawal of the stock has been confirmed, the storage bin is available for new putaways. The stock is available at the destination bin as soon as the arrival of the goods has been confirmed.

With separate confirmation of a transfer order, you ensure that the withdrawal of several handling units from different storage bins can be confirmed in each individual case, and that the transport is confirmed only after this has taken place. In this manner, the source bin is already available for putaway activities, even if the transport has not yet been confirmed.

Differences that occur can only be entered when materials of HUs are withdrawn.

During the zero stock check that is **triggered by the system**, a remaining quantity is only accepted if the handling unit from which the materials are to be taken:

- Is not nested

- Contains no serial numbers

If the handling unit is nested or contains serial numbers, you must confirm that the bin is empty for the zero stock check that is **triggered by the system**.

If the handling unit is nested or contains serial numbers, you cannot **manually** request a zero stock check as you confirm the transfer order.

Additional information, such as serial numbers, must be specified when a partial quantity is withdrawn from materials with serial numbers in an HU.

When you confirm a transfer order for a delivery, the pick-HUs are reported to the delivery, that is, the picking and packing can take place with the HUs in one step (pick-and-pack procedure).

 As soon as the delivery has the status *Picking complete,* the picking process is complete and can no longer be changed.

Picking of Handling Units for Production

Use

A production storage location can be an HU-managed storage location. If the production storage location is not WM-managed, the materials are staged for production by way of posting changes from one storage location to another. If you post goods issue, a goods movement is generated for a delivery (in this case, a posting change from one storage location to the storage location in the production supply area).

If the production storage location is WM-managed, staging occurs by way of transfer requirements. Alternatively, you can use deliveries for staging pick parts.

During component staging, the information in the handling units must be transferred to production in order to provide exact proof of the materials that were used. Using handling units for production supply greatly simplifies consumption posting.

Features

You can use handling units to reflect production staging for pick parts, crate parts and release order parts. You can use either deliveries or transfer requirements to stage pick parts, but you can only stage crate parts and release order parts using transfer requirements. If you stage using deliveries, you can post use of the pick parts via goods issue for deliveries.

Use the pick process for transfer requirements/deliveries to further process the transfer requirement/delivery that was created.

Supply to production using Warehouse Management

The following are the production-supply options that are generally available:

1. The production storage-location is not HU-managed

    Even when the standard storage location in the WM system is HU-managed, only individual materials can be managed and the HUs cannot be passed to production. Staging can occur via transfer requirements or via deliveries.

2. The production storage-location is HU-managed

- Consumption posting takes place through completion confirmation (verification) of the production order

    Consumption posting is initiated in production. Using a new function for entering goods issue, you can execute consumption posting for HUs created in WM and the transported HUs individually or with reference to the order. Staging can occur via transfer requirements or via deliveries.

    The HUs created in the WM system or the transported HUs are assigned to the production order so that the reference between the order and the HUs (with the components of this order) is retained.

    This scenario is only supported for pick parts since the reference to the order only exists for this type of material staging.

- Consumption posting for HUs does not take place through completion confirmation (verification) of the production order

Picking of Handling Units for Production

> The staged HU is to be posted *automatically* as consumption with the goods issue of the material staging delivery. In this case, you must use the delivery for material staging.

In the delivery, you can make a posting change or post goods issue (for an order, for example) to the production storage location after the transfer order has been confirmed. This can be done either manually or automatically. Only one movement is posted for each delivery, and the delivery is then completed.

If the delivery document is used as the picking proposal, the delivery is completed with the picking process.

If the HU is to be staged for an order, the delivery serves as the picking process, the goods issue posting and the consumption posting.

You can use the production scheduling profile to define how consumption posting should occur.

Inventory of Handling Units

The inventory of handling units usually refers to the outermost handling unit (HU). Since this outer HU corresponds to a storage unit, the inventory is executed in the WM system, as before. In the inventory process, the material quantities or the storage units are counted for each storage bin.

If differences are noted during inventory, a difference HU is created for the difference quantity in the differences storage type as the differences are picked from WM. The difference HU is the basis for clearing out stock in inventory management.

Currently, it is not possible to record differences for nested handling units or for handling units that contain serial numbers. It is also not possible for a handling unit that was previously not in this storage bin to be recorded for this storage bin during the inventory process. However, if differences do occur, the handling units must be unpacked and the contents of each individual handling unit must be redetermined in order to ensure that the differences that occurred can be clearly assigned to the HUs concerned. Use the *Create and Process Handling Units* function (transaction HU02) for these types of difference postings.

Recording storage units is only appropriate if you have standard palletization.

See also: Inventory [Ext.]

Radio Frequency

Use

Using the mobile data processing function, you can perform quick and error-free data transfer since the data entered through scanning the bar codes is posted synchronously in the SAP System.

The implementation of different types of "Radio Frequency terminals" makes it possible to execute the individual processes within Warehouse Management so that the processes are posted directly at the location of the physical warehouse activity.

You can perform activities such as putaway, stock transfer, and picking by scanning the respective bar code on the handling unit, without special knowledge of the SAP System.

Features

Radio frequency (RF) supports the following data entry options:

Picking and packing

This function allows you to pack goods during the picking process. If you select a handling unit for an outbound delivery, you can specify the packaging material that you want to use and pack the goods directly. The handling-unit identification is assigned to the transfer order for picking.

Packing and unpacking

The radio frequency function supports creation of handling units during goods receipt and in the warehouse. You can either create handling units without reference to a document or pack delivery items right in the delivery. Deliveries can then be packed for a shipment.

Loading and unloading

You can use loading and unloading functions to control the (un)loading of handling units from or onto different means of transport. Handling units that are to be (un)loaded can be identified by their corresponding shipment or delivery. You can find more information about a handling unit's loading status by using the inquiry function.

Handling unit details

You can use the corresponding inquiry function to call up detailed information about handling units. Information about materials or lower-level handling units appears. The Warehouse Management view provides information about the storage unit, storage type and storage bin.

Handling unit labels

The radio frequency solution also supports printing of handling unit labels. You can activate the *Print* button in the corresponding transactions by setting up your own user exit.

Goods Receipt and Goods Issue

Use

Besides the internal warehouse processes, the inbound and outbound processes are also supported in the mobile environment. This significantly increases the transparency of physical operations. From the time the goods have arrived into the warehouse, the staff can process them using radio frequency devices until they are loaded and shipped to the customer. Receiving and shipping information, including quantity, palletization, and storage data, can be modified or updated immediately and entered directly into the mobile terminals.

Prerequisites

Goods receipt (GR) and goods issue (GI) are based on an inbound or outbound delivery.

Features

You can identify the inbound and outbound deliveries for goods receipt and goods issue in different ways:

- By Delivery [Ext.]

- By Handling Unit [Ext.]

- By Staging Area [Ext.]

- By Shipment [Ext.]

- By Other Criteria, such as Material, Vendor / Ship-to party, Delivery Date, Reference, Door, or Service Agent [Ext.]

You can identify outbound deliveries also:

- By Group [Ext.]

Putaway

Use

The putaway execution in the mobile environment is based on a transfer order for putaway created in the Warehouse Management system or through a radio frequency function. Via radio frequency, you carry out the transfer order execution to confirm that the goods have been placed in the right place and that the materials are now available at the bin location. The system offers different ways of identifying the transfer order so that you can choose the most appropriate method.

Features

The following options exist for the identification of putaway transfer orders:

- Selected by Storage Unit [Ext.]: We recommend using this option for mixed pallets.

- Clustered [Ext.]

- Selected by Transfer Order [Ext.]

- System-Guided [Ext.]

- Selected by Delivery [Ext.]

Picking/Replenishment

Use

The picking execution in the mobile environment is based on transfer orders for picking, which are created in the Warehouse Management system or through a radio frequency function. Via radio frequency, you carry out transfer order execution to confirm the removal of the goods from the bin.

⚠️

Return transfer orders can only be confirmed in background mode.

Prerequisites

For the automatic creation of pick handling units (HU):

If you are working with handling unit-managed storage locations, you can define that pick-handling units are to be created and assigned automatically when you create transfer orders. In Customizing for *Handling Unit Management* choose *Basics →Warehouse Management →Define Control for Automatic Creation of Pick HUs*. In the *Packaging Materials* field you can define a default packaging material for a specific warehouse. It is assigned automatically when you create the pick HU.

If the entire material quantity is picked, propose a source handling unit as a destination handling unit. In Customizing for *Handling Unit Management,* choose *Basics →Warehouse Management → Define Storage* Type and *Define Movement Type*. Enter the value *1* in the *HU Picking Control* field. If you choose this Customizing option, the system does not support the reporting of differences.

Picking from an SU–managed bulk storage type:

A transfer order created for an SU-managed bulk storage type has no reference to specific storage unit numbers, because the system cannot identify which storage units are picked until they are physically removed from a storage bin. When you confirm the transfer order, you have to enter or scan the storage unit number(s) that were actually picked.

To confirm a transfer order for picking from an SU-managed bulk storage type through a radio frequency transaction, it is required that a transfer order item is created for each pallet. In Customizing for *Logistics Execution*, choose *Warehouse Management →Storage Units → Strategies →Define Bulk Storage Area →Define Storage Type Control*. Enter the value *Y* in the *Round off* field.

Features

The following options exist for the identification of pick transfer orders:

- [Picking: Selected by Transfer Order [Ext.]](#)
- [Picking: Selected by Delivery [Ext.]](#)
- [Picking/Replenishment: System-Guided [Ext.]](#)
- [Movement: Selected by Storage Unit [Ext.]](#)
- [Pick and Pack [Ext.]](#)

Picking/Replenishment

-

Posting Changes

Use

The confirmation order of the posting changes is initiated by the system. The user logs onto the system, and the system decides which posting change is to be confirmed.

Procedure

1. Choose *Internal Warehouse Processes* →*Posting Changes.*

2. The SAP System displays the first posting change to be confirmed. The system works in the background and decides on the sequence for the posting change processing.

3. Use *F1 Save* to save the source information to the database.

4. With *F4 Next*, you call up the destination information screen.

5. Use *F1 Save* to save the destination information and to proceed to the next posting change.

> It is not possible to skip a transfer order. You have to confirm them one after the other. After having confirmed all the posting changes available in the system, the following message appears. "The system could not find a transfer order for execution."

6. Use *F5 Detail* to call up further information on the posting change.

7. With *F6 Difference*, you report stock differences.

Pick and Pack by Delivery

Use

You can use this transaction to pick and pack material in one step. This can be useful, for example, if you need to pick several materials to be packed into one handling unit (HU). You can select an existing handling unit or create a new one. Identify the materials to be picked and packed by the delivery number.

Prerequisites

- To execute all packing functions using handling units, your system management must maintain all packaging-relevant parameters in the Implementation Guide (IMG) for *Handling Unit Management*.

    You can define a default packaging material [Page 186] for a warehouse.

- If you want to use the pick and pack function in a storage location that is not handling unit-managed, you must set the *Pick and Pack* indicator. After the transfer order is confirmed, the pick HU is assigned to the delivery. In Customizing for *Logistics Execution* choose *Warehouse Management* →*Interfaces* →*Shipping* →*Define Shipping Control* →*Shipping Control per Warehouse number.*

- Pick transfer orders are created with reference to deliveries.

Procedure

1. Choose *Outbound Process* or *Stock Transfer* →*Picking/Replenishment* →*Pick and Pack by Delivery.*

2. Enter the delivery number.

3. You have the following options for defining or selecting handling units:

    a) Enter a new handling unit number from the external number range.

    b) Enter or scan an existing handling unit number created through a radio frequency transaction.

    c) If you skip the handling unit number field, the system assigns a number. You can see the number by printing the handling unit label.

    Choose *Enter*. If you defined a default packaging material, it automatically entered. You can override it and enter a different packaging material.

4. Select *F4 Next* or *Enter* to proceed to the source information screen. The transfer order is selected according to the delivery.

5. Verify the data and select *F1 Save* to save the source information to the database. Then select *F4 Next* to proceed to the destination information screen.

6. Verify the data. Choose *F1 Save* to save the destination information to the database.

If you want to pack transfer order items of a different transfer order into the same handling unit, enter the number of the handling unit that you selected before. Proceed as described above.

If you cannot pack all the transfer order items into one handling unit, create a new handling unit and assign it to the same transfer order.

Additional Function

Print Handling Unit Label

- With *F6 Print*, you can print a label for the handling unit if you have created your own user exit. For more information about printing labels, see Printing Using the User Exit [Page 187].

Pack and Unpack

Use

The pack option [Ext.] gives you the option of packing material, handling units, or delivery items.

> <u>Non-assigned handling units</u>: It is possible to create handling units without reference to a document. Assign the material items and the packaging material to this handling unit. The packed material is posted to a storage location. The handling units created here are handling units with inventory management information. If the storage location is warehouse-managed, stock information will also be created.

> <u>Handling units assigned to a delivery</u>: Packing is part of delivery and shipment processing. During delivery processing, you can select the delivery items that you would like to pack and assign them to handling units. If the incoming goods are stored in a handling unit-managed storage location, it is mandatory to pack them.

> ➡️
>
>> In Customizing for *Handling Unit Management* you can create **packaging material** for a warehouse. Choose *Basics →Warehouse Management →Define Control for Automatic Creation of Pick HUs.*
>>
>> This material will be displayed automatically upon packing goods. You can also override it with a different packaging material.

The unpack option [Ext.] enables you to unpack handling units that are already packed. This can be necessary if you want to adjust a quantity of the packed material, for example.

Printing Using the User Exit

Use

The radio frequency solution supports the printing of different label types, for example, shipping labels and handling unit labels. You can use the print pushbuttons in the respective transaction by creating your own user exit function module, which is called from the LE_MOB_PRINT function module.

Prerequisites

To indicate that you created your own user exit in order to print labels, change the status field in the function LE_MOB_PRINT.

Procedure

1. Choose the function LE_MOB_PRINT.

2. Change the status field as mentioned above. If the user exit is not activated, you receive an error message upon using the print pushbuttons.

3. Two parameters, the ok_code and the parameter of the object to be printed, will be passed to the user exit function. The ok_code defines which pushbutton has been selected and the second parameter contains the object ID.

Handling Units in Inventory Management

Use

If you use the *Inventory Management (MM-IM)* component, you can use Inventory Management [Ext.] functions for goods movements involving handling units. The following goods movements are supported:

- Goods receipts

- Goods issues

- Transfer postings

- Stock transfers

> When you post a goods movement in a storage location that is subject to handling unit management, the system creates a delivery. It does not create a material document. The goods issue is not valuated until the delivery is posted in Shipping (also refer to Goods Issue [Ext.]).

Prerequisites

Setting Up and Cancelling the HU Requirement in a Storage Location

To set up or cancel the handling unit requirement in a storage location, all the stocks in the storage location have to be posted out, so that the stock balances are zero for all materials. This also applies to special stocks that are managed at storage location level. After the handling unit requirement is changed, you can re-post the stocks to the storage location. You can define the handling unit requirement in Customizing for Handling Unit Management, in the step *HU Requirement for Storage Locations and Default Values for Deliveries.*

Creating a Delivery

To create a delivery in the Shipping [Ext.] *(LE-SHP)* application component, the following data must be maintained in the R/3 System (also refer to Creating Outbound Deliveries [Ext.]):

- Plant data (*sales organization, distribution channel, shipping point, and division*)

- The sales and distribution data in the material master record

- The *Customer* field in the central vendor master record, as the vendor for shipping is also the customer

You can define the required plant data in Customizing for Handling Unit Management, in the step *HU Requirement for Storage Locations and Default Values for Deliveries.*

Features

You can use all the functions of Inventory Management, with the exception of the following:

- Physical inventory in Inventory Management does not support Handling Unit Management.

- When goods are received for a purchase order, you cannot subsequently enter a freight vendor that is different from the vendor. You can only enter a different freight vendor by changing the relevant purchase order.

- When goods are received for a purchase order, you cannot create a purchase order automatically, as goods movements in a storage location with handling unit requirement are carried out using deliveries.

- You cannot post a goods receipt with reference to an inbound delivery.

- The EAN128 functionality is not supported.

- Handling Unit Management is only supported for special stocks if the special stocks are managed at storage location level.

Partner Storage Location for Stock Transfers

If, in a storage location that is subject to handling unit management, you want to increase or decrease the stock of a handling unit by transferring stock, you can define another storage location as a partner storage location. The system then suggests this partner storage location any time you do not enter any other storage location. You configure this in Customizing for Handling Unit Management, in the step *HU Requirement for Storage Locations and Default Values for Deliveries.*

Serial Numbers in Handling Units

Use

If you are using the *Serial Numbers* application component (LO-MD-SN), you can assign materials with serial numbers [Ext.] in the items of handling units (HUs). If these handling units are used in deliveries or material documents, the serial numbers are copied automatically into the items of the subsequent documents.

HU requirement can be indicated for a storage location in Customizing. This means that only stocks that are in handling units can exist at this storage location. If a handling unit is at an HU-managed storage location, it has the movement status *Available with stock information.*

A serial number can only be found in a maximum of one handling unit with the movement status *Available with stock information* at any one time. The serial number can then only be reused via this handling unit.

A system status is set automatically in the serial number master record when the serial number is assigned to a handling unit at a HU-managed storage location. This status ensures that the serial number cannot be assigned again.

Prerequisites

In order to use serial numbers in handling units, the following prerequisites must be met:

- A serial number profile must have been created with the serialization procedure HUSL in Customizing for Serial Number Management.

    We also recommend that you set the stock check indicator for this serial number profile. This has the effect that when the handling unit is at an HU-managed storage location, a serial number can only be moved with the assigned handling unit. This prevents use of the serial number in material documents that do not have any reference to the handling unit.

- The serial number profile that allows serialization in handling units must be entered in the appropriate material master record.

- If you are working with movement types, batches or configurable materials, the valuation type, batch and configuration must already have been defined at the time of the serial number assignment in the handling unit.

Features

Creating and Changing Handling Units

You can specify materials with serial numbers in the items of handling units when you create handling units.

If the serial number usage of the serial number profile is set to *Optional* (02), you do not need to specify the full number of serial numbers. However, the full number of serial numbers must have been specified by the time the handling unit is used, meaning when a goods movement takes place.The system compares the number of assigned serial numbers with the quantity of items in the handling unit.

The system sets a system status of EHUZ automatically in the serial number master record when the serial number is assigned to a handling unit at an HU-managed storage location. If the serial

number is deleted from this handling unit (for example, repacked at a storage location without HU requirement) this system status is canceled. You can also see in the serial number history to which handling units the serial numbers are assigned.

You can also see in the handling unit which serial numbers are assigned. However, after deleting a serial number from the handling unit, it is no longer possible to see to which handling unit the serial number previously belonged.

Goods Issue of a Handling Unit

When you post the goods issue of a handling unit from a storage location with HU requirement, the serial numbers of the handling unit are copied into the material document. You cannot enter any serial numbers manually in the material document. The system cancels the system status EHUZ in the serial number master record. You can see with which handling unit goods issue was posted in the serial number history.

If, when posting the goods issue to a delivery, you make reference to a delivery in which you entered serial numbers manually when creating it, the serial numbers of the delivery are automatically overwritten with the serial numbers of the handling unit.

Goods Receipt of a Handling Unit

When you post the goods receipt of a handling unit to a storage location with HU requirement, the serial numbers of the handling unit are copied into the material document. In this case, you cannot enter any serial numbers manually in the material document. The system sets the system status EHUZ in the serial number master record.

For more information, see Goods Receipt and Putaway [Page 159].

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> The system supports serial numbers in handling units when posting goods receipts with reference to production orders. For more information, see Packing in Discrete Manufacturing [Page 119].

Repacking

You define a storage location without HU requirement for each storage location with HU requirement in Customizing for Handling Unit Management. This storage location is of significance when repacking handling units:

- Unpack

    When unpacking a handling unit, the system transfers automatically the goods from the storage location with HU requirement to the storage location without HU requirement. The system status EHUZ is deleted in the serial number master record.

    For more information, see Unpack [Page 33].

- Pack

    When packing a handling unit, the system transfers automatically the goods from the storage location without HU requirement to the storage location with HU requirement. The system status EHUZ is set in the serial number master record.

    For more information, see Pack [Page 27].

Serial Numbers in Handling Units

Stock transfer

When transferring a handling unit, the serial numbers of the handling unit are always copied to the material document. The following options are conceivable:

Transfer of	Transfer to	Effect in the serial number master record
Storage location with HU requirement	Storage location with HU requirement	The system status EHUZ remains set.
Storage location with HU requirement	Storage location without HU requirement	The EHUZ system status is deleted.
Storage location without HU requirement	Storage location with HU requirement	The EHUZ system status is set.
Storage location without HU requirement	Storage location without HU requirement	The system status EHUZ does not remain set.

Quality Inspection for Handling Units

Use

If you use the *Quality Management* (QM) component, you can perform quality inspections on handling units [Ext.] (HU) in Handling Unit Management [Ext.] at delivery item level. Inspection lots can also be automatically created, if the corresponding delivery item is packed. These inspection lots are then created with reference to the HU and always contain a current reference to the assigned HUs.

The quantities in inspection stock are managed directly using the HU and not using the inspection lot. This means that during goods movements the currently assigned HUs are determined using the inspection lot and can be transferred.

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> Transfer postings are then triggered directly also using the HU. The system also checks whether a posting is allowed from inspection stock. For example, while transfer postings within inspection stock are allowed, deliveries of HUs in inspection stock to customers is not permitted.

Prerequisites

In order to inspect handling units in QM, the following prerequisites must be fulfilled:

- In Customizing for *Handling Unit Management* (*Inventory Management*), the respective movement type is not deactivated for quality inspections. The indicator *QM not active* is **not** set.

- In the (respective) material master record, the corresponding inspection type is created and activated for the respective goods movement, and the indicator *Inspection for HU* must be set.

Features

Inspection Lot Creation

An inspection lot for the HU is automatically created for the following goods movements/events:

| Goods Movement/Event	Inspection Type	Comments
Packing in the inbound delivery	01	You use the field *Inspection for HU* in the *inspection setup* of the material master (Quality Management view) to determine whether the inspection lot is created at goods receipt or when the shipping notification is created.
Packing of finished product	04	

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> In general, a lot is not created at goods receipt in storage locations requiring HUs. During packing, a lot is only created if the indicator *Inspection for HU* is set in the *Inspection setup* of the material master (Quality Management view). As a result:

Handling Unit Management (LO-HU) ◼️⚡ **SAP AG**

Quality Inspection for Handling Units

- An inspection lot is never created, if the indicator *Inspection for HU* is not set in the *Inspection setup* of the material master (Quality Management view) for storage locations requiring HUs.

- In general, it is not possible to create the inspection lot at goods receipt in storage locations requiring HUs.

- If the indicator *Inspection for HU* is set, the lot is created during packing, independent of the HU-requirement.

- The inspection lot that is **not** stock-relevant includes all HU items that refer to the same material and batch. The inspection lot always refers to the entire delivery item quantity and if necessary also to several handling units.

Inspection Processing at Goods Receipt with Handling Unit Management
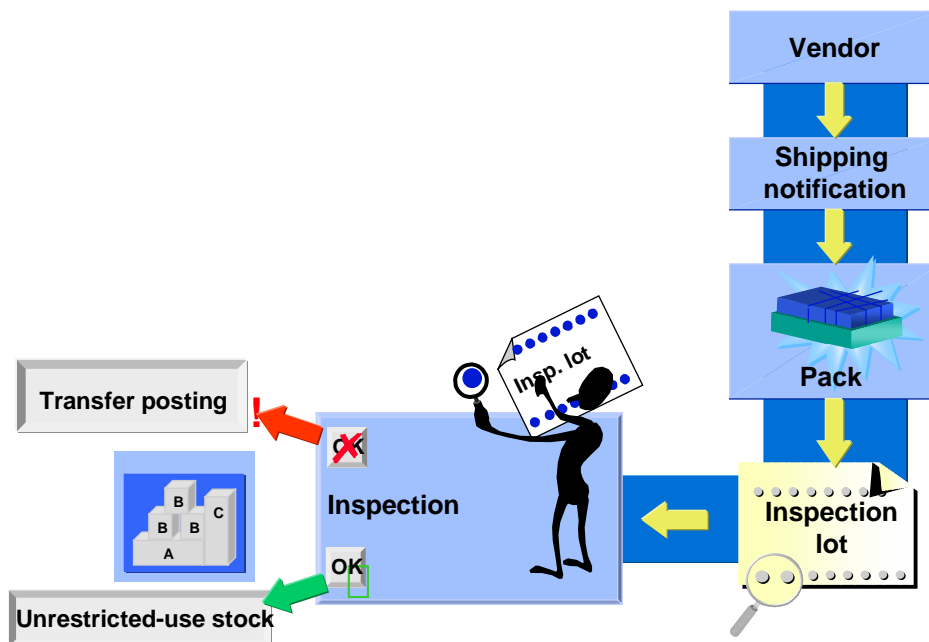
Inspection Lot Reference to Handling Unit
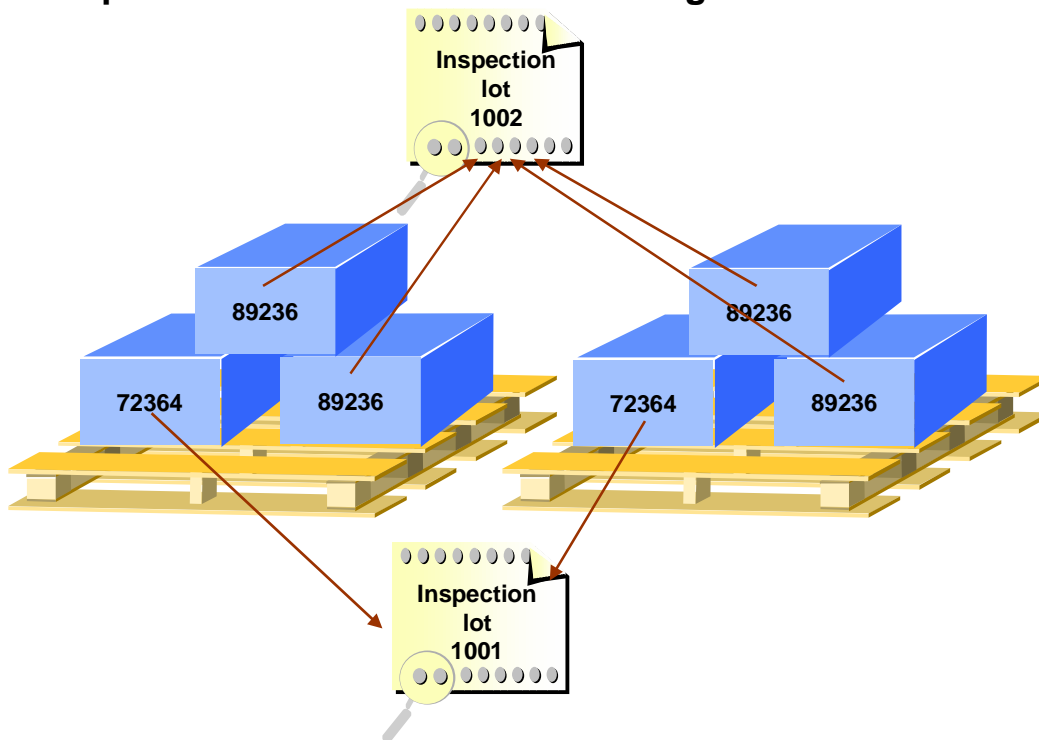
Movement Control for Handling Unit

If an inspection lot is assigned to a HU, the inspection lot controls the allowed movements for the HU. The following criteria are important for deciding whether postings are allowed:

- Status "Inspection lot in inspection/usage decision made"

- Usage decision code

- Quality score

> You define whether a particular movement is allowed in Customizing for *Handling Unit Management*.
>
> The indicator *Post to insp. stock.* in the material master controls whether there is a posting to inspection stock. This stock is managed using the handling unit.

Sample Calculation

Here it is important whether the respective result is assigned to a HU. If you do not use sample management, there is a reference between the inspection lot and all HUs, however you can no longer trace which result belongs to which HU.

The following options are available for sample calculation:

- On the basis of the total quantity of the same HU items (same material and same batch)

Quality Inspection for Handling Units

The unit of measure is specified in the inspection plan in the corresponding characteristics.

- On the basis of individual HU items

For this you require the QM component Sample Management [Ext.]. In the sample-drawing procedure [Ext.], the indicator *Physical-sample drawing by number of containers* must be set. The sample-drawing items are used for which the lot container corresponds to the lot container in the inspection lot. If there is no sample-drawing item with the lot container of the inspection lot, the system uses sample-drawing items without a lot container. The base unit of measure for the HU is used as the lot container. The indicator *Confirmation requirement* must also be set in the sample-drawing item. This means that for physical samples with inspection lots in HU management, the physical sample must also be assigned to the HU when the physical-sample drawing is confirmed.

Handling Unit and Inspection Lot with Physical Samples

PS = Primary sample
RS = Reserve sample
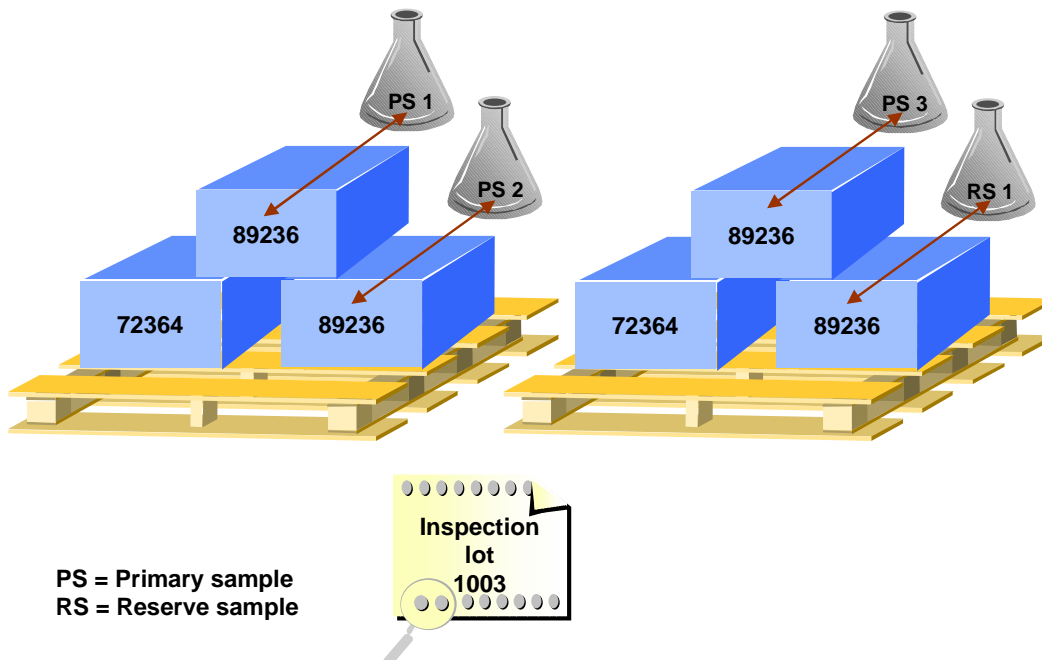
Results Recording

During results recording for a **single HU item**, use the *Sample Management* component and record results for a physical sample. You can then use the physical sample to assign the results to the HU.

Usage Decision

Since the stock is managed using the HU, the system must dynamically determine which quantities of a material are in the HU and its location when you make the usage decision.

Moreover, the system checks which postings are allowed when HUs or Warehouse Management are used. For example, you cannot trigger a return posting to the vendor, if the goods receipt has not yet been posted. Corresponding information is displayed in a list for each line of the HU.

You can then specify for each handling unit where the stock is posted. The total quantity of a HU item is always posted. If you also want to post partial quantities, you must pack/unpack the corresponding HU either before or after the usage decision is made to update the stock correspondingly.

See also:

Handling Unit Management [Page 8]

Printing and Communication for Handling Units

EAN128

Use

Due to the increased global networking of manufacturers, forwarding agents, merchants, and consumers, the communication between all those involved in the supply chain is becoming more and more important. A common numbering standard that is defined by the international standardization organizations (UCC, EAN International) forms the basis for efficient processing in this field.

These standards include the UCC/EAN128 and one of its sub-components, the Serial Shipping Container Code (SSCC), which can be used to identify the handling units that were shipped. Within the supply chain, handling unit data can be transferred from one section to the next, for example, through EDI with EDIFACT or EANCOM standards using the UCC/EAN128 and the SSCC.

You can have the SSCCs assigned as unique numbers as the handling unit is created. These numbers then serve to identify and track the handling units.

The SSCC and other parts of the UCC/EAN128 can be combined to form a valid concatenated bar code or they can be extracted from such a bar code. The SSCC is created from its own number range object.

Integration

The EAN128 numbering system is integrated in the packing function and the SSCC bar code can be read whenever there is a delivery split.

Prerequisites

Before you begin working with the EAN128 functions, you must acquire the basic number *ILN2* (ILN="international location number") from the UCC or EAN International.

Features

When you create a handling unit, you can have an SSCC assigned automatically. This assignment is controlled by the packaging material type. The number range used in this process is determined according to the following logic:

1. Plant and storage location

2. Warehouse number

3. Plant

4. Client

The SSCC can also be assigned externally by the user, in which case it is checked by the system against an external number range that is found using the same logic.

At the same levels, the basic number of the ILN 2 that is required for generating the SSCC is specified.

You can also use the *Output* section of Handling Units Customizing to print an EAN128 label [Page 201]. The structure of the bar code is controlled using a profile. Using this profile, the system determines how many bar code lines are to be printed and where an application identifier is to appear. The profile is assigned to an output type.

EAN128

You can define different profiles for the different label types. These label types include: lower-level HU (S - single label), HU containing only one material (M - main label), and HU containing different materials (G - group label). You can control the form from the standard output types in Customizing because the form and the profile are closely related.

Label Printing for EAN128

Use

The EAN128 label is used for identifying a handling unit. It describes the type and contents of a handling unit, and provides this information both in text form and as a bar code. This information:

- Uniquely identifies the handling unit

- Describes the contents of the handling unit

> In the **supply chain**, the EAN128 label is of central importance for logistics. The vendor sends a shipping notification via EDI to the customer. In particular, information on the handling units is transmitted here. If the handling units are marked with an EAN128 label, the customer can check the respective materials in goods receipt and perform this check more efficiently by using scanners. The EAN128 label thus serves as identification until the handling unit is repacked in the warehouse or used in production. The identification may even retain its validity until the handling unit leaves the warehouse again as an entire unit.

In contrast to the material label [Ext.] in the car industry, the contents and appearance of the EAN128 label is not standardized. The international standardization organizations have only defined, as yet, a framework proposal that gives each label manufacturer a relative degree of choice in label definition. The only convention that all organizations adhere to is the Serial Shipping Container Code (SSCC) that is used for unique identification of a handling unit.

In most countries, there is a separate subsidiary organization of EAN International that is responsible for defining the standard. In the US, this organization is called the Uniform Code Council (UCC), and in Germany it is the Central Office for Co-organization (CCG).

Prerequisites

First, make the following settings for label printing:

- Assign the HU standard for the output procedure to the packaging material type.

  The output procedure HU standard contains the output type E128.

- For automatic determination, maintain the condition records for output control within the master data of the handling units.

  Use processing time 3 (explicit request).

- Maintain a bar code profile that corresponds to the content of your EAN128 label and defines the sequence of data in the EAN128 bar code.

- Assign the bar code profile to output type E128. Depending on the contents of the handling unit, you have the different label types listed in the following table. You can assign different profiles (and thus also EAN128 label forms) to these types.

HU is:	**Contains only one material**	
A lower-level HU	**Yes**	**No**
Yes	M	G

Label Printing for EAN128

No	S	G

     For automatic determination, maintain the condition records for output control.

Afterwards, label printing can take place using the *Output from Handling Units* transaction (VL74), which you can use to select all the handling units for deliveries or shipments. If you want to reprint a single label, you can also use this transaction to select individual handling units.

Features

The EAN128 label is printed using output control. The condition technique that output control is based on allows for considerable flexibility in determining:

- Printout   (what)

- Layout   (how)

- Printer   (where)

The EAN128 label is depicted in the system by output type E128 within the Handling Units application (V6). In the standard system, the output type is linked with access sequence 0002, which in turn links to a condition table with the key for ship-to party and packaging material.

Due to the lack of a standardized form, SAP supplies the following sample form that only contains the SSCC.

- LE_EAN128_SSCC00

     This sample form only functions on bar-code laser printers that are equipped with a barcode Subscriber Identity Module (SIM).

If you want to adapt or change the sample form, or use it as a basis for other labels, you can do so in the respective project as described under the Adapting Label Layout [Page 204] section.

The layout module can be assigned to the output type and the transmission medium, or assigned directly in the condition record, but the assignment in the condition record has a higher priority.

Printer determination using the shipping point

You can also define a printer within the condition record. Since the printer, and thus also the location, is generally defined and determined using organizational units, the printer can also be determined directly through the shipping point. In this case, there is one print parameter for each output type. In the standard system, print parameter 5 is assigned to output type E128.

If the type and size of the label are uniform (for example, DIN A5, adhesive label) and only the layout varies, maintain one **label** printer **for each** shipping point under *Sales and Distribution* → *Master data* →*Others* →*Print parameters* for output type E128.

If the layout varies also, and therefore different printers are required, you need to perform the following:

1. Define an extended condition table

    (for example, shipping point, ship-to party, and packaging material)

2. Assign the extended condition table to the output type E128 using a new access sequence.

3. Maintain the printer within the new condition records.

Adapting the Label Layout

Prerequisites

SAPscript currently does not support a printer driver for special label printers. Most of the label printers available on the market today have their own special control languages that are not supported by the printer drivers available in the SAP standard system. However, you can call up such label printers through SAPscript if certain prerequisites are fulfilled. The method used here is described below and followed by concrete examples:

> You will find more information in SAPNet under the following notes:

> 0008928   List of supported printers / device types

> 0043423   Modification of a device type for label printing

> 0136846   Label printing using Avery Dennison TTX 450

> 0137069   Label printing with UBI EasyCoder 501 XP

> 0137372   Label printing with Printronix T3204

> 0137431   Label printing with CAB Apollo 2

> 0137614   Label printing with TEC B-572-QP

Process Flow

Application programs that use SAPscript normally use SAPscript (form definition) to control the layout of the print output and to replace variables in the form with current field values from the print program. Since there are currently no printer drivers for label printing, the layout for such labels cannot be controlled through SAPscript, but variable replacement can. The way to achieve full label printing on these special printers using an external label design program and SAPscript is described below:

1. Label design with a PC program

    You use an external PC program (Windows design program) to create the label for the required printer. The complete layout of the label and the required fields that the SAP System later fills with data are defined using this program.

2. Downloading the print data

    The design program must allow the download of the print file that is normally sent to the printer. This file contains the printer commands used for printing the label on the special printer. Only the current variable values need to be replaced later on.

3. Uploading the print file into a SAPscript form

    The print file that was just created is uploaded into a SAPscript form. For this purpose, the system uses the upload function available in the SAPscript editor, uploads the file, for example, into the standard text editor (Transaction SO10), and then copies the file using the standard text copy functions into the MAIN window of the SAPscript form to be used. The format of the file to be uploaded must be "ASCII", that is, it can only contain printable characters as well as carriage return, linefeed, and possibly also form feed. In addition,

the file must not contain more than 80 characters per line, since otherwise inappropriate new lines will be created during the upload.

If the print file contains additional binary control characters (for example, ESCAPE, 0x1B), you cannot use the method described here.

4. Inserting SAPscript variables into the print file

    You must now enter variables of the print program (program symbols) in the SAPscript form in those places where variable data is to appear in the label. These variables are supplied at runtime with the current field values from the application program.

5. Adapting the form

    With most label printers, the SAPscript form must also be adapted, that is, the MAIN window must be enlarged to the complete page size and all other windows must be deleted. Also, the MAIN window should, in most cases, only contain a single text element, namely the text just uploaded with the printer commands. To reduce new line breaks to a minimum, you can set the script type in the form header to COURIER 6 point.

6. Creation/upload of a suitable R/3 device type

    As a rule, you must use a special device type (a variant of the device type ASCIIPRI) to ensure that the form will be printed correctly on a label printer. For the examples explained below, SAP will provide these device types on the ftp servers sapservX, and will also deliver them in the SAP standard system. To test the procedure with other label printers, you can normally use the device type ASCIIPRI.

7. Definition of an output device

    As a last step, you must call up transaction SPAD to set up an output device (printer) in R/3 to which the special device type or ASCIIPRI is assigned. The application program must now use this output device to print out the labels. The label printer itself is connected up to the SAP System using one of the standard available connection types in SAP R/3 (local print to application server / remote print via lpd server / remote print via Windows PC and SAPlpd/Frontend print).

    The following notes in SAPNet describe in detail the procedure for the printer model given in each case. This procedure can probably be executed in the same way for other, similar label printers of the same manufacturer; this depends only on the support given by the PC design program for the required printer.

    136846   Avery TTX 450

    137431   CAB Apollo 2

    137069   UBI Easycoder 501 XP

    137372   Printronix T 3204

    137614   TEC B-572-QP

Evaluation and Analysis

Handling Unit Monitor

Use

You can use an evaluation report to issue a list of handling units. By entering selection criteria, you can limit the list of handling units and then display the list using the ABAP List Viewer (ALV) [Ext.]. In the list itself, you can process the selected handling units or make posting changes as required.

Integration

Depending on the application, you can find the handling unit overview from the SAP menu as follows:

- From the SAP menu, select *Logistics →Central Functions →Handling Unit Management → Handling Unit Monitor.*

- In the SAP menu, select *Logistics →Materials Management →Material Master →Other → Stock Overview*. Display a material and select *Environment →Handling unit*

- From the SAP menu, select *Logistics →Production →Handling Unit Management →Repetitive Manufacturing →Backflush →HU Management →Handling Unit Monitor.*

Features

You can limit the search for handling units by using the following selection criteria:

- HU general data

- Contents

- Assignment to objects

- User

- Freely-defined fields

If you enter a material or batch, for example, in the selection criteria for the contents of a handling unit, the system will display the highest-level handling unit with its individual items. You can then make posting changes within the ABAP list viewer. If you only want to display the higher-level handling unit for the selected contents, you must select the *Search only in the next higher-level HU (quick search)* option in the *Contents* section. However, if you choose this option, you cannot make any posting changes within the ABAP list viewer.

The following functions are possible in the list that appears:

- Displaying handling units

- Editing handling units

- Deleting handling units

- Making posting changes for the stock category for all materials in a handling unit (from blocked to unlimited-use, for example)

- Making posting changes for materials of a handling unit from one storage location to another

- Displaying a handling unit's history

Handling Unit Monitor

- Displaying change documents for a handling unit

- Making status changes (block/unblock a handling unit)

List display

The following options are available for displaying the selected handling units:

1. Handling units with cumulated material items

     In the dual-level ABAP List Viewer, the (highest-level) handling unit appears in the header line and the material items are cumulated according to material in the material lines.

2. Handling unit hierarchy with totals and auxiliary packaging materials

     In the header line for each HU, the system displays which material the HU contains and in what quantities (if the HU only contains one material). If the handling unit contains more than one material, the word MIX appears instead. Expand an HU in order to display the contents of it. Each lower-level HU and its contents is displayed separately. This list includes subtotals that group together similar HUs or HUs that are similar in some aspects. These subtotals are marked in a different color than the lines that represent the handling units. You can record in which sequence these subtotals are to be created by using *Subtotals...* in the ALV. For example, you could define the following sequence: Amount (1)/Material number (2)/Load carrier (3)/ Cumulated quantity of material to be packed (4). This setting results in the following:

   - As soon as a handling unit whose quantity of material to be packed (4) is different from that of the previous handling units appears in the HU list, the first subtotal is calculated (*). This first subtotal indicates the amount of grouped HUs up to this point.

   - As soon as a handling unit whose load carrier (3) is different from that of the previous handling units appears in the HU list, the second subtotal is calculated (**). This second subtotal indicates the number of HUs that were grouped up to this point.

   - As soon as a handling unit whose material (2) is different from that of the previous handling units appears in the HU list, the third subtotal is calculated (***). This third subtotal indicates the amount of grouped HUs up to this point.

   - At the end of the list, the total amount (4) of HUs is taken as the fourth subtotal (****).

     For example, if the material changes first (third subtotal), but the load carrier does not (second subtotal), the second subtotal is still calculated.

3. Single-level list of handling units

     The single-level ABAP List Viewer display is suitable for displaying handling units that contain only one material. The material and quantity are displayed for each handling unit. For handling units containing more than one material, the word MIX appears. You cannot make any posting changes in this display format.